PRELIMINARY DRAFT

ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED CLOSURE OF LOS ANGELES AFB, CALIFORNIA AND RELOCATION OF SPACE SYSTEMS DIVISION

UNITED STATES AIR FORCE
MAY 1990

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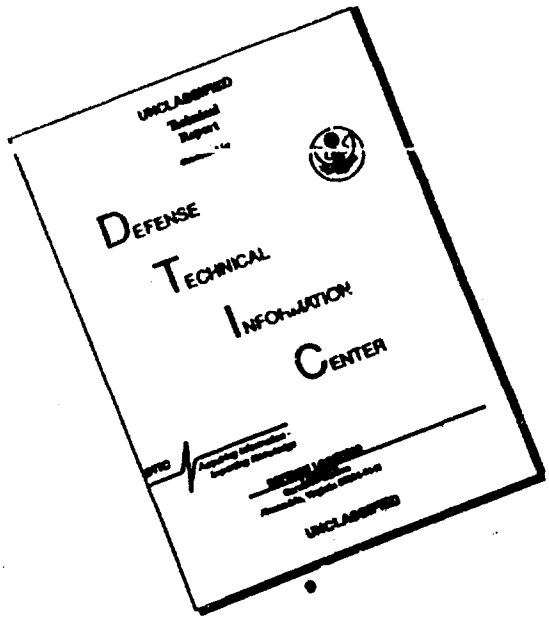

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PRELIMINARY DRAFT

ENVIRONMENTAL IMPACT STATEMENT

FOR PROPOSED CLOSURE OF

LOS ANGELES AIR FORCE BASE, CALIFORNIA

AND

RELOCATION OF SPACE SYSTEMS DIVISION

United States Air Force

May 1990

BCL-CS
05/21/90

COVER SHEET
DRAFT ENVIRONMENTAL IMPACT STATEMENT
PROPOSED CLOSURE OF LOS ANGELES AIR FORCE BASE, CALIFORNIA and relocation of SSD.

a. **Responsible Agency:** U.S. Air Force

b. **Proposed Action:** Closure of Los Angeles Air Force Base (AFB), California, and Relocation of Headquarters Space Systems Division (HQ SSD) and appropriate support units.

c. **Written comments and inquiries on this document should be received by TBS and directed to:** Director of Environmental Planning, AFRCE-BMS/DEP, Norton AFB, San Bernardino, California 92409-6448.

d. **Designation:** Draft Environmental Impact Statement (DEIS)

e. **Abstract:** During the late summer of 1989, the Air Force began a thorough review of its force structure, property, and facility requirements needed to support national security policy and future fiscal realities. As a result of this review process, the Secretary of Defense, on 29 January 1990, announced his proposal to close or realign a number of military bases. Los Angeles AFB, California, has been identified as a candidate for closure in conjunction with the proposed relocation of HQ SSD and appropriate supporting units to Vandenberg AFB, California. Prior to closure decisions, studies of strategic, operational, budgetary, fiscal, environmental, and local economic consequences are required under Title 10 USC 2687. In accordance with the National Environmental Policy Act (NEPA), the results of the environmental study are described in this DEIS, which includes analyses of community setting, land use and aesthetics, transportation, utilities, hazardous materials, geology and soils, water resources, air quality, noise, biological resources, and cultural and paleontological resources. As alternatives, the DEIS also analyzes the impacts of relocating HQ SSD and its support units to March AFB, California; Falcon and Peterson AFBs, Colorado; or Kirtland AFB, New Mexico. Additionally, the DEIS considers the environmental impacts associated with the relocation of only portions of HQ SSD to Vandenberg, March, Falcon, Peterson, or Kirtland AFBs, as well as the no action alternative. If a decision is made to close Los Angeles AFB, a second EIS will be prepared to cover the final disposition/reuse of the excess property. After base closure, but prior to final decisions on reuse, a caretaker force would be established to provide maintenance of buildings, grounds, and essential utility systems, and to restrict access to the base.

rewrite to reflect relocation was alternatives

omit

Falcon and Peterson AFBs,

CONTENTS

SUMMARY

PURPOSE AND NEED

The Air Force in late summer 1989 began a thorough review of its force structure, property, and facility requirements needed to support national security policy and future fiscal realities. As a result of this review process, the Secretary of Defense, on 29 January 1990, announced his proposal to close or realign a number of military bases. Los Angeles Air Force Base (AFB), California, the host base for the Air Force Systems Command's Space Systems Division (SSD-LA), and SSD's Ballistic Missile Organization (BMO) in San Bernardino, California (SSD-SB) have been identified as candidates for closure. In addition, the relocation of SSD and appropriate supporting units to selected Air Force installations was also recommeded for study. Potential SSD relocation bases include Vandenberg AFB, California; March AFB, California; Peterson AFB/Falcon AFB, Colorado; and Kirtland AFB, New Mexico.

Prior to closure decisions, studies of strategic, operational, budgetary, fiscal, environmental, and local economic consequences are required under Title 10 USC 2687. In accordance with the National Environmental Policy Act (NEPA), the results of the environmental study are described in this Draft Environmental Impact Statement (DEIS).

As alternatives, the DEIS also analyzes the impacts of a partial relocation of SSD operations (ranging from 1,000 to 7,500 personnel) to Vandenberg AFB, March AFB, Peterson AFB/Falcon AFB, and/or Kirtland AFB. Partial relocation of SSD functional units could result in a partial closure of some areas of Los Angeles AFB, and complete or no closure of BMO facilities in San Bernardino.

If a decision is made to close Los Angeles AFB, a second EIS will be prepared to cover the final disposition/reuse of the excess property. After base closure, but prior to final decisions on reuse, a caretaker force would be established to provide maintenance of buildings, grounds, and essential utility systems, and to restrict access to the base.

SCOPE OF STUDY

The Air Force initiated the scoping process on 9 February 1990 with the publication in the *Federal Register* of Notices of Intent (NOI) to prepare an EIS to address impacts of the proposed closure of Los Angeles AFB and relocation of Space Systems Division. Public scoping meetings were held between 14 March 1990 and 24 May 1990 in El Segundo, California; Colorado Springs, Colorado; Lompoc, California; Riverside, California; Albuquerque, New Mexico; and San Bernardino, California. These meetings were conducted to solicit public comments and to identify environmental concerns related to the possible closure actions. Comments were also invited on the environmental issues that should be analyzed in subsequent studies on the final disposition/reuse of base properties. The scope of study for this EIS was based on the results of the public scoping process, discussions with public officials, past experience with programs of a similar nature, and the requirements of the NEPA.

omit

According to the Council on Environmental Quality regulations for implementing NEPA, "The NEPA process is intended to help public officials make decisions that are based on understanding environmental consequences, and take actions that protect, restore, and enhance the environment" (40 CFR 1500.1). The focus of this EIS is, therefore, on evaluation of impacts to the environment associated with the proposed action and its alternatives. In order to provide the context in which impacts to the environment may occur, discussions of potential changes to local community settings, land use and aesthetics, transportation, and community and public utility services are included in the EIS. In addition, issues related to current and future management of hazardous materials are discussed. Impacts to the natural or physical environment are evaluated for the following resource categories: geology and soils, water resources, air quality, noise, biological resources, and cultural and paleontological resources. These impacts may occur as a direct result of base closure or relocation actions or as an indirect result of changes to the community or changes in hazardous material management practices.

~~CHANGES TO THE LOCAL COMMUNITIES~~

AFFECTED COMMUNITIES:

list bases

~~Base closure and relocation actions would cause~~ changes in the local support ~~communities.~~

LOS ANGELES AFB, CALIFORNIA

~~*Community Setting.*~~ For the Proposed Action, it is estimated that the total closure of Los Angeles AFB would result in a reduction of approximately $460 million in personal income and about $1,128 million in total spending. These changes are expected to result in the loss of a total of approximately 15,800 direct and secondary jobs. Total projected population outmigration would be about 14,000.

It has been estimated that the housing vacancy rate in the communities surrounding Los Angeles AFB would increase from about 3.4 percent to 3.5 percent. Los Angeles County Schools could lose about 1,350 students, a very small decrease in total enrollment.

For the alternative action involving partial closure of Los Angeles AFB, these effects would be proportionally reduced.

Land Use and Aesthetics. Although housing vacancies could increase slightly, the current rate of growth in the area would quickly offset these changes. Local land use patterns and zoning policies would not change. Any land use changes would probably be in the context of reuse and development plans.

Transportation. Vehicle traffic in the vicinity of the base gates would decrease by about 3 percent during peak traffic hours and less than 1 percent overall. This would contribute to slight reductions in noise levels and air pollution emissions on and near the base.

Utilities. Base closure would also decrease demand for potable water, wastewater, natural gas, and electrical utilities. These changes are not expected to have any significant effects of local air or water quality.

BALLISTIC MISSILE ORGANIZATION FACILITIES SAN BERNARDINO, CALIFORNIA

TBS

VANDENBERG AFB, CALIFORNIA

Community Setting. It is estimated that the total relocation of SSD-LA and SSD-SB functional units to Vandenberg AFB, located in Santa Barbara County, would result in an increase in employment of approximately 14,600, including 7,600 direct and 7,000 secondary jobs for the proposed action. Personal income in the county is projected to increase by approximately $380 million, and total spending by about $970 million. Total projected population inmigration would be approximately 17,100 over the three year period 1993 to 1996. For the alternative action, involving partial relocation of SSD activities, these effects would be proportionally reduced.

For the proposed action, approximately 5,500 offbase housing units would be required to support SSD military and civilian personnel during program operations. This demand represents about four percent of the housing stock in Santa Barbara County. With a current vacancy rate of 3 percent, substantial new residential development would be required in the Lompoc and Santa Maria area.

As a result of the proposed action, public school enrollments in Santa Barbara County would increase by an estimated 2409 ~~3,400~~ students. This represents an increase of 6 percent over baseline projections, and would require additional facilities.

Land Use and Aesthetics. The proposed action would result in residential development requirements in Lompoc and Santa Maria that are considerably beyond their planned growth rate. Additional developable residential land requirements may necessitate modification of existing general plans.

Transportation. For the proposed action, vehicle traffic in the vicinity of the base gates would increase by about 50 percent during peak traffic hours and about 10 percent overall. This would contribute to considerable increases in noise levels and air pollution emissions in the vicinity of the base.

Utilities. The proposed total relocation to Vandenberg AFB would increase demand for potable water, wastewater, natural gas, and electrical utilities. Existing and planned facility capacities can accommodate these service increases. The current shortage of adequate potable water supplies could affect the rate of development of new residential areas near the base. These changes are not expected to have any significant effects on local air or water quality.

MARCH AFB, CALIFORNIA

Community Setting. It is estimated that the total relocation of SSD-LA and SSD-SB functional units to March AFB, located in Riverside County, would result in an increase in employment of approximately 15,200, inluding 7,600 direct and 7,600 secondary jobs for the proposed action.

Personal income in the county is projected to increase by approximately $385 million, and total spending by about $977 million. Total projected population inmigration would be approximately 13,900 over the three year period 1993 to 1996. For the alternative action, involving partial relocation of SSD activities, these effects would be proportionally reduced.

For the proposed action, approximately 5,900 offbase housing units would be required to support SSD military and civilian personnel during program operations. This demand could be accommodated by existing vacancies and planned development in Riverside and San Bernardino counties.

As a result of the proposed action, public school enrollments in Riverside County would increase by an estimated 2,000 students. This represents an increase of 0.5 percent over baseline projections, and would be accommodated by existing and planned facilities.

Land Use and Aesthetics. No modifications of current or planned land use would be required for the proposed action.

Transportation. For the proposed action, vehicle traffic in the vicinity of the base gates would increase by about 50 percent during peak traffic hours and about 10 percent overall. This would contribute to considerable increases in noise levels and air pollution emissions in the vicinity of the base.

Utilities. The proposed total relocation to March AFB would increase demand for potable water, wastewater, natural gas, and electrical utilities. Existing and planned facility capacities can accommodate these increases. These changes are not expected to have any significant effects on local air or water quality.

PETERSON AFB/FALCON AFB, COLORADO

Community Setting. It is estimated that the total relocation of SSD-LA and SSD-SB functional units to Peterson AFB/Falcon AFB, located in El Paso County, would result in an increase in employment of approximately 14,200, including 7,600 direct and 6,600 secondary jobs for the proposed action. Personal income in the county is projected to increase by approximately $360 million, and total spending by about $800 million. Total projected population inmigration would be approximately 17,100 over the three year period 1993 to 1996. For the alternative action, involving partial relocation of SSD activities, these effects would be proportionally reduced.

For the proposed action, approximately 6,318 offbase housing units would be required to support SSD military and civilian personnel during program operations. This demand could be accommodated by existing vacancies and planned development in the Colorado Springs area.

As a result of the proposed action, public school enrollments in El Paso County would increase by an estimated 2,400 students. Existing and planned facilities within the school system will be able to accommodate this increase.

Land Use. No modifications of current or planned land use would be required for the proposed action.

Transportation. For the proposed action, vehicle traffic in the vicinity of the base gates would increase by about 50 percent during peak traffic hours and about 10 percent overall. This would contribute to considerable increases in noise levels and air pollution emissions in the vicinity of the base.

Utilities. The proposed total relocation to Peterson AFB/Falcon AFB would increase demand for potable water, wastewater, natural gas, and electrical utilities. Existing and planned facility capacities can accommodate these service increases. These changes are not expected to have any significant effects on local air or water quality.

KIRTLAND AFB, NEW MEXICO

Community Setting. It is estimated that the total relocation of SSD-LA and SSD-SB functional units to Kirtland AFB, located in Bernalillo County, would result in an increase in employment of approximately 14,100, inluding 7,600 direct and 6,500 secondary jobs for the proposed action. Personal income in the county is projected to increase by approximately $360 million, and total spending by about $600 million. Total projected population inmigration would be approximately 17,100 over the three year period 1993 to 1996. For the alternative action, involving partial relocation of SSD activities, these effects would be proportionally reduced.

For the proposed action, approximately 6,000 permanent housing units would be required offbase to support SSD military and civilian personnel during program operations. This demand can be accommodated by existing vacant units and planned development in the Albuquerque area.

As a result of the proposed action, public school enrollments in Bernalillo County would increase by an estimated 2,400 students. Existing school facilities would be able to accommodate these additional students.

Land Use. No modifications of current or planned land use would be required for the proposed action.

Transportation. For the proposed action, vehicle traffic in the vicinity of the base gates would increase by about 50 percent during peak traffic hours and about 10 percent overall. This would contribute to considerable increases in noise levels and air pollution emissions in the vicinity of the base.

Utilities. The proposed total relocation to Kirtland AFB would increase demand for potable water, wastewater, natural gas, and electrical utilities. Existing and planned facility capacities can accommodate these service increases. These changes are not expected to have any significant effects on local air or water quality.

HAZARDOUS MATERIALS

All hazardous materials and waste used or generated by Los Angeles AFB would be properly disposed of and all residual contamination would be remediated in accordance with an Environmental Protection Agency Resource Conservation and Recovery Act-approved closure plan.

The hazardous waste management plan developed at potential relocation bases would be applied to all hazardous materials and waste used or generated by SSD activities.

IMPACTS TO THE PHYSICAL ENVIRONMENT

Impacts to the physical environment associated with closure of Los Angeles AFB or SSD-San Bernardino are summarized in Table S1. Impacts to the physical environment associated with relocation actions are summarized in Table S2. Under the no action alternative, both Los Angeles AFB and SSD-San Bernardino would remain active. This alternative would not alleviate growing fiscal constraints or allow the necessary streamlining of strategic forces. The no action alternative is not expected to result in any significant environmental consequences.

Table S1

Impacts to the Physical Environment Associated with Base Closure Actions

Resource Category	Impacts of Base Closure: Los Angeles AFB	Impacts of Base Closure: Space Systems Division-San Bernardino
Geology and Soils	• No effect on geology or available mineral resources. • Future soil contamination and erosion would be avoided.	
Water Resources	• Slight decreased demand on local water supply. • Reduced potential for onbase surface water and groundwater contamination from future hazardous waste handling.	
Air Quality	• Reduced emissions from motor vehicles and laboratory operations would result in negligible reductions of various contaminants in Los Angeles County.	
Noise	• Slightly reduced traffic noise.	
Biological Resources	• No effects on vegetation or wildlife. • No threatened or endangered species would be adversely affected.	
Cultural and Paleontological Resources	• The status of historic structures at Fort MacArthur would not be affected by the action. • No prehistoric or paleontological resources would be affected.	

Table S2

Impacts to the Physical Environment Associated with Relocation Actions

Resource Category	Impacts of Relocation	
	Vandenberg AFB	**Kirtland AFB**
Geology and Soils	• No significant geologic hazards are known to occur. • Soil losses from erosion could be significant if appropriate mitigation measures are not taken.	• No significant geologic hazards are known to occur. • Soil losses from erosion could be significant if appropriate mitigation measures are not taken.
Water Resources	• Impacts to groundwater resources would be significant unless the Coastal Canal from the California Aqueduct is constructed. • No surface water features would be affected.	• Groundwater resources would not be significantly affected. • No surface water features would be affected.
Air Quality	• Impacts to air quality are not considered significant.	• Short-term construction-related air quality impacts are not considered significant. • Long-term CO emissions are considered significant because of the nonattainment status of the area.
Noise	• Noise impacts from construction activities and increased vehicular traffic are not considered significant.	• Short-term construction noise impacts are considered significant at Sites 1A and 1B because of the proximity to residential areas, but not significant at Site 2.
Biological Resources	• Impacts to vegetation would not be significant unless housing site 2 is selected. If housing site 2 is selected, 155 acres of Burton Mesa chaparral, a sage plant community, would be disturbed. • No significant impacts to wildlife or wetlands are expected.	• Preliminary studies indicate that impacts to vegetation and wildlife will not be significant; ~~however, additional field studies will be conducted to confirm this conclusion.~~ • No wetlands are known to exist on Sites 1A, 1B, or 1C; some may exist on Site 2.
Cultural and Paleontological Resources	• No significant impacts to cultural or paleontological resources are anticipated.	• Some NRHP-eligible prehistoric sites may be affected at Site 1A. • Cultural resource impacts are not expected to be significant at Sites 1B or 2. • Some important paleontological features occur in the area.

Table S2
(continued)

Impacts to the Physical Environment
Associated with Relocation Actions

Resource Category	Impacts of Relocation	
	March AFB	**Peterson AFB/ Falcon AFB**
Geology and Soils	• Soil loss from erosion during the construction period could be significant if appropriate mitigation measures are not taken. • No significant geologic hazards are known to occur.	• Soil loss from erosion during the construction period could be significant if appropriate mitigation measures are not taken. • No significant geologic hazards are known to occur.
Water Resources	• No significant impacts to groundwater or surface water are anticipated.	• Some impact to overdraft of groundwater resources is anticipated. • No significant surface water impacts are anticipated.
Air Quality	• Short-term construction-related impacts are not considered significant. • The THC criterion would be exceeded during the operations phase, necessitating additional air quality analyses.	• Air quality impacts from construction are not considered significant. • Long-term CO impacts from vehicular emissions are considered significant at Peterson AFB, but not significant at Falcon AFB.
Noise	• Increased in vehicular noise are not considered significant.	• Increases in vehicular noise are not considered significant.
Biological Resources	• The Steven's kangaroo rat may be significantly affected. • Four sensitive bird species may be affected. • No sensitive plants or wetlands are expected to be affected.	• Biological resources will be surveyed in the spring.
Cultural and Paleontological Resources	• No significant impacts to cultural or paleontological resources are expected.	• Impacts to historic or prehistoric resources are not expected to be significant at either Falcon AFB or Peterson AFB; however, additional surveys will be performed in the spring. • Important paleontological features occur in the area; it is not known if any would be disturbed.

[ADD] "Explain the organization of document"

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The Department of Defense (DOD) has a continuing policy to identify facilities, property and installations that are no longer essential to support current or programmed force structure. The Air Force in late summer 1989 began a thorough review of its force structure, property and facility requirements needed to support national security policy and future fiscal ~~realities~~ constraints. As the Air Force went through the process of determining how best to scale its assets to the threat environment and fiscal constraints, it found that existing Air Force property use is not always maximized. ~~In addition,~~ the perceived reduction of the Soviet military threat has provided the opportunity to consider scaling down United States military force structure. [As a result, the Secretary of Defense, on 29 January 1990, announced ~~his~~ a proposal to close or realign a number of military bases.] Los Angeles Air Force Base (AFB), the host base for the Air Force Systems Command's Space Systems Division (SSD-LA) and SSD's Ballistic Missile Organization in San Bernardino, California (SSD-SB) have been identified as candidates for closure. In addition, the relocation of SSD-LA and SSD-SB and appropriate supporting units to selected Air Force bases was also proposed. Potential relocation bases include Vandenberg AFB, California; March AFB, California; Peterson AFB/Falcon AFB, Colorado; and Kirtland AFB, New Mexico.

Currently, many government civilian employees at Los Angeles AFB and most military personnel not in base housing are subjected to inflated housing costs. Government civilian employees cannot presently be compensated adequately to work in the area under existing pay plans. As a result, military and civilian employees suffer financial hardships in comparison to their peers assigned to other locations. This has created difficulty in retaining and filling many civilian positions at Los Angeles AFB, particularly in the lower pay grades such as clerical help, commissary cashiers, and child care providers. The mission capability of SSD is also affected by the lengthy commutes of many civilian and some military employees, which can extend to four hours each day, because of the lack of affordable housing in the immediate area of Los Angeles AFB. These factors detract from the goal of producing a professional management team for future space systems development. This situation will continue unless civilian pay is improved through locality or other incentive pay plans, additional

military housing is provided, a lower cost location is found, or the current Los Angeles AFB operation is scaled back to fit existing facilities.

The mission of SSD is to plan, program, and manage acquisition of space systems, subsystems, support equipment, and related hardware and software; provide for the maintenance, construction, or alteration of launch, tracking, and support facilities; conduct advanced development for launch technology programs to support future space missions; provide for launch and flight test support of major DOD programs and those of other federal agencies; perform the functions of launch, on-orbit satellite tracking, data acquisition, and command and control of DOD satellites; and discharge Air Force responsibilities for designated Air Force, DOD, and international space programs. With the implementation of the new Program Executive Officer (PEO) initiative of the Defense Management Review (DMR), SSD will also host and provide acquisition support of the PEO for Space and his six major acquisition programs: Defense Support Program System Program Office (SPO), Defense Satellite Communications SPO, Defense Meteorological Satellite SPO, Titan SPO, and the Global Positioning Satellite and MILSTAR Joint Program Offices (JPOs).

The Air Force will address closure and realignment options for Los Angeles AFB and SSD-SB along with the strategic, operational, budgetary, fiscal, environmental, and local economic consequences of the proposed and alternative actions as required by Title 10 USC 2687. In accordance with the National Environmental Policy Act (NEPA), the decision on whether or not to proceed with the closure and realignment of Los Angeles AFB will not be made without an analysis of the environmental consequences of the proposal. ~~As part of this environmental study process~~, the Air Force ~~will prepare an~~ is preparing this Environmental Impact Statement (EIS) to assess the potential environmental impacts of the possible closure and realignment of Los Angeles AFB and SSD-SB. If a decision is made to close either facility, a second EIS will be completed to cover the final disposition/reuse of the excess property. During the period this base is closed and decision for its reuse is finalized, a caretaker force will be established to provide several services, i.e., sufficient maintenance to prevent deterioration of buildings, minimal maintenance of grounds, maintenance of essential utility systems, and restriction of access to the base.

[ADDITION] "Decisions to be made" (handout)

[addition to pg 1-2]

~~**DECISIONS TO BE MADE**~~:

THE ALTERNATIVES ... INCLUDE
~~**THE RESPONSIBLE OFFICIAL MUST DECIDE WHETHER**~~

- **TO CLOSE LAAFB AND RELOCATE SSD (TO INCLUDE BMO) AND APPROPRIATE UNITS TO EITHER VANDENBERG, PETERSON/FALCON, MARCH, OR KIRTLAND, OR**

- **TO CLOSE PORTIONS OF LAAFB AND (RELOCATE PORTIONS) OF SSD TO EITHER VANDENBERG, PETERSON/FALCON, MARCH, KIRTLAND, OR**

- **KEEP LAAFB OPEN AND ALLOW SSD TO REMAIN AT LAAFB.**

1.2 SCOPING PROCESS

The Council of Environmental Quality (CEQ) regulations implementing the NEPA require an early and open process for determining the scope of issues related to the proposed action. The Air Force initiated this process with the publication of Notices of Intent to prepare an EIS for the closure action in the *Federal Register* on 9 February 1990. Soon after, written requests were sent to the responsible federal, state, and local agencies to submit their concerns and issues to be analyzed in the EIS to the Air Force. Five public scoping meetings for the EIS addressing the proposed closure of Los Angeles AFB and relocation of SSD to ~~Vandenberg AFB or other~~ another Air Force installations were conducted between 14 March and 24 May 1990. These meetings were held in the host communities for each base including El Segundo, California for Los Angeles AFB; Lompoc, California for Vandenberg AFB; Riverside, California for March AFB; Colorado Springs, Colorado for Peterson AFB and Falcon AFB; and, Albuquerque, New Mexico for Kirtland AFB. Table 1.2-1 provides a record of the Scoping Meetings for each base, including the meeting locations, dates, panel members, number of attendees, and number of persons who made statements.

1.2.1 Summary of Scoping Issues

[ADDITION] see pg 5-2, 1st ¶

The following issues and concerns were identified either at scoping meetings or in written statements received before or after the meeting. Comments that are related to environmental issues for each location are presented below.

Los Angeles AFB. Public statements were made at the Los Angeles AFB meeting by representatives of the City of El Segundo, the El Segundo and San Pedro Chambers of Commerce, the Aerospace Corporation, and members of the general public. These statements were generally in opposition to the move, emphasizing the adverse economic impacts that would result from the proposed base closure. It was suggested that an evaluation of socioeconomic impacts be included in the EIS. One statement was made requesting that additional Scoping Meetings be held in other towns surrounding the base including Hawthorne, Del-Air and Hollyglen. Additional comments were made stating that the Air Force Base and personnel were good neighbors and made a significant contribution to the quality of life in the community.

Table 1.2-1

Schedule of Scoping Meetings for Proposed Closure of Los Angeles AFB

	Los Angeles AFB	Vandenberg AFB	Kirtland AFB	March AFB	Peterson AFB/ Falcon AFB
Location	El Segundo High School El Segundo, CA.	Cabrillo High School, Lompoc, CA.	Eldorado High School Albequerque, NM.	City Hall, Riverside, CA.	Centennial Hall Colorado Springs, CO
Date	14 March 1990	27 March 1990	2 April 1990	29 March 1990	26 March 1990
Panel	Col. E. Peura Col. S. TerMaath Maj. M. Vroman	Col. O. Robertson Col. S. TerMaath Lt. Col. T. Bartol	Col. E. Franklin Col. J. Skalicky Maj. M. Vroman	Lt. Col. B. Knapp Col. S. TerMaath Maj. M. Vroman	Col. G. Bergerman Col. S. TerMaath Maj. M. Vroman
Number of Registered Attendees	126	69	196	11	184
Number of Public Statements	9	8	33	9	11

BMO

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[ACTION] → "embed all bulleted issues in text format"

The following issues or comments were provided either at the scoping meeting for proposed closure of Los Angeles AFB or in written statements received before or after the meeting:

- The effect of closure on traffic congestion in the area;
- The high cost of housing in the Los Angeles area;
- The presence of SSD in the Los Angeles area supports Hughes, TRW, Rockwell, Northrop, and McDonnell Douglas;
- Reluctance of some government employees and contract support people to move;
- The officers and their families greatly contribute to the community, and strongly support the businesses in the South Bay area;
- The new military housing is a considerable investment;
- The direct and secondary impacts on the community from the loss of $110 million of military payroll;
- The significance of base closure on support contract expenditures made by the Air Force in the South Bay area;
- The loss of $362 million in goods and services generated annually by the presence of the Air Force; and
- The potential uses for Los Angeles AFB after such a relocation.

Vandenberg AFB. At the Vandenberg AFB meeting, statements were made by representatives of the County of Santa Barbara, and several local associations and private citizens. While several speakers spoke in favor of the relocation of SSD to Vandenberg AFB, noting the economic benefits to the area, others identified environmental concerns to be considered in the EIS including schools, housing, hospitals, airport capacity, water, traffic, sanitary systems, landfills, prime soils, sensitive habitats, and air quality. Cumulative effects of developments at Bixby Ranch were also mentioned.

The following issues or comments were provided either at the scoping meeting for the proposed relocation of SSD to Vandenberg AFB or in written statements received before or after the meeting:

- Increased offbase housing could cause a loss of agricultural land with prime soil;
- The critical water shortage;

- The use of the Pacific Ocean as a water resource;
- Growth-inducing impacts on the region's limited resources;
- The Burton-Mesa Chaparral on and around Vandenberg AFB;
- Santa Barbara and Santa Maria Airport capacity;
- Impacts on the roadways in Lompoc and Orcutt, Highway 1, Highway 135, and Bradley Road;
- Impacts on sewer capacity in Orcutt and Lompoc;
- Impacts on landfill problems in Santa Maria, Lompoc, and Vandenberg AFB;
- Impacts on the area's school, hospital, and dental facilities; and
- Impacts on the central coast of California.

[ADD] Statement by Natural Resources Member stating cumulative effects

March AFB. Public statements were made at the March AFB Scoping Meeting by representatives of the City of Moreno Valley; the University of California, Riverside; the Moreno Valley Chamber of Commerce; and several local organizations and private citizens. All comments were in support of the relocation of SSD to March AFB with emphasis on the creation of local jobs and the reduction of commutation. It was also noted that the Riverside area has a large quantity of affordable housing.

The following issues or comments were provided either at the scoping meeting for the proposed relocation of SSD to March AFB or in written statements received before or after the meeting:

- Commuting to work from the Riverside area contributes to air pollution.
- Relocation of SSD to March AFB would take pressure off the freeway traffic.
- Air travel is much easier from Ontario Airport than from Los Angeles International.
- The Riverside-San Bernardino standard metropolitan statistical area has a 231,000 job/housing deficit. → explain
- The Riverside area has a large quantity of affordable housing.

Peterson AFB and Falcon AFB. At the ~~Public Hearing~~ scoping meeting for Peterson AFB and Falcon AFB, statements were made by the Governor of Colorado, representatives of the U.S. and State legislatures, representatives of the City of Colorado Springs, El Paso County, the University of Colorado, local associations, and private citizens. All but one of the speakers spoke in favor of the relocation of SSD to Peterson and Falcon AFBs, emphasizing the growth capacity of housing and services in the local

community. Low housing costs, a highly educated work force, and a high quality of life were described as beneficial to the proposed program. One speaker suggested that the relocation of SSD to Colorado Springs would cause further imbalance in the educational, social, church, and cultural environments and that closure of Los Angeles AFB without relocation should be considered as an alternative action. — OMIT

The following issues or comments were provided either at the scoping meeting for the proposed relocation of SSD to Peterson AFB/Falcon AFB or in written statements received before or after the meeting:

- Denver has gone from 26 nonattainment days per year to 3, and Colorado Springs did not exceed the pollution standards for carbon monoxide at any time during the past year.
- The area has good transportation-hub features.
- The space industry is the largest single factor in the Colorado economy.
- The average cost of a new home in Colorado is $90,000, and the average monthly rent for a one-bedroom apartment is $268.
- Of 160,000 dwelling units in Colorado Springs, 22,000 are vacant.
- There is more need for balance in the educational, social, church, and cultural environments here, not a further addition to the imbalance.
- The area has a depressed wage scale because of the number of military retirees, and bringing in more defense-related jobs would only add to the problem.

Kirtland Air Force Base. Public statements were made at the Scoping Meeting for Kirtland AFB by State senators and representatives, representatives of U.S. legislators, the Governor's office, the City of Albuquerque, the University of New Mexico, local associations, and private citizens. All speakers spoke in favor of relocating SSD to Kirtland AFB noting that the community could provide all of the housing and services required by the program. A good transportation system, ample utilities, a highly educated work force, low cost of living, available housing, and a rich cultural diversity were mentioned as positive factors contributing to the SSD relocation.

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The following issues or comments were provided either at the scoping meeting for the proposed relocation of SSD to Kirtland AFB or in written statements received before or after the meeting:

- Albuquerque has good air quality, with low levels of reactive pollutants, sulfur dioxide, and easily screened particulates. The area is nonattainment for carbon monoxide.
- Albuquerque's infrastructure is adequate to handle the demands imposed upon it by a relocation.
- Albuquerque Airport can handle all growth in air traffic for the next 25 years.
- There are ample water supplies in New Mexico.
- Albuquerque has updated its waste and refuse facilities and has erected a complete solid waste system.
- The electrical utility service in Albuquerque can accommodate much greater usage.
- The median price home in New Mexico sells for $83,000.
- Many vacant rental units and homes are available for sale.

1.2.2 Issues Beyond the Scope of this EIS

~~Concerns and issues regarding impacts that will be caused by the disposal of the facilities or their reuse were also expressed in the public scoping meeting and through written comments received during the comment period~~. The issues that are beyond the scope of this EIS ~~but will be addressed in the Reuse EIS include the following~~ include:

- Environmental impacts of property disposal and reuse ~~Los Angeles AFB reuse will be analyzed in the Reuse EIS~~.
- Potential socioeconomic impacts which are not interrelated ~~are evaluated in this document to the extent that they are interrelated~~ to the physical and natural environment (~~40 CFR Part 1508.14~~).
- The Installation Restoration Program (IRP) is independent of closure or reuse of the base and beyond the scope of either EIS. The IRP is addressed only to the extent that it is related to the closure actions.

1.3 RELEVANT FEDERAL, STATE, AND LOCAL STATUTES, REGULATIONS, OR GUIDELINES

Federal:

- National Environmental Policy Act (NEPA): Requires consideration of environmental impacts in federal decision-making.
- President's Council on Environmental Quality (CEQ) regulations: The agency that administers the NEPA process.
- Endangered Species Act of 1973: Conserves ecosystems for the use of endangered or threatened species.
- National Historic Preservation Act: Protects districts, buildings, sites, and objectives significant to American History.
- Clean Water Act: Reduces water pollution and the discharge of toxic and waste materials into all waters.
- Clean Air Act: Reduces air pollution dangerous to public health, crops, livestock, and property.
- Intergovernmental Review of Federal Programs, Executive Order 12372: Provides opportunity for consultation by state and local governments of federal financial assistance or direct federal development.

Air Force:

- Environmental Impact Analysis Process (EIAP) (Air Force Regulation [AFR] 19-2): Gives specific procedural requirements for Air Force implementation of the NEPA.
- Pollution Abatement and Environmental Quality (AFR 19-1): States policies and assigns responsibilities for the development of an organized, integrated, multidisciplinary, environmental protection program to make sure the Air Force, at all levels of command, conducts its activities in a manner that protects and enhances environmental quality.
- Environmental Pollution Monitoring (AFR 19-7): Sets up environmental pollution monitoring program for Air Force installations.

- Interagency and Intergovernmental Coordination of Land, Facility, and Environmental Plans, Program, and Projects (AFR 19-9): Regulations requiring intergovernmental and interagency coordination.
- Conservation and Management of Natural Resources (AFR 126-1): This regulation gives policies, procedures, and functional responsibilities for managing and conserving soil, water, forest, fish, wildlife, and outdoor recreation resources on Air Force lands.
- Natural Resources Land Management (AFM 126-2): Program for development, improvement, maintenance, and conservation of the real property of DOD installations.

(ADD) • 126-7 Historic Preservation

State:

California:

- California Air Pollution Control Laws: Establish air pollution control districts and plans, defines types of pollution, monitoring and enforcement procedures.
- California Air Pollution Control Regulations: Define air basins and air quality standards, and sampling procedures for emission data.
- California Environmental Quality Act: Establishes policies and procedures to protect and preserve the environment.
- California Environmental Quality Regulations: Define process for evaluation of projects and preparation of environmental impact statements.
- California Hazardous Waste Control Act: Establishes procedures for treatment, storage, transport, and disposal of hazardous wastes.
- California Motor Vehicle Emissions Regulations: Establish emission standards for motor vehicles, testing and certification procedures.
- California Porter-Cologne Water Quality Act: Establishes state and regional water quality boards, enforcement and implementation processes, compliance procedures with provisions of Federal Water Pollution Control Act and water reclamation regulations.
- California Solid Waste Management and Resource Recovery Act of 1972: Regulates collection, disposal and reclamation of solid waste.
- California Solid Waste Management Regulations: Establish permitting procedures, storage and disposal methods, and inspection and enforcement.

- California Water Regulations: Establish standards and procedures to protect stream systems and associated watersheds.

Colorado:

- Colorado Air Quality Control Act: Establishes air quality control commission, permitting processes, and enforcement procedures.
- Colorado Air Pollution Control Regulations: Establish standards for air quality and various types of air emissions.
- Colorado Ambient Air Quality Standards Summaries: Establish standards for ambient air quality.
- Colorado Discharge Permit System Regulations: Establish permitting procedures and standards for discharge of wastewater.
- Colorado Hazardous Waste Act: Establishes permitting and enforcement procedures for disposal sites.
- Colorado Hazardous Waste Management Rules: Define types of hazardous waste and procedures for transport.
- Colorado Water Quality Control Act: Establishes water quality standards and permitting procedures.
- Colorado Water Quality Control Regulations: Establish standards for discharge of wastewater.
- Colorado Water Quality Standards: Establish standards for water quality.

New Mexico:

- New Mexico Air Quality Control Act: Establishes air quality control board, procedures for permitting and enforcement.
- New Mexico Air Quality Standards and Regulations: Establish air quality standards.
- New Mexico Cultural Properties Act of 1969, as amended 1986: Establishes preservation, protection and evaluation processes for cultural resources.
- New Mexico Hazardous Waste Act: Establishes a program to provide safe and adequate management and disposal of hazardous waste.
- New Mexico Hazardous Waste Regulations: Establish standards for hazardous waste management.

- New Mexico Solid Waste Management Regulations: Establish procedures for storage, collection, transport and disposal of solid waste.
- New Mexico Water Quality Act: Establishes water quality control commission and permitting procedures.
- New Mexico Water Quality Regulations: Establish limits for water contaminants and processes for monitoring and reporting.
- New Mexico Water Quality Standards: Establish water quality standards and sampling methods.

Local:

- ~~No local statutes or regulations pertain to the base closure and realignment process.~~

- CAA
- CWA
- RCRA

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION AND SUMMARY OF IMPACTS

2.1 INTRODUCTION

The perceived reduction in the Soviet military threat has provided the opportunity to consider scaling down the United States force structure. As a result of this consideration, all areas within the Department of the Air Force are being studied for their value to the Department of Defense (DOD). The Headquarters of the Space Systems Division (HQ SSD) at Los Angeles Air Force Base (AFB) is currently subjected to both efficiency reductions and limited expansion potential. For purposes of this analysis, SSD-LA is defined as those Space Systems Division units currently located at Los Angeles AFB.

Los Angeles AFB is an Air Force Systems Command (AFSC) base located in the metropolitan Los Angeles area within the City of El Segundo. It hosts AFSC's Space Systems Division (HQ SSD), which manages the design, development, acquisition, and launch activities of DOD's space program. Base operating support is provided by the 6592 Air Base Group to about 25 onbase tenants, which support SSD and about 40 offstation units/activities in the greater Los Angeles area. Currently, the civilian and military employees based at Los Angeles AFB are subject to inflated housing costs. Government employees cannot be adequately compensated to work in the area under existing pay plans. As a result, the Air Force continues to lose skilled employees to private industry and quality replacement is extremely difficult. Productivity of the SSD-LA operation is reduced due to lengthy daily commuting times, which can extend 2 to 4 hours, because of the lack of affordable housing in the immediate area of Los Angeles AFB. The goal of producing a professional management team for future space systems development suffers and will continue unless civilian pay is improved (by locality pay), additional military family housing is provided, a lower-cost location is found, or the Los Angeles AFB operation is scaled back to fit existing facilities.

The recent disestablishment of the Ballistic Systems Division has placed the management responsibilities for Intercontinental Ballistic Missile (ICBM) programs within HQ SSD. As a result, the Ballistic Missile Organization (BMO), currently located in San Bernardino, California, is considered an integral part of SSD operations and is included in the evaluation of the relocation of HQ SSD along with other SSD program offices. For this analysis, BMO offices in San Bernardino will be identified as SSD-SB.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is to close Los Angeles AFB, California, and BMO in San Bernardino and relocate SSD-LA, SSD-SB, and appropriate supporting units to Vandenberg AFB, California, March AFB, California; Peterson AFB, Colorado; Falcon AFB, Colorado; and/or Kirtland AFB, New Mexico; beginning in fiscal year (FY) 1993 with completion by the end of FY 1996. In studying the impacts of this proposed action, prior to any final decision by the Air Force, the following actions were analyzed:

- Total closure of Los Angeles AFB and BMO facilities in San Bernardino.

- Relocation of SSD-LA, SSD-SB, and appropriate supporting units; the Aerospace Corporation - a Federally Funded Research and Development Center (FFRDC); and the Systems Engineering Technical Assistance (SETA) contractor to selected Air Force bases including:
  - Vandenberg AFB California;
  - March AFB California;
  - Peterson/Falcon AFBs, Colorado;
  - Kirtland AFB, New Mexico.

- Inactivation of appropriate support units currently at Los Angeles AFB and San Bernardino that would be duplicative of those already in place at the relocation bases, including the 6592 Air Base Group and the USAF Clinic; and

- Total closure of all facilities involved in SSD activities including Area A and Area B, the FFRDC Complex in El Segundo, Lawndale Annex No. 3 in Hawthorne; and military family housing at Fort MacArthur, Pacific Heights, and Pacific Crest, and the SSD-SB and SETA facilities in San Bernardino.

For the purpose of this closure and relocation evaluation, four functional groups within SSD have been identified: the HQ SSD staff function, the Space Launch Systems Program Offices, Satellite Systems Program Offices, and the ICBM System Program Offices.

The HQ SSD staff function (HQ Staff) is responsible for providing program management support for all SSD organizations and programs. This includes contracting, personnel management, logistics,

comptroller, acquisition civil engineering, legal, security, communications-computer systems, product assurance, and safety, among others. The HQ Staff comprises about 300 military and 600 civilians, requiring approximately 144,000 square feet (sq ft) of office space, of which 35,000 sq ft must be SCIF/vaulted. The HQ Staff is supported by nearly 3,000 FFRDC employees and about 60 other in-house contractor personnel, who require over 610,000 sq ft of office space, of which 300,000 sq ft must be SCIF/vaulted. The Staff requires base operating support of about 75 people.

Space Launch Systems Program Offices (Booster SPOs) are responsible for design, development, acquisition, test, and launch of assigned space launch and upper stage vehicles, including Expendable Launch Vehicles (ELV), the Inertial Upper Stage (IUS), and their associated ground processing and launch systems. They also manage DOD payload integration and provide principle interface with NASA for Space Transportation Systems (STS) payload integration and mission support. The Booster SPOs comprise nearly 300 military and 150 civilians, requiring 72,000 sq ft of office space, and receive technical support from 325 FFRDC employees and some 40 other contractors who require a similar amount of office space and 35,000 sq ft of specialized laboratory. Base operating support to the Booster SPOs is about 50 personnel.

Satellite System Program Offices (Satellite SPOs) are responsible for the design, development, procurement, test, and evaluation of all communications and support satellite systems and projects assigned to DOD, to ensure timely delivery of operable satellite and space systems to user organizations. They are also responsible for the direction, management, and integration of research, development, and testing of assigned programs, as well as for planning, design, development, and acquisition of command and control systems for FOF satellites and DOD space transportation systems missions. The Satellite SPOs comprise a little over 1,000 military and about 575 civilians, requiring over 250,000 sq ft of office space, of which 60,000 sq ft must be SCIf/vaulted, supported by nearly 900 FFRDC employees and about 100 other in-house contractors, requiring an additional 200,000 sq ft of office space. The Satellite SPOs require about 170 personnel for base operating support.

ICBM System Program Offices (SPOs), currently included in BMO at Norton AFB in San Bernardino, California, manage programs to acquire ballistic missile systems and subsystems, support equipment and related hardware; provide for the alteration of missile sites and launch facilities; discharge Air Force responsibilities as executive agent for designated Air Force, DOD, and international missile programs; and perform the Advanced Strategic Missile Systems (ASMS) tri-service mission requirements. These are essentially the acquisition functions performed by BSD, prior to their realignment under HQ SSD. The ICBM SPOs comprise approximately 550 military and 550 Air Force

civilians, requiring over 175,000 sq ft of office space which includes approximately 45,000 sq ft of SCIF/vaulted area, and receive technical support from approximately 1,300 SETA contractor employees, requiring approximately 260,000 sq ft of office space but sharing the government SCIF/vaulted areas. Base operating support for the ICBM SPOs is estimated at about 110 personnel.

2.2.1 Personnel Relocation

A summary of current personnel at SSD-LA and SSD-SB is presented in Table 2.2-1. Total relocation of SSD-LA and SSD-SB would require moving approximately 2,200 military personnel and 7,800 civilian and contractor personnel. About 500 SPO/base support/service contractor positions would be eliminated with equivalent numbers required at the new location.

Table 2.2-1

Current Personnel
Los Angeles AFB and BMO

Location/ Organization	Military	Civilian	Total
Los Angeles AFB			
SSD-LA	1,598	1,175	2,773
Air Force Tenants	143	206	349
Other Tenants	20	49	69
FFRDC	0	4.075	4,075
SETA Contractor	0	190	190
Other Contractors	-	665	665
WAF		224	224
SUBTOTAL:	1,761	6,584	8,345
San Bernardino-BMO			
SSD-SB	620	530	1,150
SETA Contractor	0	1,300	1,300
SUBTOTAL:	620	1,830	10,795
TOTAL:	2,381	8,414	10,795

Source: Economic Resource Impact Statement, Los Angeles AFB, FY 1989.

2.2.2 Facilities

Currently, SSD-LA government personnel occupy about 600,000 sq ft of general office space, 90,000 sq ft of vaulted/special compartmented information facility (SCIF) space, and about 40,000 sq ft of miscellaneous special purpose space. The FFRDC requires a similar amount of general office space, of which half is SCIF/vaulted space. Specialized laboratory facilities and central computing facilities which currently exist at Los Angeles AFB would have to be duplicated at any relocation site.

At SSD-SB, government personnel occupy about 157,000 sq ft of general office space and about 104,000 sq ft of special purpose facilities. The SETA contractor occupies about 175,000 sq ft of additional general office space.

Current facilities at Los Angeles AFB and BMO in San Bernardino are listed in Table 2.2-2.

Table 2.2-2

Current Facilities
Los Angeles AFB and BMO

Location	Type	Area (ac)	Quantity
Government Facilities			
Los Angeles AFB			
Area A	Office	41.45	860,509 sf
Area B	Office/Supt	53.70	467,420 sf
Annex 3	Office	13.34	30,000 sf
Fort MacArthur	Office/Supt	93.00	113,235 sf
	Housing*		404 units
Pacific Crest	Housing	22.09	91 units
Pacific Heights	Housing	12.68	79 units
SSD-SB			
BMO Facilities	Office/SP		261,000 sf
Contractor Facilities			
FFRDC	Office-Own**	44.45	920,291 sf
	Office-Lease	32.51	544,608 sf
SETA	Office	-	175,000 sf

NOTES: * Includes 42 housing units under Army control by 1982 agreement.
** Includes labs and SCIFs
SP Special Purpose

These facilities would be closed under the proposed action. Facility requirements for total relocation of SSD-LA and SSD-SBO activities to selected installations are presented in Table 2.2-3.

Table 2.2-3

SSD Relocation Space Requirements
Proposed Action

	Vandenberg AFB	March AFB	Peterson/Falcon AFB	Kirtland AFB
(000 SF)				
Administration	1,550	1,550	1,550	1,550
Laboratory	170	170	170	170
SCIF	445	445	445	445
Other	310	310	310	310
BOS	320	320	320	320
MFH	1,735	2,030	955	955
TOTAL SF:	4,530	4,825	3,750	3,160

Notes: SCIF = Special Compartmentalized Information Facility
BOS = Base Operating Support
MFH = Military Family Housing
Average MFH = 1,400 SF

2.3 DESCRIPTION OF THE ALTERNATIVE ACTION

Alternative actions would involve reduced levels of facility closure and the relocation of a lesser number of organizational units and personnel. The destinations and schedule for relocation would remain the same as the proposed action. In studying the impacts of these alternative actions, prior to any final decision by the Air Force, the following actions were analyzed:

- Partial closure of Los Angeles AFB and total closure of BMO facilities in San Bernardino.

- Partial closure of Los Angeles AFB with no change in status for BMO facilities in San Bernardino.

- Total closure of BMO facilities in San Bernardino with no change in status at Los Angeles AFB.

- Relocation of appropriate SSD functional units to selected Air Force bases including:
  - Vandenberg AFB California;
  - March AFB California;
  - Peterson AFB, Colorado;
  - Falcon AFB, Colorado; and,
  - Kirtland AFB, New Mexico.

- Inactivation of appropriate support units currently at Los Angeles AFB and San Bernardino that would be duplicative of those already in place at the relocation bases, including the 6592 Air Base Group and the USAF Clinic; and

- Reduced closure of facilities involved in SSD-LA activities including Area A and Area B in El Segundo, Lawndale Annex No. 3 in Hawthorne; and military family housing at Fort MacArthur, Pacific Heights, and Pacific Crest and the SSD-SB facilities in San Bernardino.

The same four functional groups of the SSD could be included for alternative actions including the HQ SSD staff function, the Space Launch Systems Program Offices, Satellite Systems Program Offices, and the ICBM System Program Offices.

2.3.1 Personnel Relocation

Relocation of fewer than all of the SSD-LA and SSD-SB functional units could involve moving fewer than 1,000 or as many as 7,500, or more military, DOD civilian, and FFRDC and SETA contractor personnel. Analyzing the many possible combinations of units that could be moved to the various bases would unnecessarily complicate the EIS and would not produce a better analysis of the environmental inputs resulting from the moves. To simplify the analysis and focus attention appropriately on the analysis of impacts, numerical ranges of personnel movements were analyzed. The high end of these ranges are represented by the numbers (Options I-V) given in Table 2.3-1. For example, a move of fewer than 1,000 personnel is represented by the number 1,000 and the impacts described for that range (referred to as Option V), represent the estimated impacts for a move of 1,000 personnel, or fewer, to the given location.

2.3.2 Facilities

Currently, SSD-LA government personnel occupy about 600,000 sq ft of general office space, 90,000 sq ft of SCIF/vaulted space, and about 40,000 sq ft of miscellaneous special purpose space. Aerospace Corporation requi : similar amount of general office space, of which half is SCIF/vaulted space. Specialized laboratory facilities and central computing facilities which currently exist at Los Angeles AFB would have to be duplicated at any relocation site.

At SSD-SB, government personnel occupy about 157,000 sq ft of general office space and about 104,000 square feet of special purpose facilities. The SETA contractor occupies about 175,000 sq ft of additional general office space.

Facility requirements for partial relocation of SSD activities to Vandenberg AFB, March AFB, Peterson/Falcon AFBs, and Kirtland AFB are presented in Tables 2.3-2 through 2.3-5.

2.4 FACILITY SITING OPTIONS

In order to evaluate the potential environmental impacts resulting from the development and operations of HQ SSD activities at each of the candidate bases, a number of specific site options for HQ SSD facilities have been identified at each base including Vandenberg AFB, March AFB, Peterson/Falcon AFBs, and Kirtland AFB. These sites were determined through field investigations which assessed a number of siting criteria including existing facility availability, site conditions, accessibility, environmental constraints, and total capacity. At each candidate base, sufficient land area was identified to accommodate the total relocation of HQ SSD-LA and SSD-SB (10,000 personnel) described by the proposed action, either in a single contiguous area or among several separate sites. These same sites were also considered for partial relocation of HQ SSD operations described by the alternative action. A description of the sites selected for each candidate base is presented in this section.

Table 2.3-1

Space Systems Division
Personnel Relocation Options

	Proposed Action	Alternative Actions			
	Option I	Option II	Option III	Option IV	Option V
TOTAL:	10,000	7,500	5,000	2,500	1,000

Table 2.3-2

SSD Relocation Space Requirements
Vandenberg AFB

	Proposed Action	Alternative Actions			
	Option I	Option II	Option III	Option IV	Option V
(000 Square Feet)					
Administration	1,550	1,160	960	325	185
Laboratory	170	170	0	0	0
SCIF	445	400	89	43	17
Other	310	310	140	67	27
BOS	320	250	120	80	32
MFH	1,735	1,380	900	461	277
TOTAL SF:	4,530	3,670	2,209	976	538

Table 2.3-3

**SSD Relocation Space Requirements
March AFB**

	Proposed Action	Alternative Actions			
	Option I	Option II	Option III	Option IV	Option V
(000 Square Feet)					
Administration	1,550	1,160	960	325	185
Laboratory	170	170	0	0	0
SCIF	445	400	89	43	17
Other	310	310	140	67	27
BOS	320	240	83	80	32
MFH	2,030	1,615	840	394	237
TOTAL SF:	4,825	3,895	2,112	909	498

Table 2.3-4

**SSD Relocation Space Requirements
Peterson/Falcon AFB**

	Proposed Action	Alternative Actions			
	Option I	Option II	Option III	Option IV	Option V
(000 Square Feet)					
Administration	1,550	1,160	960	325	185
Laboratory	170	170	0	0	0
SCIF	445	400	89	43	17
Other	310	310	140	67	27
BOS	320	150	100	80	32
MFH	955	760	560	217	130
TOTAL SF:	3,750	2,950	1,849	732	391

Table 2.3-5

**SSD Relocation Space Requirements
Kirtland AFB**

	Proposed Action	Alternative Actions			
	Option I	Option II	Option III	Option IV	Option V
(000 Square Feet)					
Administration	1,550	1,160	960	325	185
Laboratory	170	170	0	0	0
SCIF	445	400	89	43	17
Other	310	310	140	67	27
BOS	320	90	50	80	32
MFH	365	290	85	83	50
TOTAL SF:	3,160	2,420	1,324	598	311

2.4.1 Vandenberg AFB, California

Two siting alternatives were evaluated for the relocation of HQ SSD operations to Vandenberg AFB (Figure 2.4.1-1). Site 1, the old hospital site, would accommodate the entire proposed action as well as partial relocation alternatives. Sites 2A and 2B, in combination, are sufficient for the proposed action or could be used separately for partial relocation alternatives. In addition, a proposed site for military family housing has been identified (Figure 2.4.1-2).

2.4.1.1 Site 1

Site Location & Conditions. Site 1 is bounded by Nebraska and Washington Avenues to the northeast, South Dakota Road to the northwest, and Alaska Way to the southeast. This site consists of approximately 105 acres (up to 155 acres if the land up to Ocean View Avenue is included).

The land is generally flat and slopes gently to the southwest. Elevations range from 475 feet mean sea level (MSL) along Nebraska Avenue to 428 feet MSL along Ocean View Avenue. The site is about one-third developed, largely with a series of two-story wooden barracks dating back to World War II ~~that are classified as "temporary" structures on the Real Property Inventory Detail List~~. There are a few trees on the site's periphery. Also along the periphery are three baseball fields.

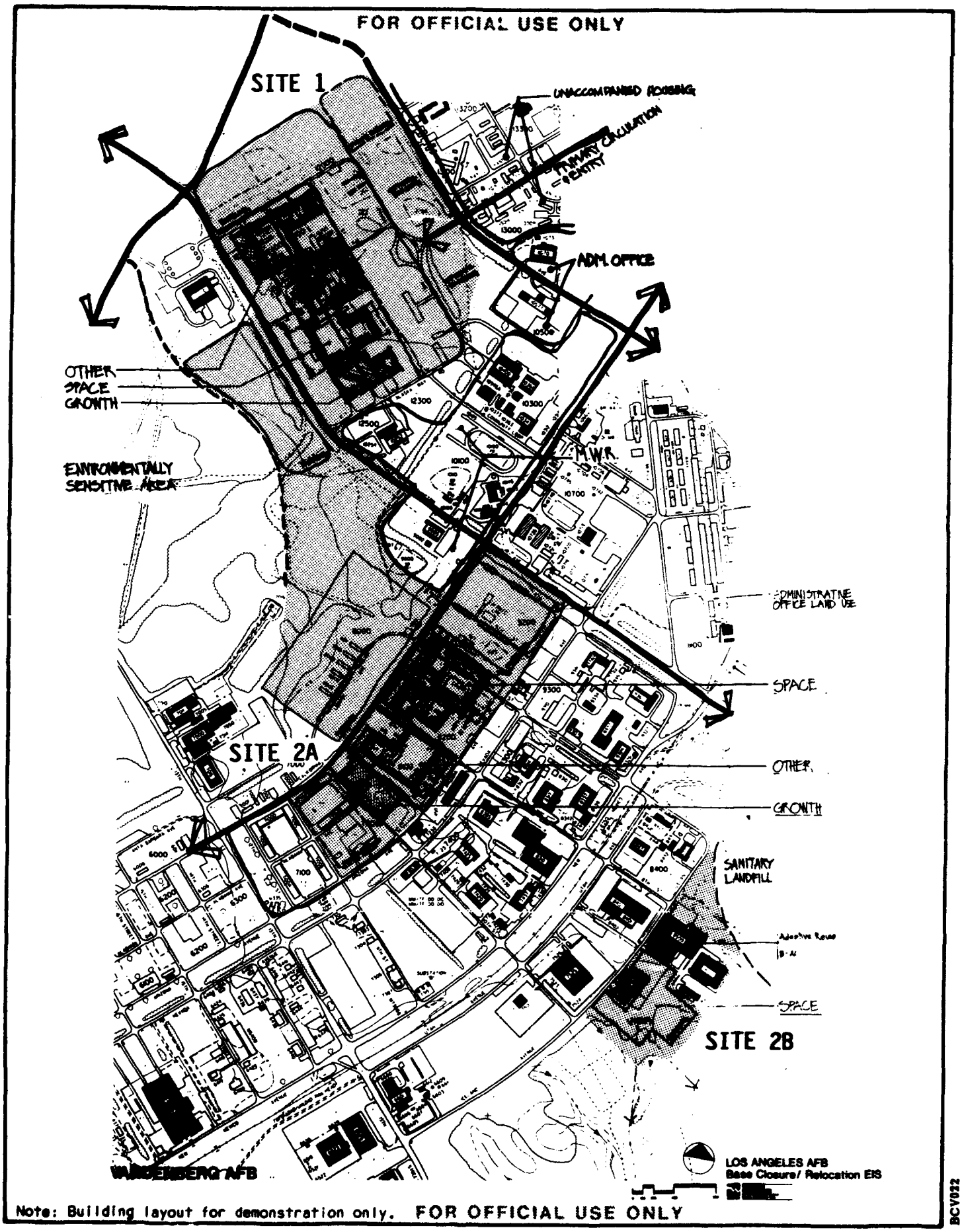

FIGURE 2.4.1-1 PROPOSED SITES (SITE 1 AND 2A/B) AT VANDENBERG AFB, CALIFORNIA

(*) OMIT

This is in a safety impact zone (missile launch)

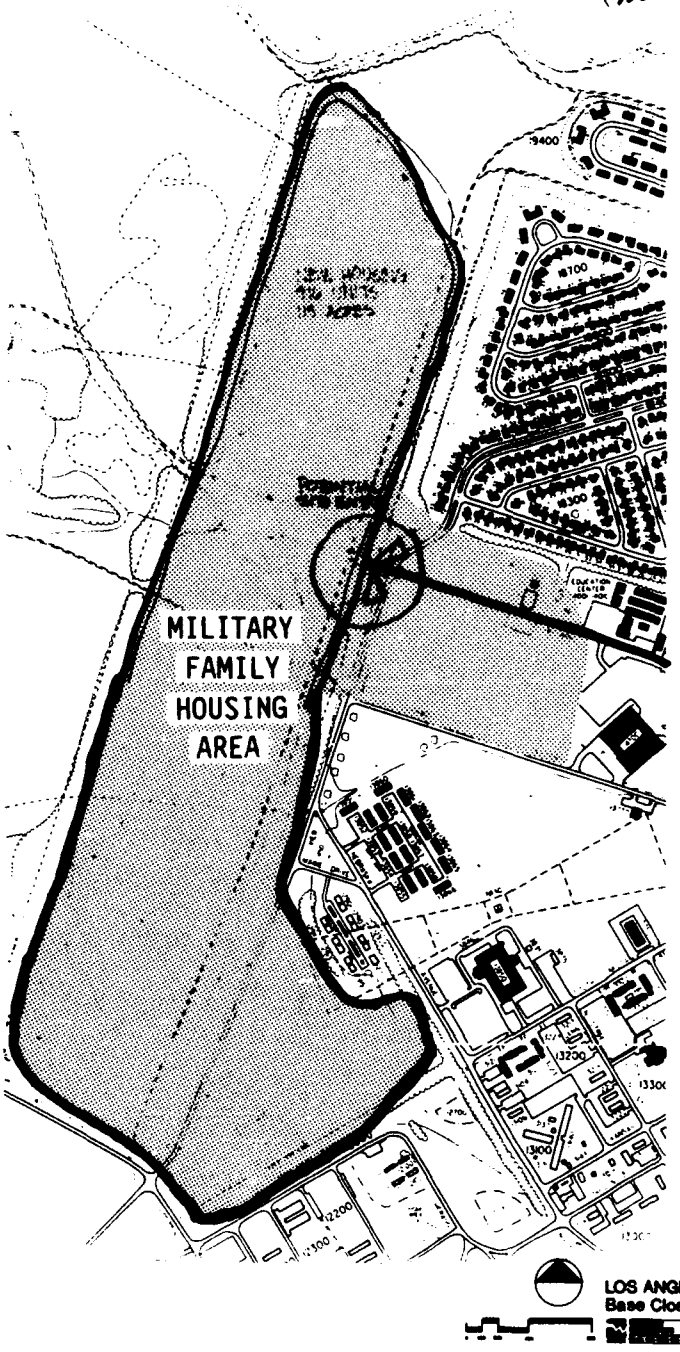

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FIGURE 2.4.1-2 PROPOSED MILITARY FAMILY HOUSING SITE AT VANDENBERG AFB, CALIFORNIA

An additional 50 to 70 acres of land, across Washington Avenue and adjacent to Building 12000 and its parking lot, are available for development for either buildings and/or offstreet parking.

Adjacent Land Uses. Building 12000, ~~the MX~~ Integrated Test Facility, is directly across Washington Avenue from the site. A sizable unaccompanied housing area is northeast across Nebraska Avenue. The Vandenberg Community Center, with many Moral, Welfare, and Recreation (MWR) facilities, is located south-southeast across Alaska Way.

General Accessibility/Direct Access. The main gate is the Santa Maria Gate and provides easy access via California Boulevard and Oregon Avenue. There is direct access onto the site from both Nebraska and Washington Avenues, and also from the Pine Canyon Gate via Washington Avenue.

~~*Environmental Constraints.*~~ Site The soil on this site has been disturbed, but it is thought to contain no biota and cultural resource material. There are no Installation Restoration Program (IRP) sites in the vicinity, and there are no Air Installation Compatibility Use Zone (AICUZ) noise contours that would limit or preclude development.

no constraints

2.4.1.2 Site 2A

Site Location and Site Conditions. This site encompasses a total of 105 acres, and is bounded by California Boulevard to the northwest, 13th Street to the southwest, Arizona Avenue to the southeast, and Washington Avenue to the northeast. Some 50 to 70 acres are available for buildings and/or offstreet parking across California Avenue between the Western Space and Missile Center (Facilities 7000, 7011, 7015) and the Physical Fitness Facility (9005).

There are several World War II-era wooden dormitory structures on Lompoc Avenue; thus, this site has been proposed for a minimum security correctional facility. Presently, this area is largely unoccupied. Several side streets off California Boulevard have been vacated. The Base Comprehensive Plan calls for this area to be developed as "Administrative Office."

The site terrain is relatively flat, and ground elevations range mostly from 435 to 450 feet MSL, except for the contractor trailer area which slopes below 435 feet MSL. There is little vegetation along California Boulevard.

Adjacent Land Uses. Base and contractor industrial facilities are located to the southwest and northwest. Across California Boulevard is the Western Space and Missile Center. Some wooden World War II-era structures front on Lompoc Avenue, and the Physical Fitness Center stands at the intersection of California Boulevard and Washington Avenue.

General Accessibility/Direct Access. The site is bounded by three of Vandenberg AFB's major thoroughfares: California Boulevard, Washington Avenue, and 13th Street, making it accessible from the Main Gate and all parts of the main base. Direct access will be primarily from California Boulevard and Arizona Avenue.

Environmental Constraints. This entire site has been previously disturbed. There are no IRP sites. In addition, this site is not affected by any AICUZ noise contours that would limit or preclude development.

2.4.1.3 Site 2B

Site Location and Site Conditions. This site includes about 20 acres which comprise Building 8500, its offstreet parking lot, and adjacent lands along Iceland Avenue. Buildings 3510 and 8505, immediately southwest of Building 8500, are to remain intact. Building 8500 is available for reuse by HQ SSD. It has been estimated that this particular building can accommodate approximately 500 people.

Adjacent Land Uses. Building 8500 is surrounded by Buildings 8510 and 8505 to the southeast, the Base Sanitary Landfill No. 5 to the northeast, Building 8401 to the northwest, and its offstreet parking lot to the southwest.

General Accessibility/Direct Access. This site is on the western edge of the Vandenberg AFB main base area. Iceland Avenue, a collector road, provides direct access, and Washington Avenue and 13th Street feed into Iceland Avenue.

Environmental Constraints. Most of the land adjacent to Building 8500 has been designated as environmentally constrained. This includes the area immediately to the south of Building 8500. The Base Sanitary Landfill, utilized from the 1940s to 1978, and Landfill 2 (Oak Canyon), used from 1978 to the present, restricts development to the west and northwest. Base Sanitary Landfill 2 and the Bionetics Building (8430) constitute an IRP site one block away. IRP Site No. 42, Building 7501, is

one block away. IRP Site No. 23, Base Sanitary Landfill 5 is several hundred feet to the northeast from Building 8500.

Finally, a chemical test laboratory, on Iceland Avenue between Facility 7501 and Facility 6800, may cause an odor problem in the vicinity.

2.4.1.4 Potential Military Family Housing (MFH) Site

MFH Housing. The proposed action at Vandenberg AFB would require 1,240 units of family housing on 344 acres. A 350-acre site along Ocean View Drive, north of Washington Avenue and adjacent Utah Avenue, has been identified as the most appropriate location for the MFH area. The Ocean View Drive site is close to the base's community center where community and MWR facilities are concentrated. This site is largely clear of vegetative cover, except for two parallel treelines extending almost the entire length of the site.

2.4.2 March AFB, California

Two primary siting alternatives were evaluated for the relocation of HQ SSD operations at March AFB (Figure 2.4.2-1). Site 1, the Weapons Storage Area (WSA), could accommodate the entire proposed action as well as partial relocation alternatives. Site 2, the Arnold Heights housing area, would also be sufficient for both the proposed action and for the partial relocation alternatives. In addition, a proposed site for MFH has been identified (Figure 2.4.2-1).

2.4.2.1 Site 1

Site Location and Site Conditions. This 625-acre area contains a series of ammunition storage bunkers, many of which are presently inactive. A small demolition range operated on high ground is in the vicinity, which ranges in elevation from 1,600 feet MSL at its northernmost point to 1,777 feet MSL on one of its several knolls. About one-half of the total acreage within Site 1 consists of steep slopes greater than 10 percent. Good views exist to the northeast, north, northwest, west and south of existing single-family residential developments (much of this relatively new development) and some remaining citrus groves. Conversely, this site enjoys high visibility from all the surrounding areas, both offbase and onbase.

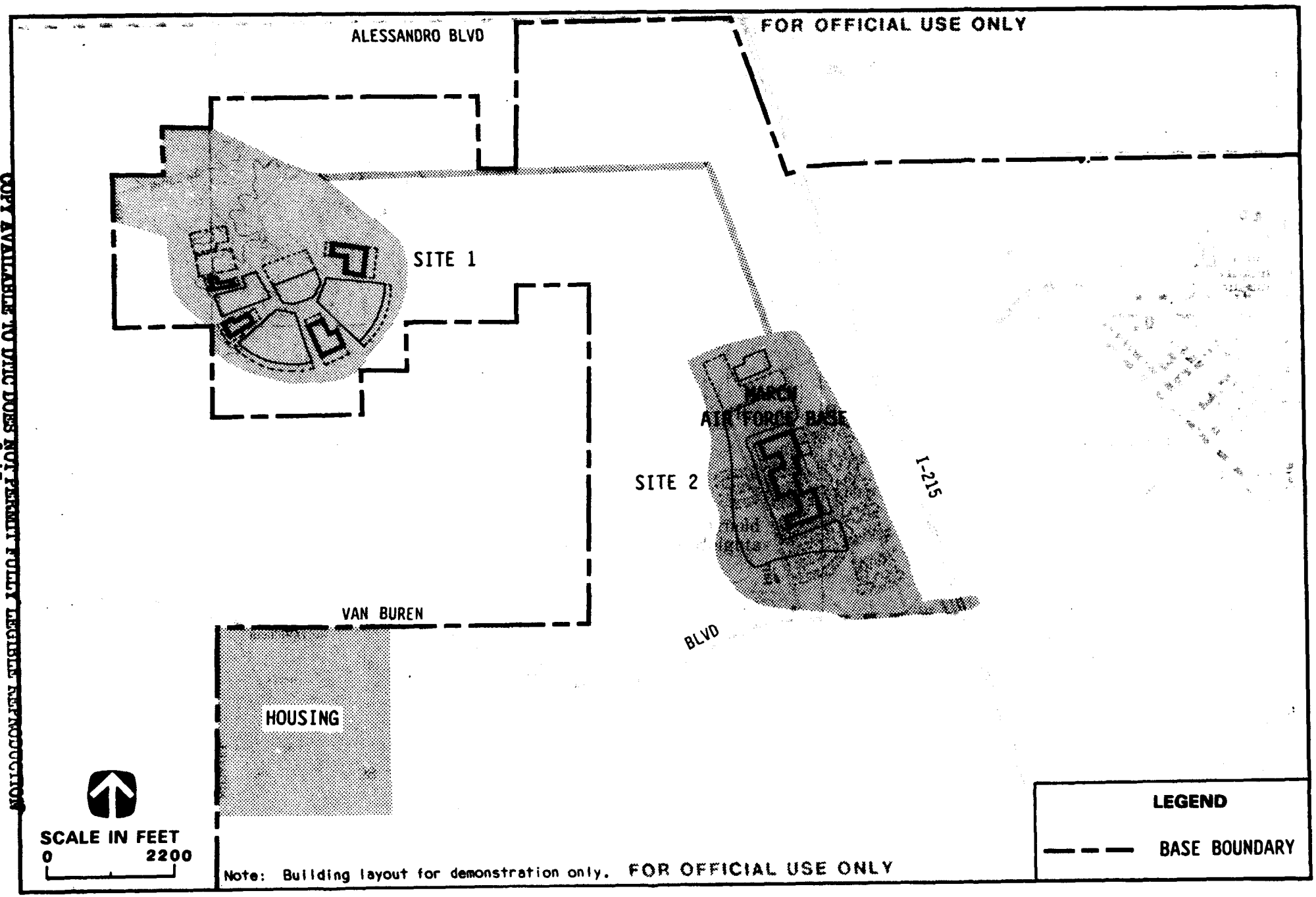


FIGURE 2.4.2-1 PROPOSED SITES AT MARCH AFB, CALIFORNIA

Adjacent Land Uses. Immediately south of this site is the 1,514-acre Orange Crest development, which includes 4,487 residential units, 52 acres of commercial land, 15 acres of offices, and 207 acres of industrial land. The 207 acres planned for light industrial development are immediately south of Site 1. This planned community is partially developed, and further development is in progress. To the northwest and west, at some distance, are a series of single-family residential subdivisions; immediately west is the Alessandro Heights Specific Plan, which is a planned industrial development. Due north is largely vacant land, except for a trailer park, a small number of single-family homes between the base perimeter and Alessandro Avenue, and a water filtration plant of the Metropolitan Water District of Southern California. Due east is vacant base property, including the northern end of the Camp Haan area.

General Accessibility/Direct Access. Cactus Avenue is the one paved road providing direct access to this site. This roadway provides a direct link east to Interstate 215 where an upgraded interchange is scheduled to be built. Arnold Avenue, which intersects Cactus Avenue west of Interstate 215, provides access south to the Arnold Heights MFH area, the HQ 5th Air Force, a proposed third-party-financed MFH area, the Air Force Village retirement community, and the base golf course.

Put IRP sites on map

Environmental Constraints. There are several IRP sites onsite: the 53-acre Landfill 5, south of Cactus Avenue and west of Plummer Road; a Munitions Residue Burial Site (about 4.5 acres) 400 feet southwest of Sanitary Landfill 5; and a Construction Rubble Burial Site, north of Cactus Avenue.

Quantity-distance explosive safety zones cover a major part of this site; however, with the construction of three igloos at the proposed remote site west of the main runway and the relocation of the ammunition to that new site, these limits on development would be removed.

A Kangaroo rat habitat corridor prevents development of approximately 25 percent of the total site; this leaves some 475 acres potentially available for development.

A 65 day/night equivalent sound level (L_{dn}) noise contour traverses the middle of this site, and a 70 L_{dn} noise contour skirts the northeast edge of the site. Administrative offices are "conditionally acceptable" and within 65 to 70 L_{dn} noise contours provided certain noise level requirements are met during design/construction.

include noise contour & on-site plants

2.4.2.2 Site 2

Site Location and Site Conditions. Site 2 includes the Camp Haan and Arnold Heights housing areas for a total of approximately 200 acres. Site 2 is bounded by the Interstate 215/railroad corridor to the east, Van Buren Boulevard/Riverside National Cemetery to the south, vacant land to the west, and largely vacant land of the Camp Haan area due north.

General Accessibility/Direct Access. Primary access to the site would be via Van Buren Avenue from the south and via Interstate 215, Cactus Avenue, and Arnold Drive from the north.

Environmental Constraints. There are no IRP sites within the Arnold Heights MFH area. It is possible that underground storage tanks exist within the Camp Haan area. are IRP on NPL list.

All of Site 2 falls between the 70 and 80 L_{dn} noise contours. In the first case, new development is deemed to be "generally unacceptable"; in the second case, new development is generally discouraged and should not be undertaken. This will require a reexamination of this particular site to determine whether lands farther west extending to Plummer Avenue can be utilized.

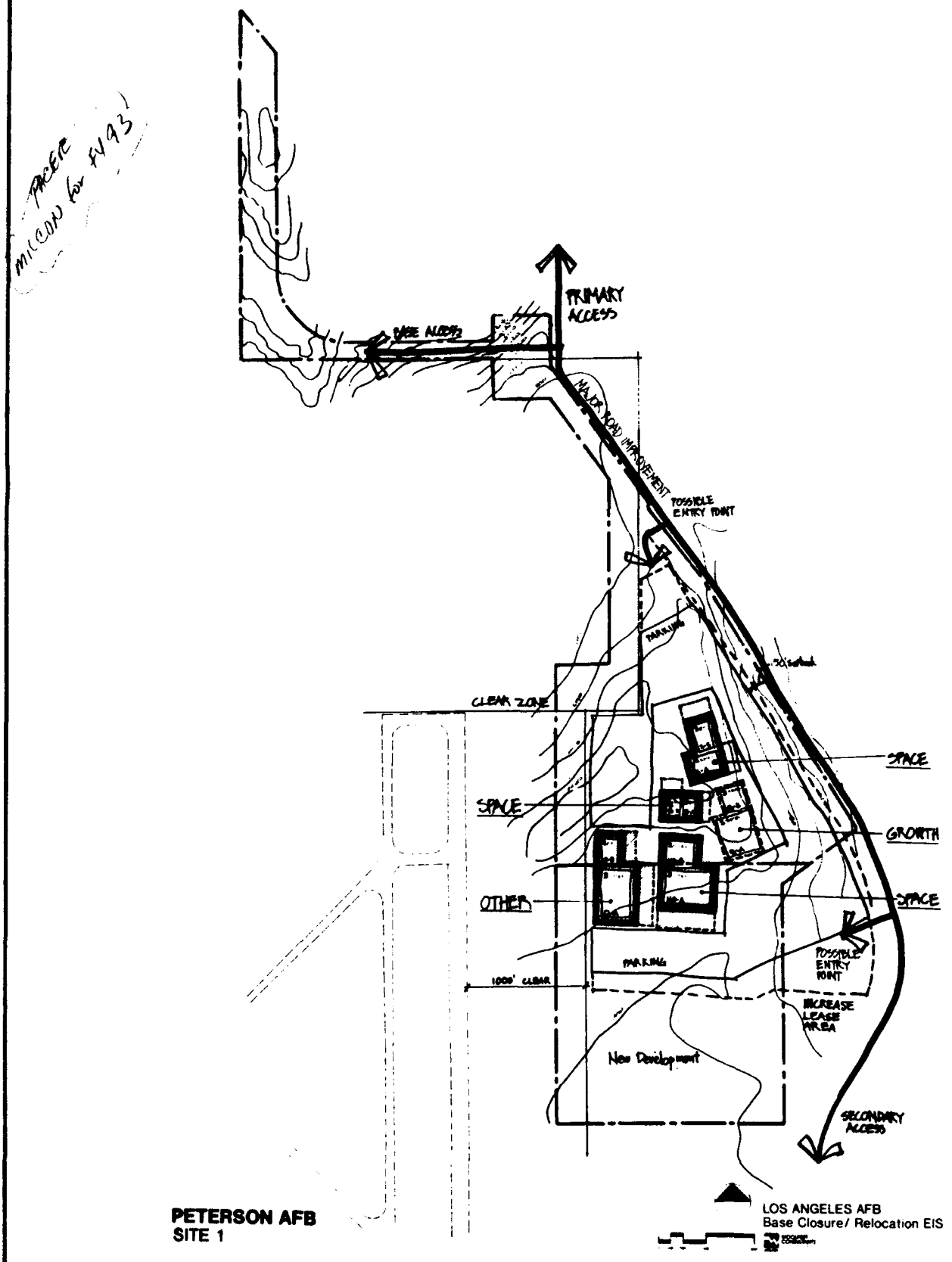
within AICUZ guidelines

2.4.2.3 Military Family Housing Site

The MFH requirement at March AFB is 1,450 units, which would require approximately 180 acres. The land area northwest and south of the HQ 5th Air Force facility has been identified as the best location for this MFH development. This southwest portion of March AFB is emerging as a predominantly residential area, which includes the Air Force Village retirement community and the third-party-financed MFH area, which is replacing the Wherry housing there. The adjacent uses are either single-family residential or citrus orchards that are likely to be developed for residential use.

2.4.3 Peterson/Falcon AFBs, Colorado

Four primary siting alternatives were evaluated for the relocation of HQ SSD operations to Peterson/Falcon AFBs. Site 1 (Figure 2.4.3-1) is located ~~immediately~~ 1000 feet east of the north-south runway of the Colorado Springs Municipal Airport and could accommodate the entire proposed action ~~in a compact megastructure configuration~~. This area is currently part of the lease area available for base development. ~~Partial relocation options could be more easily developed on this site.~~



Note: Building layout for demonstration only.

BCP019

FIGURE 2.4.3-1 PROPOSED SITE 1 AT PETERSON AFB, COLORADO

Site 2 includes Site 1's area and adjacent offbase land east of Marksheffel Road (Figure 2.4.3-2). This area would accommodate the proposed action and all of the alternative action options. Site 2 is especially applicable if government facilities are located onbase, with contractor facilities (FFRDC and SETA) located on private property.

Site 3 would locate all HQ SSD facilities on offbase property east of Marksheffel Road (Figure 2.4.3-3). This site could be adapted for the proposed action (Option 1), but would probably not be applicable or necessary for the options of the alternative action.

Site 4 (Figure 2.4.3-4) would locate all HQ SSD facilities adjacent to Falcon AFB, directly east of its current boundaries. This site could accommodate the proposed action and all alternative action options. The distance between Falcon and Peterson AFB services could necessitate the construction of new base support facilities and the hiring of additional personnel.

Because of the lack of suitable onbase land for military family housing, offbase residential planned areas immediately to the east of the base would be the most appropriate sites for MFH development.

omit

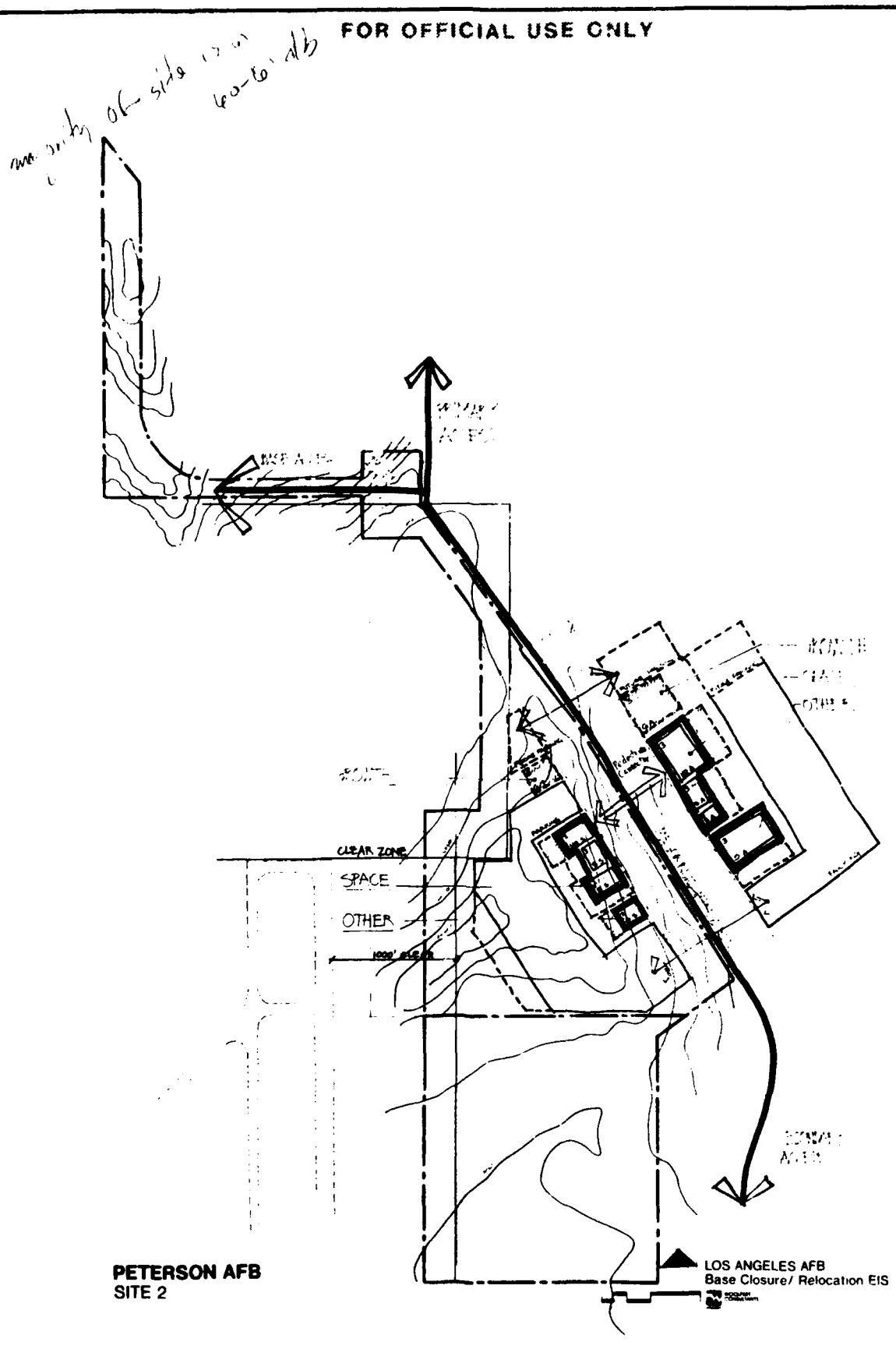
2.4.3.1 Site 1

Site Location and Conditions. Site 1 encompasses the entire 122-acre Lease Amendment property and the northernmost portion of the Lease Option property, about 100 acres. ~~The terrain is moderate with slopes falling in both the 0 to 4 and 4 to 8 percent categories.~~

Adjacent Land Uses. Immediately to the west of this site is the north-south runway of the Colorado Springs Municipal Airport. Immediately south of the Lease Option property is the Colorado Center development (a 4,086-acre, mixed-use project which is to contain 1,133 acres of residential development at build-out and 1,729 acres of commercial, office, and industrial development). Immediately to the east of this site and Marksheffel Road is the 21,325-acre Banning-Lewis Ranch planned new community which extends from Drennan Road on the south to Wooden Road (some 13 miles north) and from Peterson AFB on the west for about 4 miles to the east. Finally to the north of this site is vacant rangeland and a dairy farm facility.

rewrite

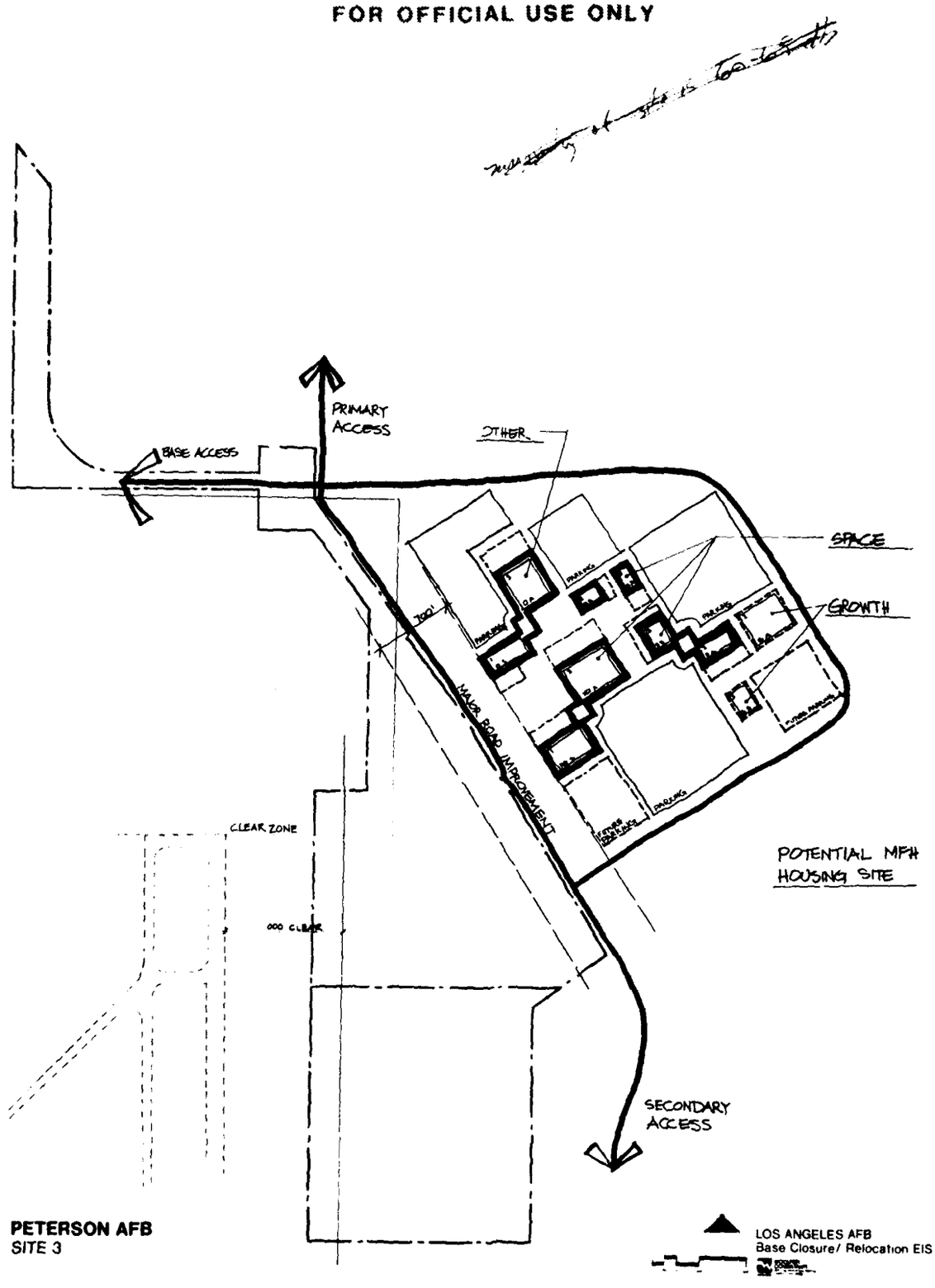
General Accessibility/Direct Access. Primary access to the site would be via Colorado Highway 94 and Marksheffel Road. Secondary access to the site would be via Drennan Road once this roadway is improved. Over the long term, Powers Boulevard, Bradley Road/Marksheffel Road, and the



Note: Building layout for demonstration only.

BCP028

FIGURE 2.4.3-2 PROPOSED SITE 2 AT PETERSON AFB, COLORADO



Note: Building layout for demonstration only.

BCP021

FIGURE 2.4.3-3 PROPOSED SITE 3 AT PETERSON AFB, COLORADO

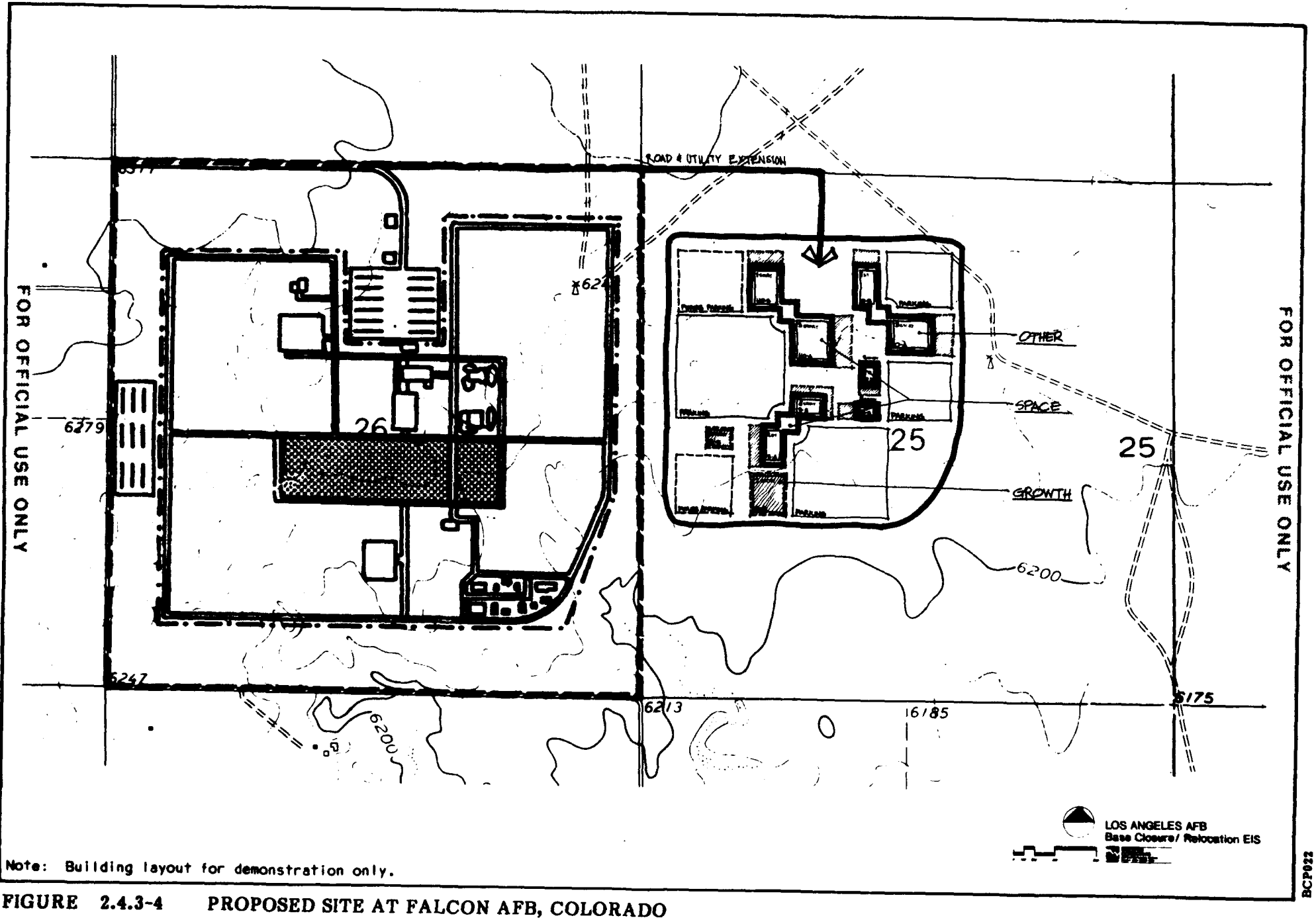


FIGURE 2.4.3-4 PROPOSED SITE AT FALCON AFB, COLORADO

Banning-Lewis Parkway, will provide access to this site assuming that both the Colorado Center and Banning-Lewis Ranch developments build out.

Environmental Constraints. Certain major constraints apply because of the construction of the north-south runway, AICUZ regulations, and required airfield clearances. First, the Clear Zone preempts certain acreage on the northwest side of the site; secondly, the 1,000 feet lateral clearance from the runway centerline preempts the first 250 feet along the western edge of Site 1; and thirdly, the required 7:1 lateral clearance limits to varying degrees the ability to construct multi-story structures on the western half this particular site. Only the far eastern edge of the Lease Amendment landholding is below the L_{dn} 65 noise contours.

remove per Peterson

incorrect information; rewrite

2.4.3.2 Site 2

Site Location and Site Conditions. Site 2 encompasses about 210 acres and is located on the northeast half of the Lease Amendment landholding and on private land directly across Marksheffel Road to the northeast. This private land is part of the ~~Banning-Lewis Ranch~~ RTC. The terrain is moderate with slopes in both the 0 to 4 and 4 to 8 percent categories. The soils present few, if any, constraints on development.

Adjacent Land Uses. Immediately to the west of this site is the north-south runway of the Colorado Springs Municipal Airport. Immediately south is the Peterson AFB Lease Option property and the Colorado Center development. Immediately to the east of this site is the Banning-Lewis Ranch planned new community.

General Accessibility/Direct Access. Primary access to the site would be via State Route 94, Marksheffel Road, and via a new access road linking this site with the southern part of the base. Secondary access to the site will be via Drennan Road once this roadway is improved.

Environmental Constraints. Certain major constraints apply because of the construction of the north-south runway, AICUZ regulations, and required airfield clearances. First, the Clear Zone preempts certain acreage on the northwest side of this site; secondly, the 1,000 feet lateral clearance from the runway centerline preempts the first 250 feet along the western edge of Site 1; and thirdly, the required 7:1 lateral clearance prevents the construction of multi-story structures on the western half of the Lease Amendment landholding.

remove

2.4.3.3 Site 3

Site Location & Site Conditions. This site totals some 175 acres and is located northeast and east of Marksheffel Road adjacent to the Lease Amendment landholding. The terrain is moderate with slopes falling in both the 0 to 4 and 4 to 8 percent categories. Elevations onsite range from 6,060 feet MSL (southwest edge of site) to 6,150 feet MSL (southeast edge of site). The soils present few, if any, constraints on development.

Adjacent Land Uses. Immediately to the west of this site is the north-south runway of the Colorado Springs Municipal Airport. Immediately south of the Peterson AFB Lease property is the Colorado Center development. Immediately to the east of this site is the Banning-Lewis Ranch planned new community.

General Accessibility/Direct Access. Primary access to the site would be via State Route 94, Marksheffel Road, and a new access road which would link this site with the southern part of the base. Secondary access to the site will be via Drennan Road once this road is improved.

Environmental Constraints. Certain major constraints apply because of the construction of the north-south runway, AICUZ regulations, and required airfield clearances.

2.4.3.4 Site 4

Site Location and Site Conditions. This site is located on 180 acres immediately to the east of Falcon AFB, 10 miles east of Peterson AFB, and 2.5 miles south of Colorado Highway 94.

Adjacent Land Users. The land in the vicinity of Falcon AFB is grassland utilized for the cattle grazing. A significant amount of the total landholding of Falcon AFB itself has been leased for grazing purposes. ~~The nearest settlement cluster is at Ellicott to the north and east along Colorado Highway 94.~~

Site Conditions and Site Constraints. The land base in Section 27 is typical grassland and similar to other rangeland in the general vicinity. There is very limited vegetation on the site.

General Accessibility/Direct Access. This proposed site is reached by way of Colorado Highway 94 which traverses El Paso County along an east-west alignment. Secondary access is from the south by way

of Drennan Road which, although unpaved, is utilized by a significant number of Falcon AFB employees. Direct assess to the proposed site would be by way of Enoch Road and the entrance road into Falcon AFB.

Environmental Constraints. ~~The entire landholding of Falcon AFB was previously rangeland and as such has not been the subject of an IRP study. It is assumed that there are no hazardous waste sites in this general area.~~ No constraints there is no indication of hazardous waste. This particular site is 10 miles east of the Colorado Springs Municipal Airport's runway and, therefore, is not affected by the flight operations there or AICUZ noise contours.

2.4.3.5 Military Family Housing Site

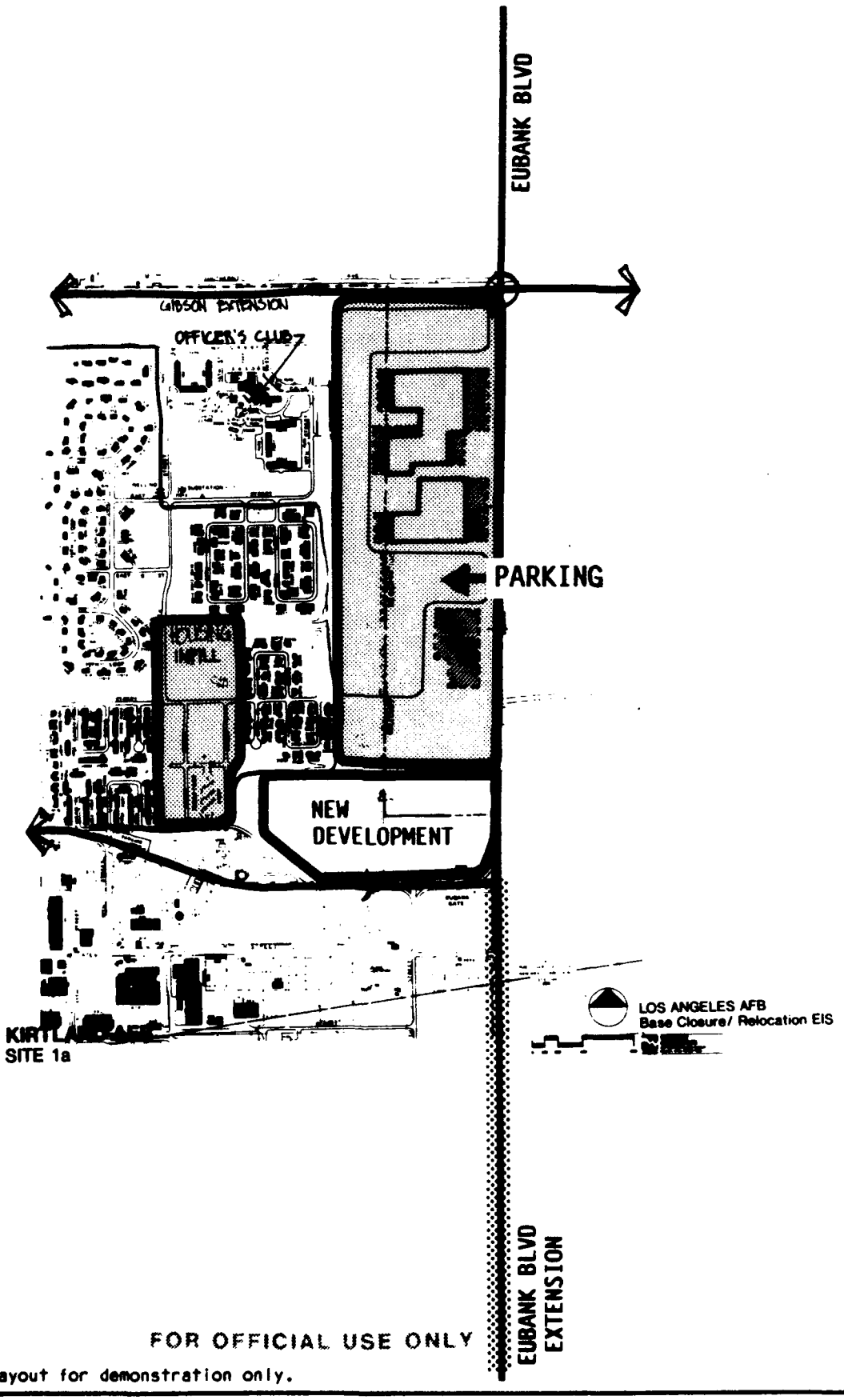
Housing for all of the HQ SSD relocation sites at Peterson/Falcon AFBs would be on 190 acres offbase and east of Marksheffel Road. This land is within the Banning-Lewis Ranch and has some of the same attributes as Sites 3 and 4.

2.4.4 Kirtland AFB, New Mexico

Two primary siting alternatives were evaluated for the relocation of HQ SSD operations at Kirtland AFB. Site 1A (Figure 2.4.4-1) would accommodate a portion of the entire proposed action in combination with Site 1B (Figure 2.4.4-2) or with an eastward extension of the site into currently privately-owned vacant land for the proposed action. Alone, this site could accommodate Options III, IV, and V for partial relocation alternatives with emphasis on the smaller requirements. Site 1B, the old hospital site and other facilities, could accommodate about 25 percent of the total relocation requirement in modified existing facilities.

Site 2 (Figure 2.4.4-3), south of the base golf course, could accommodate all or part of the HQ SSD relocation, ~~but would be justified~~, due to its separation from existing utilities and support, only if major facilities were established.

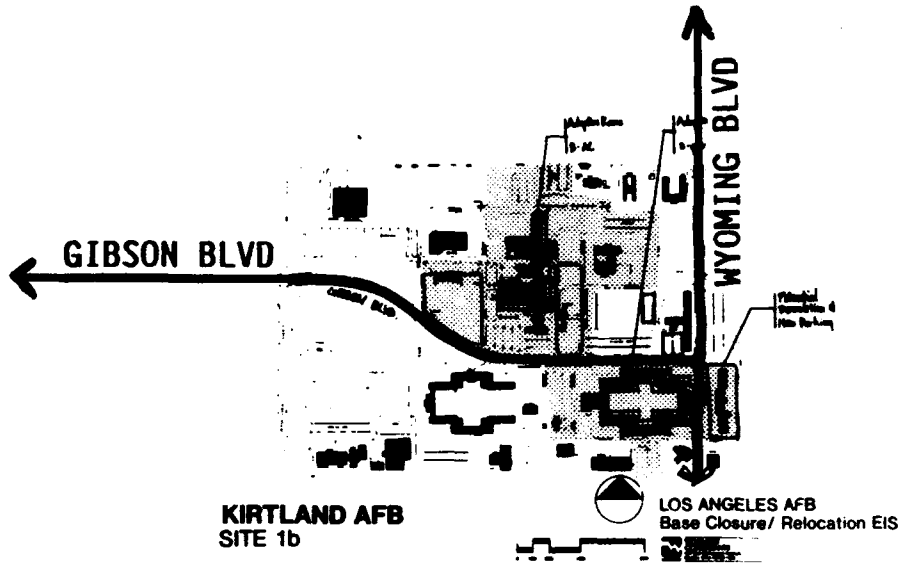
omit
Military family housing sites could be developed adjacent to existing housing near the Officers' Club or in the golf course area.



Note: Building layout for demonstration only.

BCK016

FIGURE 2.4.4-1 PROPOSED SITE 1A AT KIRTLAND AFB, NEW MEXICO

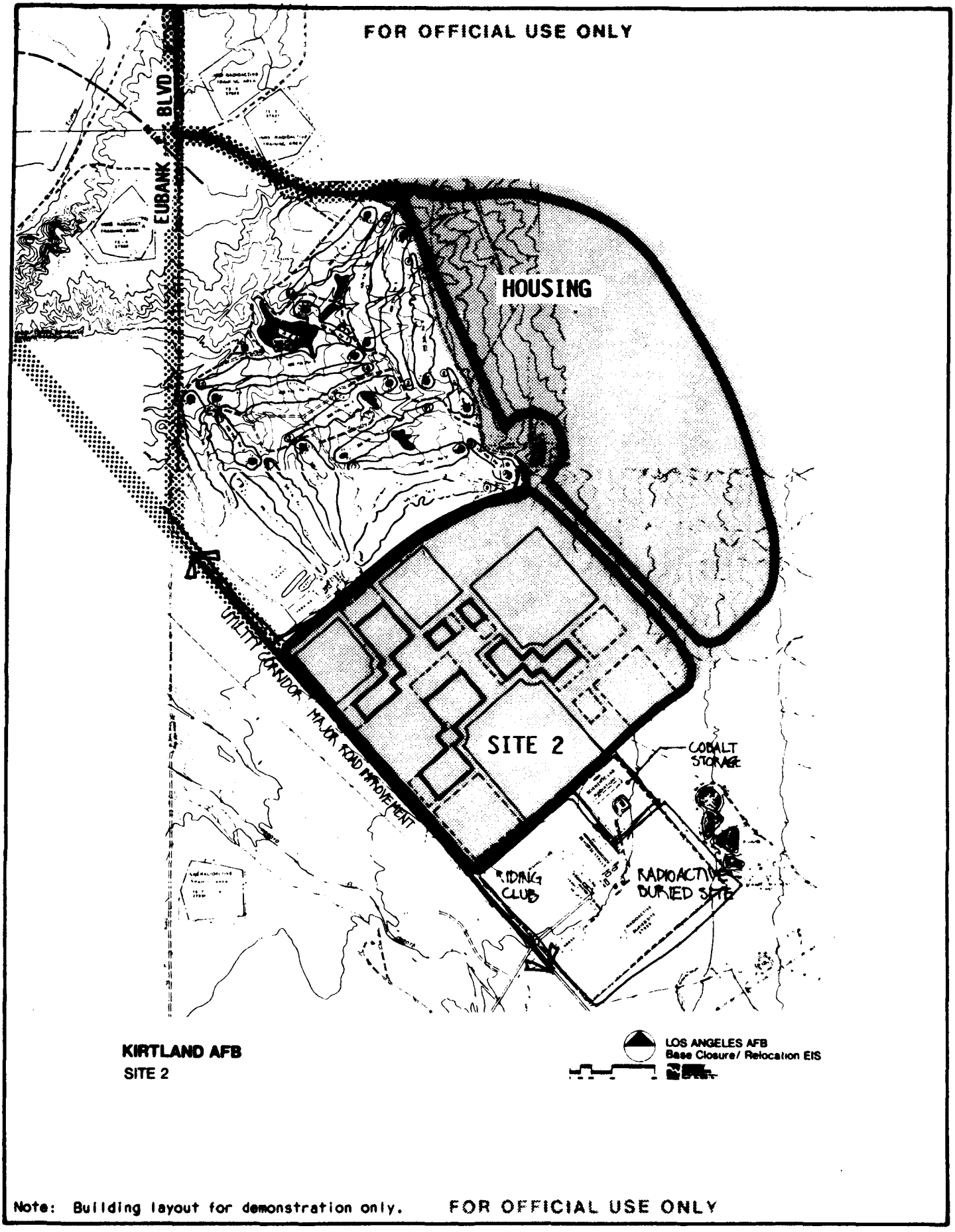


Note: Building layout for demonstration only.

FOR OFFICIAL USE ONLY

BCK017

FIGURE 2.4.4-2 PROPOSED SITE 1B AT KIRTLAND AFB, NEW MEXICO



Note: Building layout for demonstration only.

BCK018

FIGURE 2.4.4-3 PROPOSED SITE 2 AT KIRTLAND AFB, NEW MEXICO

2.4.4.1 Site 1A

Site Location and Site Conditions. This site encompasses approximately 113 acres (80 acres is owned by the Department of Energy [DOE]) and is bounded on the north by Southern Avenue, on the east by Eubank Avenue, on the south by certain proposed DOE administrative office developments along the north side of East G Street, and on the west by the Officers' Club, Temporary Living Facilities/Visiting Officers' Quarters (TLF/VOQ), and 24th/25th Loop and East Capehart MFH areas.

The terrain is flat throughout the site. Because Site 1A is typical rangeland, there is no significant vegetative cover. The proposed HQ SSD/Aerospace Corporation complex, and related off-street parking, will be located on this site. But, with the construction of this proposed facility, there will be little room for future expansion. ~~The relationship to the Officers' Club and the TLF/VOQ facilities will be positive.~~

Adjacent Land Uses. The Officers' Club and various TLF/VOQ facilities are located west of the northern portion of this site, and the 24/25th Loop and East Capehart MFH areas are located west of the middle and southern portions of this site. The Sandia Labs and the DOE control the real estate south of East G Street. ~~East of Eubank Avenue is vacant land owned by the Albuquerque School Board.~~

General Accessibility/Direct Access. Site 1A is fairly accessible via Eubank Avenue. The Gibson Avenue realignment will traverse the northern edge of this particular site, which will further enhance this site's accessibility. Primary and direct access onto this site will be from Eubank Avenue. Secondary access will be from D Street, 5th Street, and A Street, but these roads do not have MFH units fronting them.

No constraints

Environmental Constraints. ~~This site has no AICUZ noise contours that would limit or preclude development. The 65 L_{dn} noise contour falls about 1,800 feet south of this site.~~

2.4.4.2 Site 1B

Site Location and Site Conditions. Site 1B is in the middle of the cantonment area. The cantonment area is all previously disturbed land so no biota or cultural resource materials are found in this vicinity. The hospital building (Building 20140) contains 168,000 square feet (gross) and 112,000 square feet

(net). It occupies 15 acres and includes adjacent existing/potential off-street parking areas. Much of this building is available for reuse; only the clinic, occupying the south wing, will remain.

Immediately southwest of the Gibson Boulevard/Wyoming Avenue intersection are three buildings (Buildings 20201, 20201, and 20203) available for reuse by HQ SSD. This site is 15 acres and includes Building 20200, which could potentially be demolished to create an off-street parking site for relocated employees. ~~However, that building may be too narrow to lend itself to the required reuse~~.

Adjacent Land Uses. The chapel is immediately west of the hospital building. Off-street parking lots, an open field, and Building 20160 are located west of the hospital. South of Gibson Boulevard, opposite the hospital, are several low-rise office buildings in two clusters around central courtyards. Southeast of the hospital is the Air Force Operational Testing and Evaluation Center (AFOTEC) and two satellite buildings, one under construction and one planned.

General Accessibility/Direct Access. Both the hospital and Buildings 20201, 20202, and 20203 (each 15 acres) are highly accessible from the entire installation, being adjacent the intersection of the base's two major thoroughfares--Gibson Boulevard (east-west) and Wyoming Boulevard (north-south). Direct access to the hospital is from both Gibson Boulevard and D Street. The interior offstreet parking lot for Buildings 20201, 20202, and 20203 can be accessed from both Gibson and F Street.

Environmental Constraints. No constraints ~~Both the hospital and Buildings 20201, 20202, and 20203 are located in areas that are below the 65 L_{dn} noise contour, thus they would not be adversely affected by prevailing aircraft noise.~~

2.4.4.3 Site 2

Site Location and Site Conditions. This is a remote site that is located along Pennsylvania Avenue approximately 2.5 miles southeast of the south edge of the cantonment and approximately 6,000 feet northwest of the Manzano Mountain complex. This site encompasses approximately 175 acres of land immediately adjacent (southeast) to the Tijeras Golf Course, which occupies 210 acres. The terrain slopes toward the golf course, and the site elevations range from 5,435 feet MSL in the southwest corner of the site (adjacent the riding stable) to 5,390 feet mean sea level adjacent the 9th hole of the golf course. Because this site is typical range land, it has no significant vegetation.

Adjacent Land Uses. Site 2 is bounded on the southwest by Pennsylvania Avenue; on the southeast by the riding stable; cobalt storage facility, and the radioactive burial facility; and on the northwest by the Tijeras Arroyo Golf Course. To the northwest lies undeveloped range land.

General Accessibility/Direct Access. Primary access to this site would be Pennsylvania Avenue which is the southerly extension of Wyoming Boulevard and also by way of Eubank Road extended.

Environmental Constraints. Immediately adjacent the site, to the southeast, is an abandoned sewage lagoon that was subsequently designated as an IRP site and is scheduled for clean up.

There is a geologic fault line - the Hubble Springs Sandia Fault - which bisects Site 2 and yet another fault the Tijeras Fault some 1.5-2 miles southeast of this site.

2.4.4.4 Military Family Housing

The MFH requirement at Kirkland AFB totals 260 units and approximately 72 acres of land. A relatively modest amount of vacant land exists within the cantonment - some 21 acres in the 2425th Loop East Capehart housing area. This would accommodate about 150 MFH units. The DOE property adjacent the Officers' Club includes 80 areas and is the preferred site within the cantonment area for MFH units.

The land adjacent the base golf course (Site 2) has also been proposed as a potential MFH site. While there is ample acreage in this general vicinity for both the required 260 MFH units (72 acres), there are also numerous constraints: as a remote site, all the military families would be removed from the community/MWR facilities in the cantonment area, and there is a fault line running through this site.

2.5 NO ACTION ALTERNATIVE

With the no action alternative, Los Angeles AFB and SSD-SB would remain open at its present size and HQ SSD and Aerospace Corporation remain intact. ~~However, to sustain a viable operation into~~ the twenty-first century, a continued investment in new office facilities, additional military family housing, refurbishment of existing buildings to meet Air Force standards, infrastructure improvements and increased civilian pay will be required. Facility upgrade requirements to support this "no action" alternative are presented in Table 2.5-1.

omit

Table 2.5-1

No Action Alternative
Facility Requirements

Location	Type	Existing	New Facilities
		(Government Facilities)	
Los Angeles AFB			
Area A	Office	860,509 sf*	134,000 sf
Area B	Office/Supt	467,420 sf**	327,469 sf
Annex 3	Office	30,000 sf	Sold
Fort MacArthur	Office/Supt	113,235 sf	0
	Housing	404 units***	0
Pacific Crest	Housing	91 units	0
Pacific Heights	Housing	79 units	0
Other Locations	Housing		622 units
		(FFRDC Facilities)	
Aerospace Corp	Office-Own	920,291 sf (0)	
	Office-Lease	554,608 sf (0)	

Notes: * - Most to be refurbished
** - Most to be demolished
*** - Includes 42 units controlled by the Army under 1982 agreement.

2.6 COMPARISON OF ALTERNATIVES

A complete summary of changes to the local community, changes in hazardous materials management practices, and impacts to the physical environment is provided in the Summary and Table S1. More detailed discussions are provided in Chapter 4.0, Environmental Consequences.

- Introduction to proposed action.

3.0 AFFECTED ENVIRONMENT

This section includes the environmental setting description for Los Angeles Air Force Base (AFB), including Headquarters Space Systems Division (HQ SSD) and appropriate supporting units. The environmental setting description also includes Aerospace Corporation, a Federally Funded Research and Development Center closely associated with the day-to-day operations of Los Angeles AFB. This section also describes the environmental setting for ~~Vandenberg~~ AFB, ~~California~~, which has been selected as a possible relocation site for HQ SSD, appropriate supporting units, and Aerospace Corporation. In addition, the environmental settings for March AFB, California; Peterson AFB and Falcon AFB, Colorado; and Kirtland AFB, New Mexico are described. These bases are being considered as alternative locations for the beddown of HQ SSD, appropriate supporting units, and Aerospace Corporation.

3.1 LOS ANGELES AIR FORCE BASE, CALIFORNIA

Los Angeles Air Force Base (AFB), with an area of 238 acres (197 acres are fee owned, 40 acres are public domain, and 1 acre is easement), is located in the Los Angeles metropolitan area in Los Angeles County, California (Figure 3.1-1). The host organizations at this Air Force Systems Command (AFSC) base are Headquarters, Space Systems Division (SSD) and the 6592 Air Base Group. The base has 24 tenant units onbase and provides support to approximately 40 offbase units/activities.

The base consists of five noncontiguous sites: Areas A and B in the City of El Segundo; Lawndale Annex No. 3 (Lawndale Annex) in the City of Hawthorne; the Middle Reservation of the Fort MacArthur Military Reservation (Fort MacArthur), and the Pacific Crest and Pacific Heights Housing Areas in the San Pedro area of the City of Los Angeles. The Fort MacArthur area includes both military family housing and some administrative/support facilities (Figures 3.1-2 and 3.1-3). Aerospace Corporation, a Federally Funded Research and Development Center closely associated with the day-to-day operations at Los Angeles AFB, is located adjacent to Areas A and B (Figure 3.1-2).

Areas A and B consist of two separate parcels with a combined area of 95 acres located at the intersection of Aviation and El Segundo Boulevards, approximately 0.7 miles south of Los Angeles International Airport and 2.5 miles east of the Pacific Ocean. Aerospace Corporation is located west of Area A and south of Area B. Another facility of Aerospace Corporation is located on Aviation Boulevard east of Area B. Lawndale Annex No. 3 is located approximately one mile south of Area A on the east side of Aviation Boulevard, south of Rosecrans Avenue.

The Fort MacArthur, Pacific Crest, and Pacific Heights Housing Areas are located in the southeastern portion of the Palos Verdes Peninsula approximately 14 miles southeast of Areas A and B. The Fort MacArthur Housing Area is located west of Los Angeles Harbor, approximately six miles southwest of downtown Long Beach. The Pacific Crest and Pacific Heights Housing Areas are located approximately 1.5 miles west of the Fort MacArthur Housing Area and 0.5 miles north of the Pacific Ocean near the intersection of Western Avenue and 25th Street. The two housing areas were created out of the former U.S. Army property at White Point, a part of the Fort MacArthur Military Reservation.

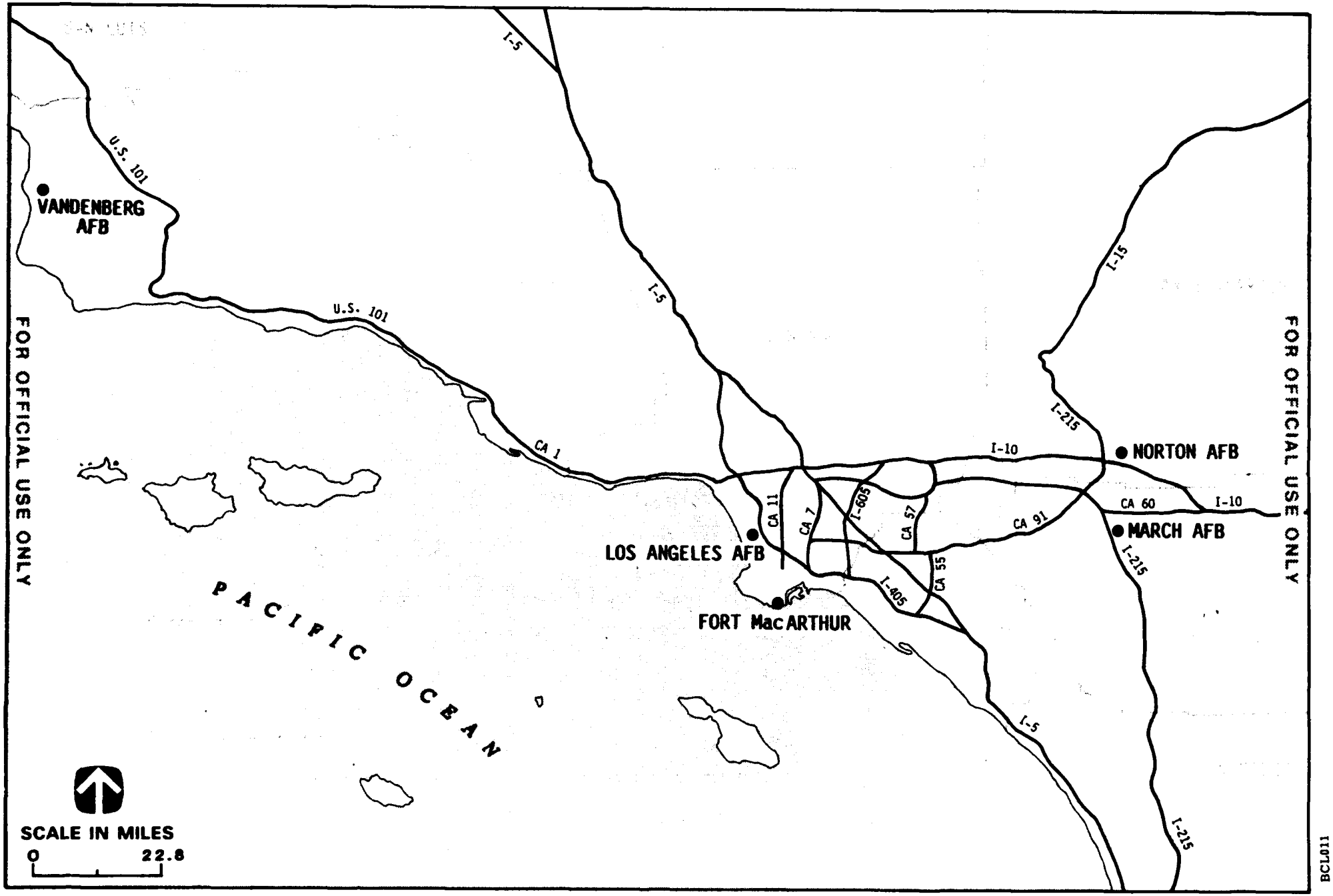


FIGURE 3.1-1 REGIONAL VICINITY MAP FOR LOS ANGELES AFB, VANDENBERG AFB, MARCH AFB, AND NORTON AFB, CALIFORNIA

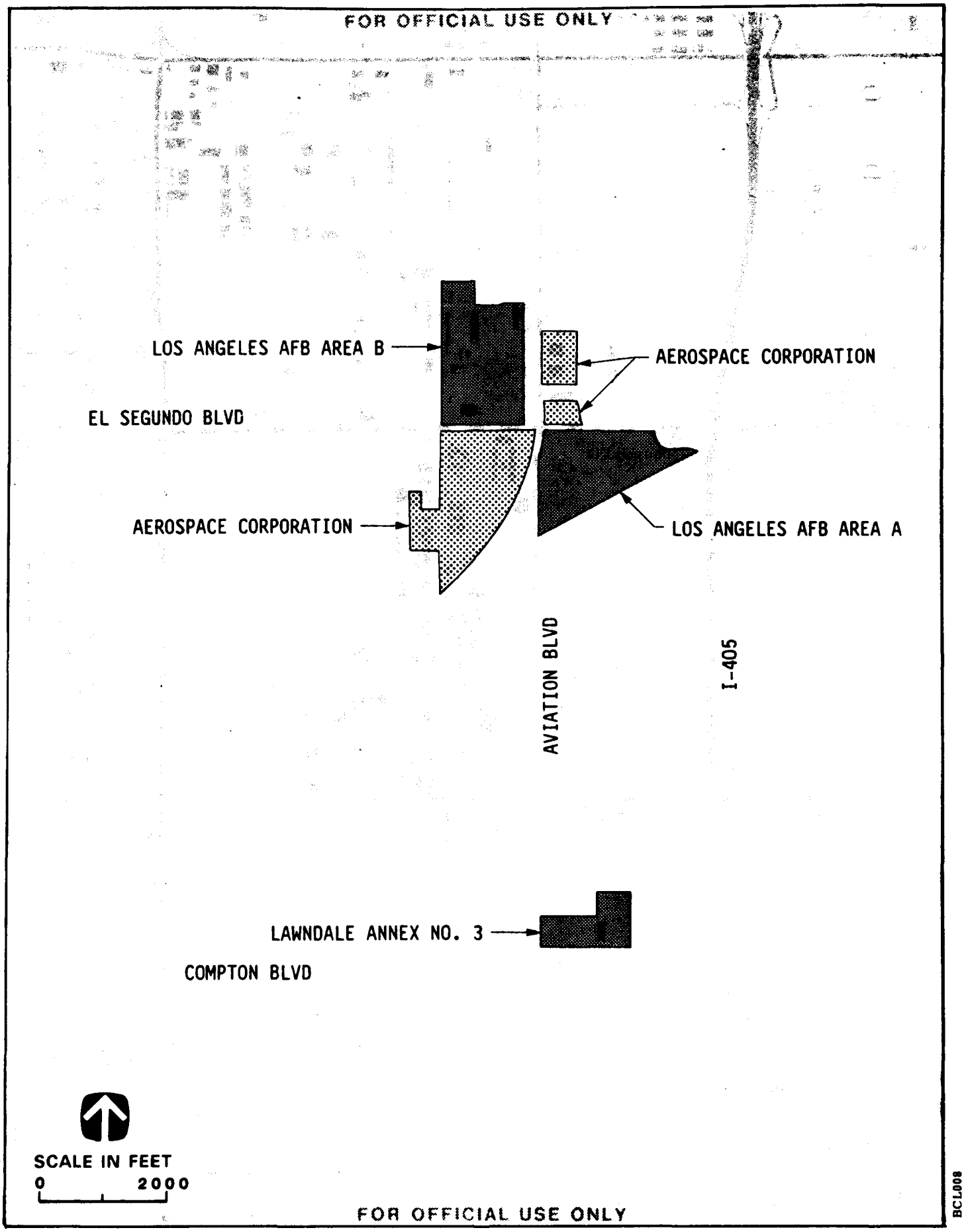


FIGURE 3.1-2 LOCAL VICINITY MAP FOR LOS ANGELES AFB (AREAS A AND B AND LAWNDALE ANNEX NO. 3) AND AEROSPACE CORPORATION, LOS ANGELES COUNTY, CALIFORNIA

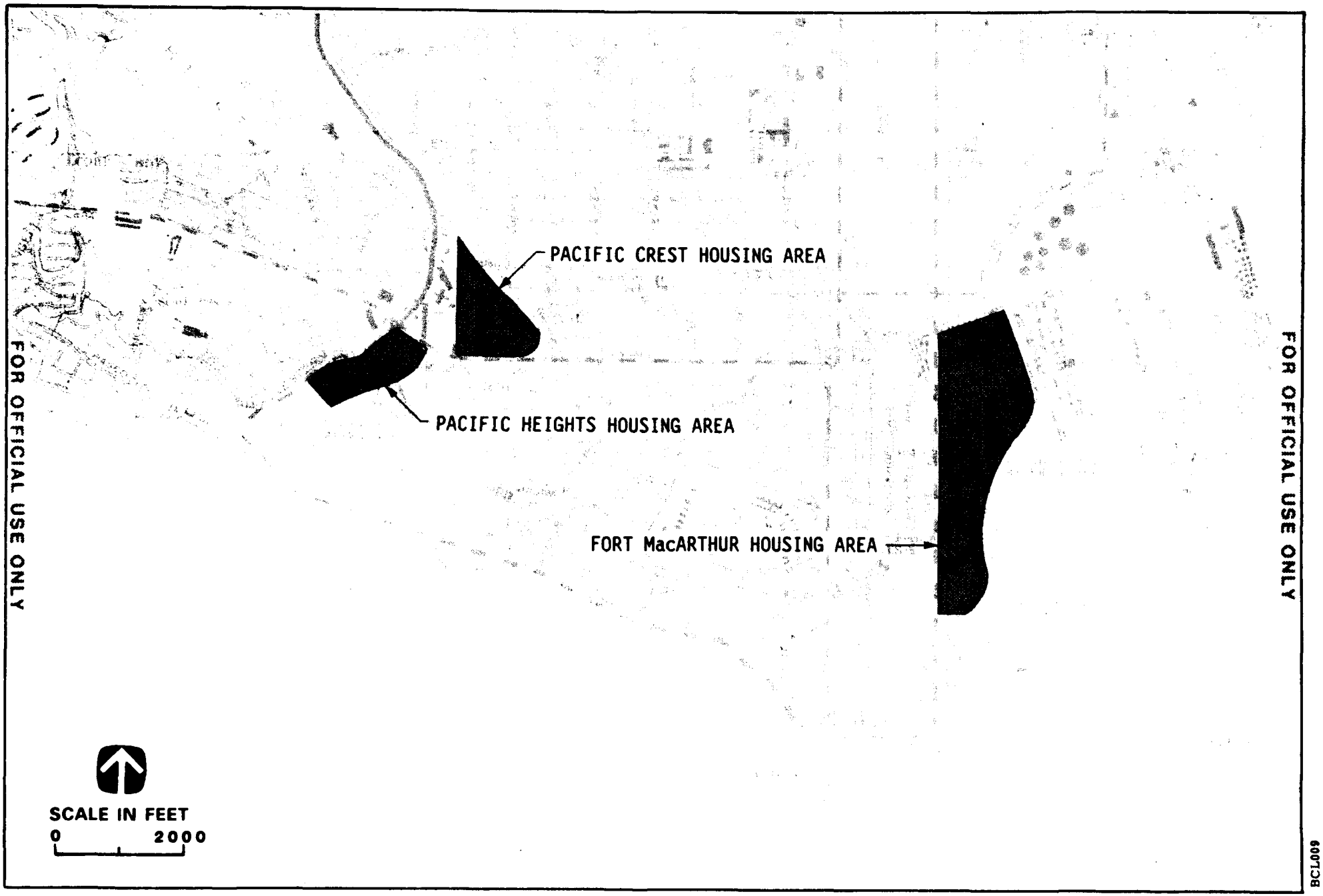


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FIGURE 3.1-3 LOCAL VICINITY MAP FOR FORT MacARTHUR, PACIFIC CREST, AND PACIFIC HEIGHTS HOUSING AREAS, LOS ANGELES AFB, LOS ANGELES COUNTY, CALIFORNIA

Los Angeles AFB employed 1,761 permanent party military personnel (1,324 officers and 417 enlisted), 1,430 appropriated fund civilian personnel, 224 other civilian personnel, and 655 contract civilians at the end of fiscal year (FY) 1989. Aerospace Corporation employed 4,075 personnel at the end of FY 1989. Approximately 29 percent of the military personnel live in one of the three housing areas and 71 percent live offbase. Military personnel living offbase and the civilian personnel live in communities throughout Southern California.

History. Los Angeles AFB evolved from the site of the Western Development Division (WDD) of the Air Research and Development Command established in July 1954 in Inglewood, California. WDD was responsible for developing the nation's first intercontinental ballistic missile, the Atlas. In 1955, Space Technology Laboratories (STL) of Ramo-Wooldridge Corporation, the primary contractor at WDD, purchased 41.45 acres at the southeast corner of Aviation and El Segundo Boulevards and constructed a research and development (R&D) center (now Area A). The Air Force purchased the R&D center from STL in December 1960 and redesignated it Los Angeles Air Force Station (AFS) in April 1964. In June 1962, the Air Force acquired a permit to use four buildings in the Navy-owned Douglas Street site (now Area B). These facilities and 52.28 acres (Area B) were transferred from the Navy to the Air Force in October 1963. In March 1968, the Navy transferred an additional 1.42 acres in Area B to the Air Force, increasing the property to 53.7 acres. Los Angeles AFS became the headquarters of SSD in October 1979 and was renamed Los Angeles AFB in 1988.

The Air Force acquired 13.34 acres of the former Lawndale Army Missile Plant from the General Services Administration in August 1985. The property was acquired for the construction of 400,000 square feet of additional administrative office space for Los Angeles AFB. Building 80 and several temporary modular buildings are used for this purpose.

omit

The Air Force acquired 96 acres of the Middle Reservation of the Fort MacArthur Military Reservation in October 1982. Fort MacArthur had 43 existing residences, and 252 additional housing units were constructed in 1983. The Fort MacArthur Housing Area also includes administrative offices, several warehouses, and civil engineering shops. In 1982, the Air Force acquired additional Army property located at the White Point Reservation of Fort MacArthur for the construction of the Pacific Crest (91 residences) and Pacific Heights (79 residences) Housing Areas.

Mission. The mission of SSD includes the following:

- plans, programs, and manages AFSC programs to acquire space systems, subsystems, support equipment, and related hardware and software;
- provides maintenance, construction, alteration, and security of launch, tracking, and support facilities;
- conducts research, exploratory development, and advanced development programs to support future space missions;
- provides and conducts launch and flight test and evaluation support of major Department of Defense (DOD) programs and programs of other federal agencies;
- performs the functions of launch, launch control, deployment checkout prior to turnover, major anomaly resolution not handled by the operating command, and sustaining engineering;
- performs on-orbit test and evaluation of systems, subsystems and components;
- discharges Air Force responsibilities for designated Air Force, DOD and international space programs;
- plans, programs, and acquires test facilities and other test investments required by AFSC space programs at all locations (test centers and contractor facilities);
- plans and provides for security on all systems and information requiring safeguards consistent with Air Force and DOD security directives;
- provides management oversight for commercial expendable launch vehicle activity;
- conducts launch agreement negotiations with commercial space launch operators;

- provides system security engineering management support for selected space systems, subsystems, facilities, support equipment, and related hardware and software; and

- supports other product divisions and federal agencies with technologies derived from its subordinate laboratories.

The 6592 Air Base Group provides administrative, civil engineering, logistical, chaplain base security police, personnel, disaster preparedness, morale, family support, welfare, social actions, recreation, and headquarters squadron support for organizations and personnel assigned or attached to Los Angeles AFB and Fort MacArthur. Host and tenant organizations at Los Angeles AFB are listed in Table 3.1-1.

Aerospace Corporation. Aerospace Corporation's central mission is to assist the Air Force in applying the full potential of science and technology to the advancement of space systems vital to national security. Aerospace Corporation engages in space systems architecture, engineering, planning, analysis, and research, predominantly for programs managed by SSD.

Aerospace Corporation is a Federally Funded Research and Development Center supporting the DOD and operating under government-stipulated procedures and constraints appropriate to its mission. Its principal function, architecture-engineering of space systems, is performed under a single contract with SSD. Aerospace Corporation's corporate general office complex is composed of 17 company-owned and leased office buildings, research facilities, and laboratories located adjacent to Los Angeles AFB in El Segundo.

Table 3.1-1

Host and Tenant Organizations at Los Angeles AFB

HOST - HEADQUARTERS, SPACE SYSTEMS DIVISION

HQ, Space Systems Division
6592 Air Base Group
USAF Clinic

TENANTS • - tenants left behind

Air Force Communications Command (AFCC)
Space Systems Acquisition Support Office
AFOTEC OL-AC (Air Force Systems Command [AFSC])
• AFWAL West Coast Office
• Air Force Commissary
• Air Force Audit Agency
Air Force Cryptologic Support Center (Electronic Systems Command)
• Air Force Office of Special Investigations
Air Training Command Resident Office
• Defense Courier Station - Los Angeles (Navy)
Defense Systems Management College
Foreign Technology Division Liaison (AFSC)
Det 3, AFALC (Air Logistics Command [ALC])
Det 13, 1369 Audiovisual Squadron (Military Airlift Command [MAC])
Det 27, 6592 Management Engineering Squadron (AFSC)
Det 42, Sacramento Air Logistics Center (AFLC)
Det 50, 2 Weather Squadron (MAC)
• General Accounting Office
National Aeronautics and Space Administration (NASA) Liaison
Navy Space Systems Activity
• Small Business Administration
Strategic Air Command Liaison
Tactical Air Command Liaison
U.S. Marine Corps Liaison
2080 Communications Squadron (AFSC)
U.S. Army Strategic Defense Command Liaison
• State of California Department of Military

Note: List does not include tenants at other locations whose operations are not related to the operation of Los Angeles AFB (e.g., Air Force Recruiting and Air Force Program Offices).

Source: U.S. Air Force 1989.

3.1.1 Community Setting

3.1.1.1 Population and Employment

Population. Based on 1980 U.S. Census data and more recent State of California surveys, the five-city area surrounding Los Angeles AFB (Hawthorne, Lawndale, Redondo Beach, Manhattan Beach, and El Segundo) has experienced an overall growth rate of 15 percent during the past decade and a population increase from 182,300 to 210,300. These cities, in the South Bay area of Los Angeles County, are expected to experience moderate growth rates over the next ten years. The population of Los Angeles County, the largest county in the United States, has increased from 7,477,500 to 8,650,300 since 1980, resulting in a county-wide growth rate of approximately 16 percent. Projections call for a 5 percent growth rate over the next ten years.

Employment. The communities bordering Los Angeles AFB have a work force of 116,624. Together, with workers commuting from other areas, these people fill the 172,877 jobs supported by the cities in the vicinity of the base. The Los Angeles area has seen steady and significant increases in employment over the past 15 years and is expected to continue this trend into the next century with job openings increasing at a rate of approximately 1 percent per year. These cities depend heavily on the manufacturing sectors for economic well-being as many of the residents are employed by aerospace and electronics firms in the area. The presence of Los Angeles AFB also influences the area's job-base as expenditures made by the military create approximately 10,145 jobs in the region surrounding Los Angeles AFB.

In Los Angeles County, the total civilian workforce is currently 4,350,000 with an unemployment rate of 4.9 percent. Total employment is expected to rise as the population grows, but the unemployment rate is expected to remain stable. The growth in total wage and salary employment has fluctuated between 2 and 3 percent over the last five years. The three largest sectors in the local economy, manufacturing, services, and retail trade, are expected to see growth rates of 1.3, 3.0, and 2.1 percent, respectively, in 1990.

3.1.1.2 Housing

The 1980 U.S. Census estimated that there were 2.85 million housing units in Los Angeles County. It is projected that the number of units will exceed 3 million in 1990, and increase to 3.3 million by the year 2000, an 11 percent increase in ten years. In the vicinity of Los Angeles AFB, the total number of units was 78,372 in 1980, and is estimated to be 85,762 in 1990. The number of units is projected to increase to 90,406 by the year 2000, a 5 percent increase. Los Angeles County is a fully-developed area characterized by very little vacant land and low vacancy rates. As a result, home prices and rental costs are very high with costs escalating in the beach communities.

Los Angeles AFB has 750 units of military housing for its accompanied (married) personnel. Housing consists of two, three, and four bedroom units, and the majority are occupied by Air Force officers. The base also provides additional housing (e.g., dormitories and temporary living facilities) for unaccompanied permanent and visiting officers and enlisted personnel.

3.1.1.3 Education

The five-city area surrounding Los Angeles AFB has a combined total of 10 high schools and 37 elementary schools with a total enrollment of 23,584 high school students and 17,100 elementary school students. In spite of population increases in the area, the trend toward fewer children per household, coupled with an aging population, has led to a total enrollment that has been gradually declining recently. As a result, many area schools are operating below capacity.

3.1.1.4 Community Services

Police and fire protection for the three housing areas is provided by the Harbor Divisions of the City of Los Angeles police and fire departments. Lawndale Annex No. 3 is provided police and fire protection by the City of Hawthorne. Onsite security at Los Angeles AFB and Aerospace Corporation facilities is maintained by private security firms under contract to the federal government. Los Angeles AFB (Areas A and B) and Aerospace Corporation are provided fire protection by the City of El Segundo.

Los Angeles AFB provides medical services to military personnel and their dependents. In 1989, the base clinic recorded 35,665 outpatient visits. In addition to the active-duty and military dependents, the facilities also serve an estimated 37,500 people who are military retirees or dependents of those retirees. Other military medical facilities are available to active-duty personnel and retirees in the region, including the Air Force Regional Hospital at March AFB, the Navy Hospital at Long Beach, and Veteran's Hospitals in Los Angeles, Loma Linda, and Long Beach.

While the Department of Defense provides medical services to military personnel and their dependents, there are many hospitals in the vicinity which can deliver emergency and elective care. Centinela Hospital Medical Center, Daniel Freeman Hospital, UCLA Harbor Medical Center, RFK Medical Center, and Harbor General Hospital are located near the base and have a combined bed capacity of over 1,500. Medical care in nonmilitary clinics and hospitals is offered through the (CHAMPUS) program.

3.1.2 Land Use

3.1.2.1 Existing Land Use Patterns

Los Angeles AFB and Aerospace Corporation. Los Angeles AFB (Areas A and B) and Aerospace Corporation are located within a two-square-mile industrial district in the eastern portion of El Segundo. This area is dominated by the aerospace industry. The other industrial district, in the southwestern part of the city, is older and occupied by a Chevron USA Inc. oil refinery.

Areas A and B and most of the facilities of Aerospace Corporation are concentrated at or near the intersection of Aviation and El Segundo Boulevards on the extreme eastern side of the City of El Segundo (Figures 3.1-1 and 3.1.2-1). Area A is located on the southwest corner of the intersection on a 41.5-acre triangular parcel. Area A is a highly classified military research and development installation. Area B is located north of the Aerospace Corporation complex and northwest of Area A. Area B, with an area of 53.7 acres, primarily consists of base operating support facilities, including

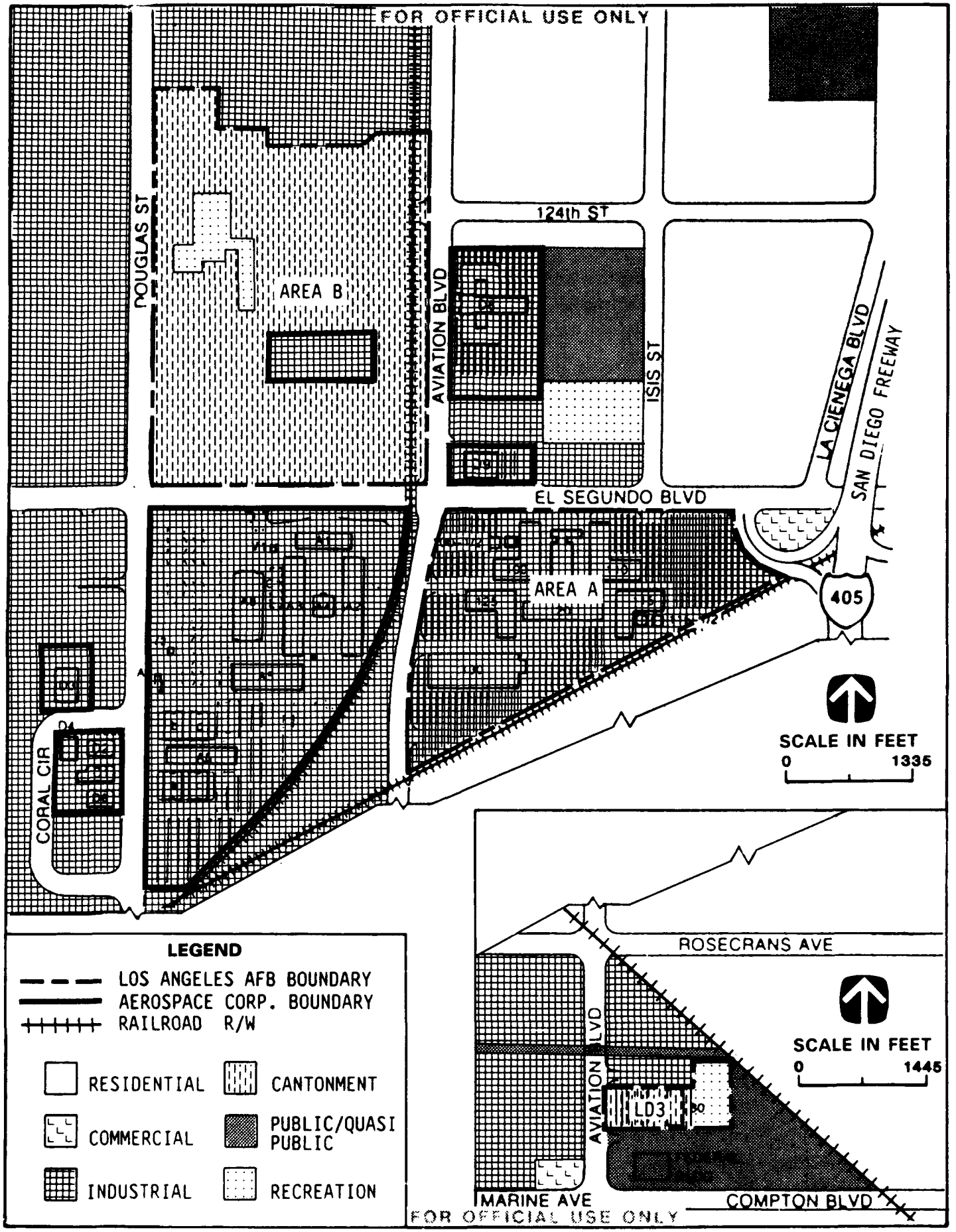


FIGURE 3.1.2-1 LAND USE AT LOS ANGELES AFB (AREAS A AND B AND LAWNDALE ANNEX NO. 3) AND AEROSPACE CORPORATION

administrative offices, recreation facilities, and industrial shops. Aerospace Corporation leases three additional buildings not shown in Figure 3.1.2-1. Aerospace Corporation Building D-10 is located 0.25 miles west of Area B, and Buildings D-7A and D-7B are located 0.6 miles northwest of Area B.

Industrial land uses surround the Los Angeles AFB/Aerospace Corporation complex to the north, west, and south. Residential land uses consist of two single-family neighborhoods to the north and south of Area A. Both neighborhoods have elementary schools, and the northern neighborhood includes a county park. Commercial land uses in the area consist of a hotel located east of Area A. Railroad right-of-ways, owned and operated by the Southern Pacific Railroad Company, are located west and south of Area A.

Lawndale Annex No. 3. Lawndale Annex No. 3 is located approximately one mile south within an industrial district in the southwest corner of the city of Hawthorne and adjacent to industrial districts in the cities of El Segundo, Lawndale, Manhattan Beach, and Redondo Beach. Land uses in these districts are primarily associated with the aerospace industry (Figure 3.1.2-1).

Lawndale Annex No. 3 is located on a 13.34-acre "L" shaped parcel fronting onto Aviation Boulevard. The western portion of the facility includes a fenced dry storage area and an employee parking lot for Building 80 and the temporary modular buildings. The eastern part of the property contains recreation facilities including a multipurpose baseball diamond and football/soccer field.

Lands surrounding Lawndale Annex No. 3 consist of industrial and public uses. To the north is utility right-of-way owned by Southern California Edison (SCE) with high voltage transmission lines and a 9.39-acre parcel owned by the State of California. The property was used for the storage of state records and office equipment, and is presently occupied by a private company specializing in dry storage of boats, recreational vehicles, vehicles, and self storage. The rear of the property is used as a corporation storage yard. The Los Angeles County Transportation Commission (LACTC) is planning to use the property as a maintenance and storage yard for rolling stock of the Norwalk - El Segundo Rail Transit Project. To the east is a large SCE substation, vacant open space, and the shared rights-of-way of the Atchison, Topeka and Santa Fe Railroad Company and SCE. The railroad bed is projected to be raised to accommodate the planned Compton Railroad Overpass and Compton Road

Space Park Station of the LACTC Metro Green Line. A six-story Federal Building is located to the south, and a large industrial complex owned by TRW, Inc. is located to the west.

Fort MacArthur Military Reservation. Fort MacArthur consists of 295 housing units for junior officers and enlisted personnel; administrative offices and group quarters (including the Patton Quadrangle), warehousing and storage facilities, civil engineering shops, an open mess, communications facility, the historic Trona Plant (Building 425) and recreational facilities including tennis courts, basketball courts, large tot lots, picnic areas, and a pool and bathhouse (Figure 3.1.2-2).

The former Lower Reservation of Fort MacArthur, encompassing 46 acres, is located east of the housing area. This land was excessed by the Army in 1981 and now is owned by the City of Los Angeles and administered by the City's Harbor Department. The Air Force has leased a five-acre parcel to the Harbor Department to improve public access and scenic view points. The area now includes the West Channel/Cabrillo Beach Recreational complex, consisting of recreational facilities, a marina, a hotel, a tourist shopping center, a tidal marsh, a Boy Scout Sea Scout base, parks, and commercial facilities.

Land uses to the north, south, and west of Fort MacArthur generally consist of mixed single-family and multiple-family residences, with some commercial.

Pacific Crest and Pacific Heights Housing Areas. The Pacific Crest and Pacific Heights Housing Areas provide 170 housing units for field grade and senior officers (i.e., major through colonel). The Pacific Crest Housing Area is located on a 22-acre parcel and was the site of the U.S. Navy Portsmouth Housing Area until the late 1960s. The property was excessed to the City of Los Angeles for park purposes by the U.S. Department of the Interior, and the city developed Bogdanovich Park. The City of Los Angeles later vacated the park and conveyed the parcel to the Air Force for construction of 91 detached single-family housing units. The land use surrounding the Pacific Crest Housing Area is urban. The areas east and south consist of the U.S. Navy Whites Point Housing Area, a church, a preschool, and single-family residences. The areas to the north and west include a mixture of multiple-family residences, a church, a neighborhood commercial shopping center, and a City of Los Angeles fire station (Figure 3.1.2-3).

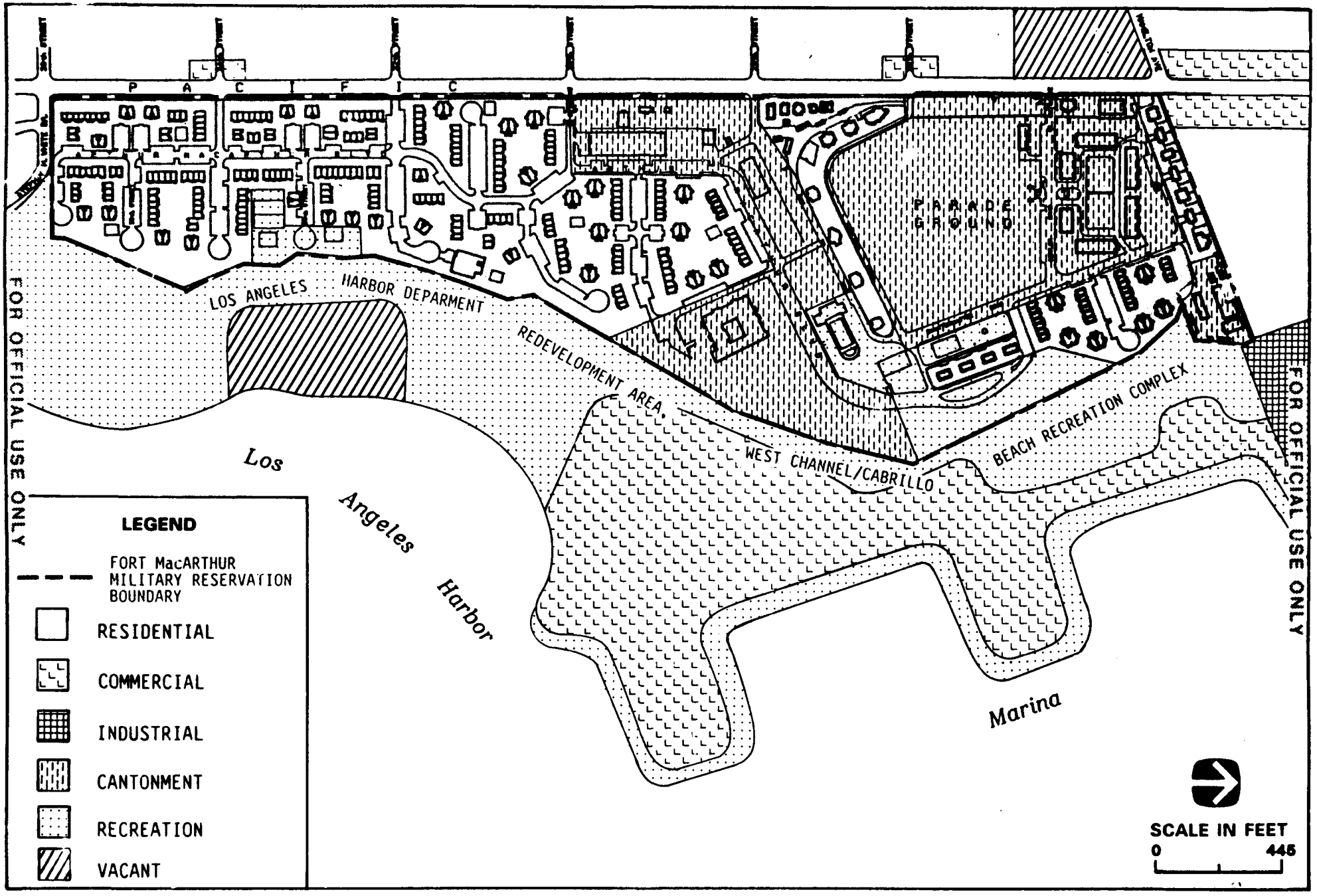
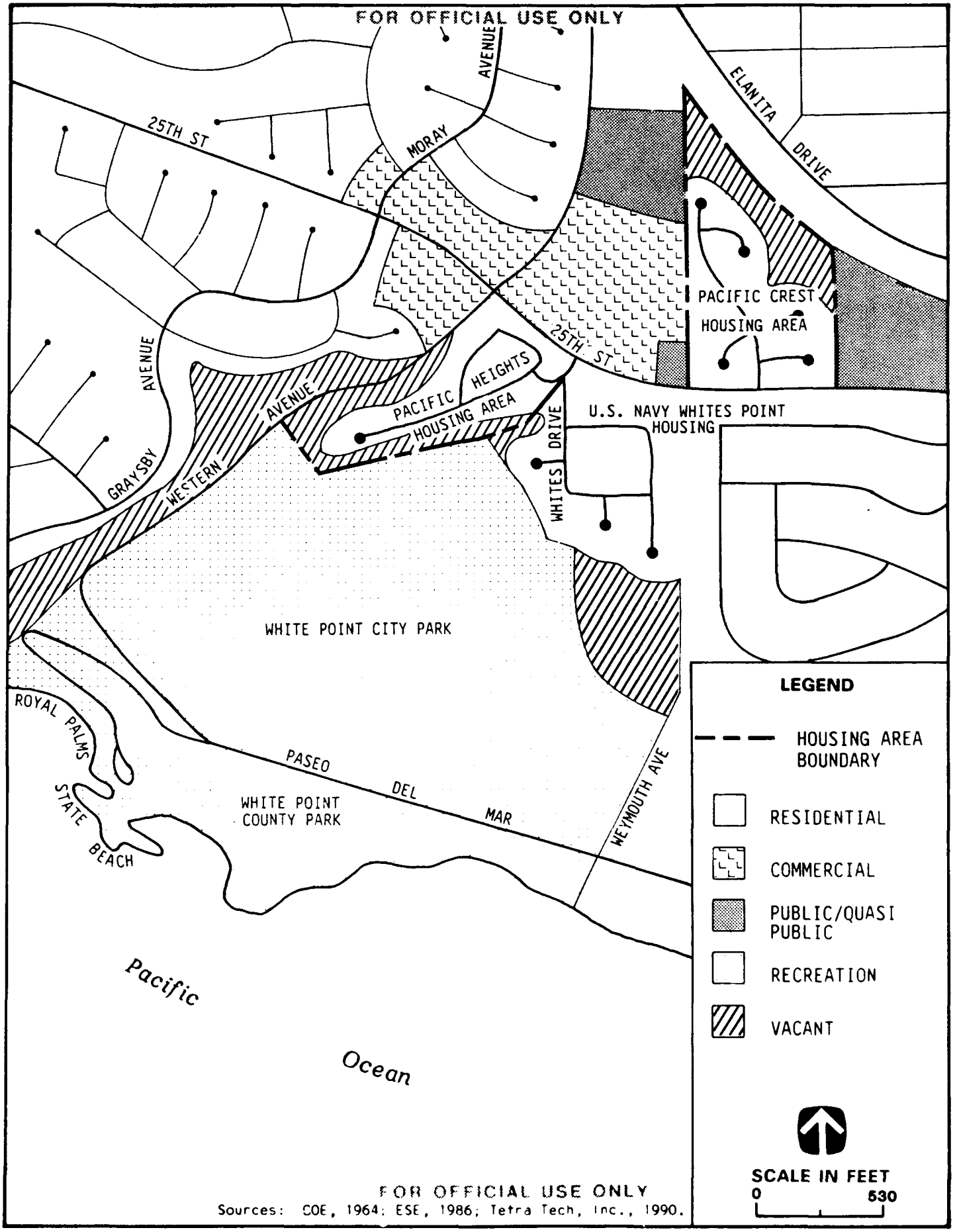


FIGURE 3.1.2-2 LAND USE AT FORT MacARTHUR MILITARY RESERVATION AND VICINITY, SAN PEDRO, CALIFORNIA



FOR OFFICIAL USE ONLY

Sources: COE, 1964; ESE, 1986; Tetra Tech, Inc., 1990.

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FIGURE 3.1.2-3 LAND USE AT PACIFIC CREST AND PACIFIC HEIGHTS HOUSING AREAS AND VICINITY, SAN PEDRO, CALIFORNIA

The Pacific Heights Housing Area is located approximately 0.1 mile west of the Pacific Crest Housing Area on approximately 16 acres. The property was part of the White Point installation of the Army's Fort MacArthur Military Reservation and included a coastal battery housing two 16-inch artillery guns and later a Nike missile launch battery and support facilities. The 146-acre facility was declared excess property by the Army and released to the General Services Administration (GSA) in 1975. The GSA later conveyed more than 30 acres, south of Paseo del Mar, to the County of Los Angeles in 1978 to create White Point County Park. In 1978, the GSA conveyed an additional 115 acres north of Paseo del Mar to the City of Los Angeles to create White Point City Park. The City later conveyed approximately 16 acres of White Point Park to the Air Force for the construction of 79 detached single-family housing units.

The land use surrounding Pacific Heights is urban, consisting of neighborhood shopping centers (Figure 3.1.2-3). The U.S. Navy Whites Point Housing facility is adjacent to the housing area on the southeast and shares Whites Point Drive for common ingress and egress to 25th Street. Land to the south of the Pacific Heights Housing Area is parkland. White Point City Park is presently undeveloped and open to hikers and bicycle riders. The City Parks and Recreation Department maintains a community garden area and office/maintenance shop on the former Nike missile site. White Point County Park and the state-owned Royal Palms State Beach are located south of Paseo del Mar. The county park is essentially undeveloped with the exception of a baseball diamond. Royal Palms State Beach is located on state tidal lands at the foot of a 100-foot cliff. Land uses to the west include single-family residences and some mixed multiple-family housing.

3.1.2.2 Land Use Plans and Policies

The land occupied by Areas A and B and Aerospace Corporation are addressed in the City of El Segundo General Plan. The development policies of the adopted general plan for the eastern portion of the city encourage the maintenance of the aerospace industry. The general plan designations for Los Angeles AFB and Aerospace Corporation consist of Commercial, Light, and Heavy Manufacturing. The land occupied by the Lawndale Annex No. 3 is considered in the City of Hawthorne General Plan. Adopted in 1989, the general plan designates the area General Industrial.

The Fort MacArthur Housing Area and associated support facilities are considered in the San Pedro Community Plan, adopted by the City of Los Angeles in 1980. Fort MacArthur is designated Open

Space - Publicly Owned 1. If Fort MacArthur is ever declared surplus by the federal government, its future nonfederal uses are planned for recreation, educational, open space, or other public use. Fort MacArthur is also within the jurisdiction of the California State Coastal Commission. The State Coastal Commission has determined (Consistency Determination No. CD-18-80, January 1981) that the Fort MacArthur Housing Area is consistent to the maximum extent practicable with the Commission's policies and objectives.

The land occupied by the Pacific Crest and Pacific Heights Housing Areas is addressed in the San Pedro Community Plan. The housing areas are also designated Open Space - Publicly Owned 1.

The Pacific Heights Housing Area is within the jurisdiction of the California Coastal Commission. The Commission, in Consistency Determination No. CD-17-86 in May 1986, objected to the consistency determination made by the Air Force. The Final Environmental Impact Statement for the housing project does not document any resolution of the matter between the two parties. Pacific Crest is located outside of the coastal zone.

3.1.2.3 Aesthetics and Visual Resources

Los Angeles AFB and Aerospace Corporation facilities consist of multistory office buildings and manufacturing type buildings surrounded by large expanses of paved parking lots. These facilities are surrounded by industrial, manufacturing, or office buildings which comprise the large aerospace industrial district in the City of El Segundo. The adjoining residential neighborhoods were developed many years ago as bedroom communities in response to the growing local aerospace industry. Lawndale Annex No. 3 and its sister facility, owned by the State, was constructed to serve the Army within a larger industrial district in the City of Hawthorne and surrounding industrial districts in the cities of Manhattan Beach, Redondo Beach and El Segundo. The surrounding property consists of industrial and manufacturing buildings primarily for the aerospace industry and supporting utility facilities. The visual resources of these areas are characteristic of a large urban industrialized area.

Fort MacArthur represents both historic Los Angeles and new development. The historic district of the Fort has preserved the old military buildings of the former Army Post. The Air Force has redeveloped the remainder of Fort MacArthur with new residential housing which blends with the surrounding harbor area and the community of San Pedro.

The Pacific Heights and Pacific Crest Housing Areas consist of detached single-family residences on elevated marine terraces surrounded by an urbanized area consisting of commercial shopping centers, single-family residences, and multiple-family residential apartments. The nearby City, County, and State parks to the south provide open space. The base housing is highly visible at both sites; however, the use of detached single-family residences surrounded by the undeveloped steeper slopes was incorporated into the layout of the housing areas to keep the area in an open space natural state, and to lessen the visual impact on the surrounding properties.

3.1.3 Transportation

3.1.3.1 Traffic

Los Angeles AFB Areas A and B and Aerospace Corporation facilities are primarily located at or near the intersection of Aviation and El Segundo Boulevards (Figure 3.1-2). Aviation Boulevard is a north-south arterial and El Segundo Boulevard is an east-west arterial. Aviation Boulevard provides six lanes and El Segundo has four lanes of traffic. An Intersection Capacity Utilization (ICU) analysis is presented in Table 3.1.3-1. Level of service (LOS) (Table 3.1.3-2) for this general area has been recorded at level D.

Lawndale Annex No. 3 is about one mile south of Areas A and B on the east side of Aviation Boulevard and north of Compton Boulevard in the City of Hawthorne (Figure 3.1-2). Adjacent to the site, Aviation Boulevard has two northbound lanes and three southbound lanes. Median channelization is provided to allow left turns into the site, but does not permit left turns from the site onto Aviation Boulevard. Compton Boulevard is a an east-west which provides two lanes of traffic in each direction as well as left turn channelization. Neither Compton nor Aviation Boulevard provide direct connections to the freeway system. Freeway connections are provided via Rosecrans Avenue, an east-west arterial north of the site, and Inglewood Avenue, a north-south arterial east of the site. Table 3.1.3-1 provides the current LOS for the major arterials in the area. Both major intersections on Aviation Boulevard are operating at LOS D or below.

The Fort MacArthur Housing Area is located along Pacific Avenue in San Pedro. Pacific Avenue provides the only access to Fort MacArthur. The Fort's main entrance is located on Pacific Avenue between Hamilton Avenue and 26th Street. Gaffey Street is a principal access route to San Pedro and

Table 3.1.3-1

Intersection Capacity Utilization and Level of Service
Los Angeles AFB

Intersection	Existing ICU/LOS[1]		
	AM Peak Hour	PM Peak Hour	Daily[2]
Aviation Blvd. and El Segundo Blvd.	~~NA~~ TBS	NA	NA
Aviation Blvd. and Rosecrans Avenue	1.19/F	0.95/F	NA
Aviation Blvd. and Compton Blvd.	1.32/F	1.11/F	NA
Pacific Avenue and 22nd Street	NA	NA	0.60/A
Gaffey Street and 25th Street	NA	NA	0.46/A
Western Avenue and 25th Street	0.51/A	0.62/B	NA

Notes: NA = Not Available

[1]ICU = Intersection Capacity Utilization
LOS = Level of Service

[2]Actual times (i.e., morning or afternoon) for these ICU/LOS measurements were not available.

Source: U.S. Air Force, 1983, 1985 and U.S. Air Force, 1987.

Table 3.1.3-2

Level of Service Descriptions

Level of Service	Traffic Quality	Nominal Range of ICU[1]
A	Low volumes; high speeds; speed not restricted by other vehicles; all signal cycles clear with no vehicles waiting through more than one signal cycle.	0.00 - 0.60
B	Operating speeds beginning to be affected by other traffic; between one and ten percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods.	0.61 - 0.70
C	Operating speeds and maneuverability closely controlled by other traffic; between 11 and 30 percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods; recommended ideal design standards.	0.71 - 0.80
D	Tolerable operating speeds; 31 to 70 percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods; often used as design standard in urban areas.	0.81 - 0.90
E	Capacity; the maximum traffic volume an intersection can accommodate; restricted speeds; 71 to 100 percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods.	0.91 - 1.00
F	long queues of traffic; unstable flow; stoppages of long duration; traffic volume and traffic speed can drop to zero; traffic volume will be less than the volume which occurs at Level of Service E.	NA[2]

Notes: [1]ICU (Intersection Capacity Utilization) at various level of service versus LOS E for urban arterial streets.
[2]Not applicable.

Source: Highway Capacity Manual, Highway Research Board Special Report 87, National Academy of Sciences, Washington D.C.

parallels Pacific Avenue several blocks to the west. It is classified as a major highway. A connection between Gaffey Street and Pacific Avenue is provided at 22nd Street and is classified as a secondary highway. Pacific Avenue, 22nd Street, Gaffey Street and 25th Street are two critical intersections with respect to traffic circulation in the Fort MacArthur area. ICU values for these intersections are presented in Table 3.1.3-1 and are equivalent to a LOS A.

The Pacific Crest and Pacific Heights Housing Areas are located on the north side of 25th Street east of the intersection of 25th Street and Western Avenue, and on the south corner of the intersection of 25th Street and Western Avenue, respectively. Western Avenue is a two-lane road adjacent to the western border of the site with a steep grade from Paseo del Mar to 25th Street. North of 25th Street, Western Avenue is a major arterial with two lanes in each direction, a median, signalized intersection, and limited direct access. A four-lane road, 25th Street has turning lanes near the housing areas. ICU values for major intersections in the area are presented in Table 3.1.3-1 and are equivalent to LOS A and B for the morning peak hour and afternoon peak hour traffic, respectively.

3.1.3.2 Airports

Los Angeles International Airport (LAX) is located approximately 1.5 miles northwest of Los Angeles AFB. LAX provides both domestic and international airline service and is used by over 25 major airlines and a number of smaller ones. Passenger traffic at LAX exceeded 44 million in 1988. In addition to LAX, the Southern California region is served by several other major airports including Burbank, Ontario, Long Beach, and John Wayne-Orange County.

Los Angeles AFB and Aerospace Corporation personnel primarily use commercial flights available at LAX, although the other major airports in Southern California are used to some extent. In 1989, travel for Los Angeles AFB and Aerospace Corporation generated 88,000 ~~flights~~ trips.

3.1.4 Utilities

→ one table to include
- water supply
- wastewater treatment
- solid waste
- energy - natural gas

3.1.4.1 Water Supply

Potable water for Los Angeles AFB is provided by the Southern California Water Company, the City of El Segundo, and the Los Angeles Department of Water and Power. Table 3.1.4-1 presents current annual volumes for Los Angeles AFB and Aerospace Corporation.

Table 3.1.4-1

Potable Water Usage for Los Angeles AFB and Aerospace Corporation 1989

Location	Provider	Consumption (cu ft)
Los Angeles AFB		
Areas A and B;		
Lawndale Annex No.3	DWP	4,739,305
Fort MacArthur Base	DWP	4,680,807
Fort MacArthur Housing	DWP	5,927,790
Pacific Crest Housing	DWP	2,937,600
Pacific Heights Housing	DWP	2,555,224
Subtotal		20,840,765
Aerospace Corporation	ES	6,818,182
TOTAL:		27,658,947

NOTES: SCW = Southern California Water Company
DWP = City of Los Angeles Department of Water and Power
ES = City of El Segundo

3.1.4.2 Wastewater Treatment

Wastewater treatment for Los Angeles AFB and Aerospace Corporation is provided by the Sanitation Districts of Los Angeles County. Table 3.1.4-2 presents the current annual volumes of wastewater for Los Angeles AFB and Aerospace Corporation facilities.

Table 3.1.4-2

Wastewater Volumes for
Los Angeles AFB and Aerospace Corporation
1989

Location	Consumption (cu ft)
Los Angeles AFB	
Areas A and B; Lawndale Annex No.3	3,394,385
Fort MacArthur Base	786,718
Fort MacArthur Housing	3,583,582
Pacific Crest Housing	807,193
Pacific Heights Housing	700,750
Subtotal	9,272,628
Aerospace Corporation	4,057,487
TOTAL:	13,330,115

3.1.4.3 Solid Waste

The removal and disposal of solid waste generated by Los Angeles AFB and Aerospace Corporation is provided by local private contractors. Table 3.1.4-3 presents the current annual volumes of solid water generated at each location.

Table 3.1.4-3

Solid Waste Collection and Disposal Volumes
For Los Angeles AFB and Aerospace Corporation
1989

Location	Amount (Tons)
Los Angeles AFB	
Area A	1,170
Area B	1,404
Lawndale Annex No. 3 *(Building 80)*	143
Fort MacArthur Base	404
Fort MacArthur Housing	1,132
Pacific Crest Housing	257
Pacific Heights Housing	226
Subtotal	4,736
Aerospace Corporation	315
TOTAL:	5,051

Notes: 1 Based on an estimate of 120 cubic yards per ton.

3.1.4.4 Energy

Electricity. Electricity for Los Angeles AFB and Aerospace Corporation facilities is provided by Southern California Edison and the Los Angeles Department of Water and Power. Table 3.1.4-4 presents current annual usage for each location.

Table 3.1.4-4

Electric Power Consumption at Los Angeles AFB and Aerospace Corporation FY 1989

Location	Provider	Consumption (cu ft)
Los Angeles AFB		
Area A	SCE	24,579,600
Area B	SCE	7,319,658
Lawndale Annex No. 3	SCE	1,239,020
Fort MacArthur Base	SCE	1,658,291
Fort MacArthur Housing	SCE	2,368,520
Pacific Crest Housing	SCE	610,560
Pacific Heights Housing	DWP	530,046
Subtotal		38,275,695
Aerospace Corporation	SCE	45,012,804
TOTAL:		83,288,499

NOTES: SCE = Southern California Edison
DWP = City of Los Angeles Department of Water and Power

Natural Gas. Natural gas is supplied to Los Angeles AFB and Aerospace Corporation facilities by the Southern California Gas Company. Table 3.1.4-5 presents current annual usage for each location.

Table 3.1.4-5

Natural Gas Usage at Los Angeles AFB and Aerospace Corporation 1989

Location	Provider	Consumption (mcf)
Los Angeles AFB		
Areas A and B	SCG	53,035
Fort MacArthur Base	SCG	13,841
Fort MacArthur Housing	SCG	17,548
Pacific Crest Housing	SCG	3,340
Pacific Heights Housing	SCG	2,986
Subtotal		90,850
Aerospace Corporation	SCG	94,344
TOTAL:		185,194

NOTES: MCF = Thousand Cubic Feet
SCG = Southern California Gas Company

3.1.5 Hazardous Materials

3.1.5.1 Hazardous Materials Storage and Handling

Aboveground Storage Tanks. One 10,000-gallon aboveground regular gasoline storage tank is located at Building 235 in Area B at Los Angeles AFB. Two aboveground storage tanks are located at the Aerospace Corporation facilities. A 1,300-gallon argon tank is located at 325 South Douglas Drive, and a 6,000-gallon gasoline tank is located at 277 Carole Drive. The tanks have been permitted by the City of El Segundo Fire Department. There are no aboveground storage tanks at Fort MacArthur or the housing units at Pacific Crest and Pacific Heights.

Underground Storage Tanks. There are seven active underground storage tanks located at Los Angeles AFB Area A and seven located in Area B. The tanks are single-wall steel construction and their integrity has been verified. Table 3.1.5-1 describes the storage tanks.

Table 3.1.5-1

Underground Storage Tanks at Los Angeles AFB

Tank	Building	Capacity (gal)	Product
Area A			
A-1	130	4,600	Diesel
A-2	125	3,400	Diesel
A-3	120	3,400	Diesel
A-4	115	3,000	Diesel
A-5	110	3,000	Diesel
A-6	105	3,400	Diesel
A-7	100	3,000	Diesel
Area B			
B-1	200	1,500	Diesel
B-2	200	2,000	Diesel
B-3	200	3,500	Diesel
B-4	241	10,000	Diesel
B-5	220	2,000	Diesel
B-6	220	10,000	Diesel
B-7	220	55	Water

As a part of the Air Force hazardous waste management program, a number of fuel oil underground storage tanks have been scheduled for removal at a later date because of age and state. Three underground storage tanks associated with a gas station in Area B will be removed and replaced with new, technologically-advanced tanks.

There are no active underground storage tanks at Lawndale Annex No. 3. Fort MacArthur has one active 500-gallon gasoline tank. ~~The tanks has not been integrity tested because no direct access to the tank exists;~~ excavation and retrofitting will be required prior to testing. There are no active underground storage tanks at the Pacific Heights of Pacific Crest Housing Areas.

Aerospace Corporation has five underground fuel storage tanks. These single-wall steel tanks were installed in 1985. Each has been integrity tested. Table 3.1.5-2 describes the storage tanks.

Table 3.1.5-2

Underground Storage Tanks at Aerospace Corporation

Tank	Building	Capacity (gal)	Product
No. 1	D-3	6,000	Gasoline
No. 2	D-3	10,000	Diesel
No. 3	Ag-0	10,000	Gasoline
No. 4	Ag-0	10,000	Gasoline
No. 5	Ag-0	2,500	Diesel

Other Storage and Handling Facilities. Areas A and B use and store hazardous materials as defined by state and federal regulations. A list of stored hazardous materials is presented in Table 3.1.5-3.

Aerospace Corporation uses and stores hazardous and extremely hazardous materials as defined by state and federal regulations. The list of materials is very extensive and includes poisonous gases, and pyrophoric, toxic, explosive, and corrosive materials. Radioactive materials are also used and stored by the Aerospace Corporation and inventoried quarterly. All storage and use of hazardous materials is in compliance with federal and state regulations.

Table 3.1.5-3

Hazardous Materials List for Los Angeles AFB

Location	Amount	Material
AREA A		
No. 1	1,500 cu ft	Acetylene
No. 2	1,000 cu ft	Acetylene
No. 3	250 cu ft	Acetylene
No. 4	6,000 cu ft	Anyhydrous Ammonia
No. 5	25 gal	Ammonium Hydroxide
No. 6	100 gal	Ethylene Glycol Antifreeze
No. 7	200 gal	Asphalt Adhesive
No. 8	300 gal	Asphalt Emulsion
No. 9	1,000 gal	Assorted Paints
No. 10	200 cans	Spray Paint - 14 oz each
No. 11	100 cyls	Propane - 14 oz cylinders
No. 12	2,000 lbs	Sodium Hydroxide, Sodium Chromate
No. 13	500 gal	Carbon Removing Compound
No. 14	50 gal	Aqueous Chlorine (12%)
No. 15	150 gal	Compressor Lube Oil
No. 16	100 gal	ENTEC 327 - (Ioprophyl, Ethyl Alchols)
No. 17	125 gal	ENTEC 349 - (Dodecylguanideine HCl, IsoOHMethyl (bis) Isocyanate)
No. 18	250 gal	ENTEC 351 - (Potassium Hydroxide Phosphoric Acid I-H-Benzotriazole)
No. 19	600 lbs	ENTEC 364 (1-Bromo-3-Chloro-5-Dimethylhytrantonium)
No. 20	150 gal	ENTEC 725 (Sodium Hydroxide Solution)
No. 21	500 gal	ENTEC CPS-4 (EDTA/NAOH Solution)
No. 22	250 gal	ENTEC CPS-4 (EDTA/NAOH Solution)
No. 23	300 gal	Trichloromethane
No. 24	500 gal	Freon 55 - (Azeotrope of dichlorodofluromethane)
No. 25	1,500 gal	Freon 502 - (Azeotrope of dichlordofluromethane and Chloropentafluor) methane (refrigeration units)
No. 26	150 lbs	Freon 22 - (Chlorodifluromethane)
No. 27	25 gal	Propyl Alcohol - (Glass cleaner)
No. 28	100 gal	Hydraulic Fluid
No. 29	120 gal	Aqueous HCL (32%)
No. 30	4,000 cu ft	Nitrogen
No. 31	200 cu ft	Nitrogen
No. 32	2,500 cu ft	Oxygen
No. 33	200 cu ft	Oxygen
No. 34	100 gal	Paint Thinner
No. 35	16,000 lbs	Pavex
No. 36	250 cu ft	Propane
No. 37	100 lbs	Sodium Nitrate
No. 38	10,000 gal	Super Unleaded Gas
No. 39	10,000 gal	Unleaded Gas
No. 40	200 gal	Valvoline 10-40
No. 41	75 gal	Z-Starter (Aqeous Sodium Hydroxide)

Table 3.1.5-3 Continued, Page 2 of 2

Location	Amount	Material
AREA B		
No. 1	10,000 gal	Regular Gasoline
No. 2	2,000 gal	Freon 22
No. 3	100 gal	Kerosene
No. 4	3,000 cu ft	Anhydrous Ammonia
No. 5	200 gal	Paints
No. 6	100 gal	Paint Thinner
No. 7	100 gal	Lacquer Thinner
No. 8	1,500 cu ft	Oxygen
No. 9	9,000 lbs	Aqueous Sodium Hydroxide (5%)
No. 10	500 lbs	Research Grade Sodium Hydroxide
No. 11	100 gal	Mixture of Perchloroethylene and petroleum Naptha
No. 12	150 gal	Sulfuric Acid
No. 13	30,000 cu ft	Anhydrous Ammonia
No. 14	200 gal	Petroleum Oil
No. 15	1,000 gal	Assorted Paints
No. 16	1,000 ea	(40 oz.) Spray Paint Cans
No. 17	750 gal	Carbon Removing Compound
No. 18	1,500 gal	Freon 502 - (Refrigeration Units)
No. 19	110 gal	Kerosene

There is no handling or storage of hazardous materials at the Fort MacArthur, Pacific Heights, or Pacific Crest Housing Areas.

Hazardous Waste Disposal. Hazardous waste disposal at Los Angeles AFB is handled by a civilian contractor. The wastes are collected onsite in accordance with state and federal regulations and held for less than 90 days. The waste stream is typically characterized as hazardous; on rare occasions acutely or extremely hazardous materials are involved. California-licensed waste haulers are utilized and the wastes are disposed of in accordance with California and federal regulations.

Aerospace Corporation generates both hazardous and acutely hazardous waste streams. In compliance with state regulations, as a producer of extremely hazardous waste, Aerospace Corporation has an extremely hazardous waste disposal permit (subject materials listed in Table 3.1.5-4). The permit is applied for yearly to the California Department of Health Services Toxic Substances Control Division. The wastes are collected onsite and are transported by a California-licensed waste hauler to licensed hazardous waste facilities in six states (i.e., California, Utah, Arkansas, Texas, Oregon) depending on the type of waste to be disposed of.

3.1.5.2 Asbestos

A complete asbestos survey was conducted for Los Angeles AFB - Area A, Area B, Lawndale Annex No. 3, and the Fort MacArthur Housing Area. Asbestos is ubiquitous in the Area A and Area B facilities and a good portion of it is friable. Its composition is primarily Chrysotile, Amosite, or a combination of both. It is located in all of the heating systems. The system boilers are usually located in the basement of the buildings and the associated ducts which move through the building to the roof area. Ceilings and floor tiles in the buildings also contain asbestos.

omit

Area B has World War II-era buildings constructed with asbestos siding or asbestos-coated siding. Asbestos-containing materials in the main boiler room are being removed and several buildings in Area B have had the asbestos-containing materials removed. The management and operations plan stipulates an ongoing process of repairs to the buildings and quarterly inspection.

Is there a current health hazard?

Table 3.1.5-4

Aerospace Corporation Extremely Hazardous Waste List

Chemical Name	Quantity Disposed of Per Year (Range)
Acetyl chloride	500 gm. /2 kg.
Aluminum chloride	4 lb. /16 lb.
Ammonium bifluoride	50 lb. /200 lb.
Antimony pentachloride	2 lb. /12 lb.
Arsenic and arsenic compounds	2 lb. /8 lb.
Arsenic contaminated trash	2 lb. /12 lb.
Benzidine and salts	200 gm. /2 kg.
Benzoyl chloride	1 lb. /4 lb.
Beryllium & beryllium compounds	8 lb. /42 lb
Biphenyl	1 lb. /6 lb.
Bromine	1 lb. /6 lb.
Cadmium and compounds	15 lb. /60 lb.
Calcium hydride	1 kg. /4 kg.
Calcium hypochlorite (5% in water)	1 gal. /2 gal.
Calcium, metal	2 lb. /12 lb.
Cuprous cyanide	1 lb. /4 lb.
Cyanide and cyanide compounds	15 lb. /60 lb.
Cyanide solid & solution	10 gal. /60 gal.
Dimethyl hydrazine	5 lb. /30 lb.
Dimethyldichlorosilane	2 qt./8 qt.
Ethoxyethyltrichlorosilane	100 ml. /600 ml.
Hydrazine	5 lb./30 lb.
Hydrochloric acid	10 gal./40 gal.
Hydroflouric acid	10 gal. /40 gal.
Lithium battery	25 lb./150 lb.
Magnesium chloride	25 lb. /150 lb.
Mercuric chloride	21 lb./150 lb.
Mercury (amalgamated)	5 lb./30 lb.
Methylhydrazine	5 lb. /15 lb.
Nitrosodimethylamine	100 gm. /400 gm.
Platinum compounds	100 gm. /400 gm.
Potassium cyanide	100 gm. /400 gm.
Sodium amide	100 gm. /400 gm.
Sodium cyanide	5 lb. /20 lb.
Sodium, metal	1 lb. /4 lb.
Stannic chloride	1 pt. /4 pt.
Thallium compounds (30-80%)	50 gm. /400 gm.
Zirconium chloride	1 lb. /4 lb.

Notes: *Quantities listed are approximations.*

All liquid quantities listed above are solidified in accordance with July 8, 1987 California List landfill ban.

The materials are laboratory reagents, therefore the concentrations are 100 percent of commercially distributed product unless specified.

Lawndale Annex No. 3 has no known asbestos-containing materials. Fort MacArthur has no asbestos-containing materials in the new construction. The older housing units all contain asbestos-containing materials. A series of interior utility upgrades is being done to the housing units in groups of 11. One group has been completed thus far. All asbestos-containing materials have been removed from the Clinic and Child Care Center. Building 425 - the Trona Plant, the gymnasium, and the Visiting Officers Quarters have asbestos-containing materials. The operations and management plan stipulates repairs and inspections on a quarterly basis. There are no asbestos-containing materials in the Pacific Heights or Pacific Crest housing units.

Asbestos is ubiquitous in Aerospace Corp facilities.

~~A complete asbestos survey has not been done for the Aerospace Corporation facilities.~~ As the buildings are being updated, the asbestos-containing materials are being removed. The buildings are similar to those on Los Angeles AFB Areas A and Area B. ~~The asbestos is ubiquitous in all the buildings.~~

3.1.5.3 Installation Restoration Program Sites

The Installation Restoration Program (IRP) is designed to assure the identification, confirmation, and quantification of past hazardous material disposal sites on DOD property. The work under this program will control the migration of hazardous contaminants and the effects of environmental and health hazards that have occurred from past disposal operation. ~~Pursuant to the 1986 Superfund Amendment~~ and Reauthorization Act (SARA), the Preliminary Assessment/Site Inspection and Remedial Investigation for the feasibility study has been completed for five sites at Los Angeles AFB. The remedial action stage has been completed on two projects and closed out with the Department of Health Services. It was only necessary to perform the Preliminary Assessment/Site Inspection prior to Remedial Action for another eight sites. Remedial action are in progress or planned for these sites. Los Angeles AFB has a total of 15 IRP sites.

Area A has three IRP sites: pesticide runoff site; underground fuel spill site; and Plating Shop Sump, at Building 130. The pesticide runoff site is located near a former entomology shop. ~~The practice was to discharge pesticide-contaminated rinsewater from equipment and containers rinsing to a drain that discharged onto the neighboring Southern Pacific Railroad right-of-way.~~ Soil borings ~~taken at the point of discharge~~ showed no contamination. A decision document was written to justify the closing of the site with no further action.

insert IRP map

The underground fuel spill site is located in the southwest corner of Area A. The storage tank experienced a loss of approximately 25,800 gallons of No. 2 fuel oil. Because the tank was unsecured, it is not known if the loss was due to theft or to tank failure. Soil borings have shown some soil contamination but no groundwater contamination. Interim remedial action is ~~proposed~~ approved for FY 1990 for tank removal and sampling of the tank pit after excavation.

The plating sump was identified in the Phase I Records Search as an area of concern. A contractor operated a plating shop from 1957 until 1960, when the operation closed. Because of the short duration the shop was open and the nature of the materials, it was decided to go directly to the remedial action stage and do a simple removal of the sump. Soil borings will be completed in the excavation to check for contamination. This is planned for FY 1991.

Six IRP sites were identified in Area B: an Auto Hobby Shop Seepage Pit and five abandoned underground storage tanks. The ~~seepage pit~~ at the Auto Hobby Shop is connected to a triple-cell clarifier (oil-water separator). ~~The clarifier received waters from a floor drain and discharged it into a seepage pit until~~ It was in use until 1976 when it was then connected to the sewer system. In 1985, the clarifier pump failed and the wastewater was for a short time discharged into the seepage pit. Waste and compounds that entered the seepage pit since 1963 include oil, grease, detergents, and a carbon-removing compound ~~containing chlorinated hydrocarbon solvents and phenolic compounds. In 1986, 800 gallons of water, solvent, and oil were pumped out of the pit. Some sludge was left in the concrete block pit, which measured 5 feet square and 13 feet deep with an 18-inch-square manhole. This site is in the remedial investigation stage. It is expected to move to the remedial action stage in FY 1990,~~ pending review of the Draft Remedial Investigation Report by appropriate agencies. The Remedial Investigation found soil contamination and no groundwater contamination. The report recommends removal of the pit and adjacent soils and soil and water resampled.

~~The Remedial Investigation phase does not need to be performed on abandoned underground storage tanks if there is only minor contamination.~~ A Preliminary Assessment/Site Inspection was performed on the five tanks in Area B and then progressed immediately to the Remedial Action Stage. Three of the tanks are scheduled for removal in May 1990. ~~The other two tanks cannot be removed without damaging an active tank that is in close proximity~~. These three tanks will be removed together at a later date.

There are also two abandoned underground storage tanks located at Lawndale Annex No.3 scheduled for removal. There are no other IRP sites located at the Lawndale Annex.

Fort MacArthur has two IRP sites: a Pesticide Wastewater Soakage Pit, and Underground Storage Tank Site. The Pesticide Wastewater Soakage Pit is located near the tennis courts next to the base housing on Fort MacArthur. The area was used to discharge pesticide-contaminated rinse water to the storm drain or the gravel soakage pit in the early 1970s. ~~About 1975, the rinse water was discharged to the sanitary sewer system or used as a diluting agent for subsequent pesticide applications. Soils adjacent to the former pit were suspected of being contaminated with pesticides.~~ The Remedial Investigation found no evidence of pesticide contamination from the pesticide soakage pit. ~~A decision document will be prepared to justify the closing of the site with no further action.~~ No further action is planned at this site.

The Underground Storage Tank Site has two 20,000-gallon concrete tanks used by the Army 3rd Artillery as a backup supply of gasoline and diesel. Installed in 1928, the tanks appear to have leaked for a long time and several thousand cubic yards of soil were contaminated with low levels of hydrocarbons and lead. An unconfined aquifer runs through the site and is also contaminated with low concentrations of the same contaminants. The Remedial Investigation has been completed and the decisionmaking process on the remedial action to take at the site is in progress. A notice of violation was issued by the City of Los Angeles Fire Department requiring site characterization. This has been accomplished, but the final report has not been submitted to the agency.

The Pacific Heights Housing Area unit had two sites that have been cleaned up and closed out with the California Department of Health Services. A fuel tank site with two tanks that were a part of an abandoned gas station were excavated and removed during the construction of the housing unit. A second site, containing a number of buried drums containing a dilute water/hydrocarbon mixture, was also excavated during construction. The Pacific Crest Housing Area has no IRP sites.

3.1.6 Geology and Soils

3.1.6.1 Geology

Physiography and Topography. Los Angeles AFB lies within the Los Angeles Basin, a topographic lowland plain with a northwest trending axis approximately 50 miles in length and 20 miles wide. The stratigraphy of the Basin is characterized by both unconsolidated and indurated sediments ranging from the Jurassic to Recent age. The most likely earthquake-generating faults near the base include the San Andreas, the San Fernando-Sierra Madre, the Newport-Inglewood, and the underground Charnock.

Regional Geology. Bedrock in the vicinity of LAAFB consists of metamorphic rocks of the Franciscan Formation and Catalina Schist. These units are impervious and non-water-bearing and are overlain unconformably by rocks of Miocene age. The Miocene Monterey Formation consists of massive shale and claystone units. The bottom section of the Monterey exhibits coarse, pebbly sandstone and schist-bearing conglomerate. The upper units of the formation are predominantly shale and micaceous siltstone. Fine- to medium-grained sandstone units also occur within the upper section; however, these units are discontinuous and contain connate water with a salinity near that of seawater.

The Miocene units are overlain by a Pliocene-age unit of the Pico Formation. This unit is divided into three subdivisions, based on water-bearing characteristics, and is separated by local unconformities. The Lower Division, also referred to as the Repetto Formation, consists of fine to coarse sand with brown pebbly, sandy siltstone and clay. The Middle Division is predominantly massive marine siltstone with lesser amounts of fine to coarse sand. Both the Lower and Middle Divisions are largely impervious and contain saline water. The Upper Division of the Pico Formation is about 1,000 feet thick and consists of interbedded, semiconsolidated sand and micaceous silt, with lesser marine clay and gravel members.

The Pico Formation is overlain by early Pleistocene deposits forming the San Pedro Formation. The San Pedro Formation consists of unconsolidated to semiconsolidated gravel, sand, silt, and clay of marine origin, with partial influence and reworking by fluvial processes. The coarser sands and gravels are usually found in the lower two-thirds of the deposit. The Lower Pleistocene deposits of

the Lakewood Formation overlie the San Pedro Formation. The lower section of the Lakewood Formation is approximately 200 to 300 feet thick and consists of fluvial gravel, sand, silt, and clay. The upper section of the Lakewood Formation grades into a fossiliferous marine sand and gravel, overlain by a nonmarine sand and silt deposit.

These deposits are overlain by a thin veneer of late Pleistocene quartz dune sand. This deposit is mapped as the "Older Dune Sand" and consists of fine- to medium-grained sands and minor amounts of gravel, sandy silt, and clay. The Older Dune Sand is up to 200 feet thick and exhibits thin, irregular, relatively dense, cemented layers near the surface.

The youngest deposits underlying the area are the recent alluvial deposits. These deposits consists of interbedded fine to coarse sands and silty sands, with lenses of sandy clay. The deposits are up to 200 feet and exhibit thin beds that are relatively densely cemented. The clay lenses are discontinuous and range in thickness from approximately 2 inches to 5 feet.

Seismicity. No faults can be observed at the White Point, Los Angeles AFB, and Fort MacArthur sites. The two major faults in the area considered most likely to rupture and possibly cause strong ground shaking at the site are the Palos Verde and Newport-Inglewood Faults. These faults have the following characteristics:

Fault Name	Minimum Distance To Sites (Miles)	Total Fault Length (Miles)	Maximum Credible Earthquake Magnitude	Age of Most Recent Displacement
Palos Verdes	3	50	7.0	Late Quaternary
Newport-Inglewood	11	50	7.0	Historic (1933)

The maximum credible earthquake magnitudes listed for these faults are believed to be relatively good approximations, based on direct geologic evidence.

3.1.6.2 Soils

Soil borings within the Los Angeles AFB and Lawndale Annex No. 3 area indicate that 1 to 3 feet of fill material overlie the natural soil present. The soil is the Oceano Association and has a moderate potential for water erosion and a very high susceptibility to wind erosion. This soil is very permeable to water. The majority of this association at Los Angeles AFB and the Lawndale Annex is paved over with buildings, parking lots, and streets.

Within the Fort MacArthur, Pacific Crest, and Pacific Heights Housing Areas, the predominant soil is the Diablo-Altamont Association. This soil also has a moderate potential for water erosion and a high susceptibility to wind erosion. This soil also has a sandy texture which enhances its capability to adsorb water. As with the Oceano Association, the Diablo-Altamont Association in this area is largely paved over with buildings, parking lots, and streets.

3.1.7 Water Resources

3.1.7.1 Groundwater

Los Angeles AFB and Aerospace Corporation. Los Angeles AFB lies within the Los Angeles Basin, which is a topographic lowland and plain with a northwest trending axis approximately 50 miles long and 20 miles wide. The stratigraphy of the Los Angeles Basin is characterized by both unconsolidated and indurated sediments of Jurassic to Recent age. There are four geologic formations that contain groundwater aquifers underlying Los Angeles AFB. The Monterey and Pico Formations contain groundwater with high salinity that eliminates them as a potable water source. The San Pedro Formation overlies the Monterey and Pico Formation and bears two aquifers that contain potable water. They are the Lynwood and Silverado aquifers. The Lakewood Formation is the most recent geologic structure under Los Angeles Air Force Base and Lawndale Annex No. 3 that contains aquifers. These aquifers, the Gage and Gardena aquifers, are productive and potable sources of water. The shallowest groundwater occurrence at Los Angeles AFB exists in a localized semi-perched system in the basal section of the alluvial deposits. The depth to water in this system is from 90 to 95 feet. This source of groundwater is not used as a potable, industrial, or municipal source because of its limited quantity.

Fort MacArthur, Pacific Crest, and Pacific Heights Housing Areas. The underlying geologic units beneath the Fort MacArthur area do not support a well developed aquifer system. The Monterey Shale Formation is highly impervious and will have localized sand units that contain highly saline water. This water is unpotable and has no hydraulic connection to a freshwater recharge. Small, localized perched water tables may occur on top of the silty clay units found on top of the Monterey Formation. Moisture content in this formation can fluctuate seasonally from 0 to 25 percent (weight basis).

3.1.7.2 Surface Water

The area surrounding Los Angeles AFB (Areas A and B), Lawndale Annex No. 3, associated housing areas, and Aerospace Corporation are well developed industrial complexes, transportation routes, and houses. There are no streams or rivers within this vicinity.

The topographic gradient decreases from the Los Angeles AFB and Lawndale Annex No. 3 area to the east. Before the Harbor Freeway, the topographic gradient then begins to increase. All surface water, unless received by a storm drain system, would drain toward the Dominguez Channel which eventually empties into Long Beach Harbor.

The Fort MacArthur Housing Area is positioned on a bluff and the topographic gradient decreases to the west and south of the site. Overland run-off would drain to the ocean unless collected by the storm drain system of the area. The Pacific Crest and Pacific Heights Housing Areas are also situated on a bluff. There is a sharp decrease in topographic gradient from the White Point area to the west. Any surface water uncollected by the storm drain system would drain directly into the Pacific Ocean.

3.1.8 Air Quality

The pollutant emissions from sources and atmospheric interactions determine the quality of air, and the effects on receptors establish the extend to which air quality is degraded. Air quality in a given location is described by the concentration of various pollutants in the atmosphere which are expressed in units of concentration, generally parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing it with an appropriate

federal and/or state ambient air quality standard. These standards represent the allowable atmospheric concentrations at which public health and welfare are protected and include a reasonable margin of safety. Federal and/or California state ambient air quality standards have been established for the following pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter smaller than 10 micrometers in diameter (PM_{10}), lead sulfate, and hydrogen sulfide (H_2S).

The Federal Clean Air act, as amended in August 1977, requires air pollutant emissions resulting from operations at Los Angeles AFB and Aerospace Corporation facilities comply with the air quality standards and regulations that have been established by federal, state, and county regulatory agencies. These include the permitting and new source review regulations of the South Coast Air Quality Management District (SCAQMD).

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) which must be maintained during the operation of any emission source. These standards are presented in Table 3.1.8-1. The Clear Air Act delegates to each state the responsibility to establish air quality rules, regulations, and standards. These rules, regulations, and standards must be at least as restrictive as the federal requirements. The California Air Resources Board (CARB) has established air quality standards which are more stringent than some of the NAAQS, and which also regulate pollutants for which there are currently no federal standards. A listing of the California Ambient Air Quality Standards is also presented in Table 3.1.8-1.

The Clean Air Act gives state and local agencies the authority to establish air quality rules and regulations. Rules adopted by local air pollution control districts and accepted by the CARB are included in the state implementation plan (SIP). When approved by the EPA, these rules become federally enforceable. The SCAQMD, having received the necessary approvals, regulates stationary sources in the District, which includes the Los Angeles AFB and the Aerospace Corporation.

The SCAQMD has issued a new Air Quality Management Plan which has identified air pollution control programs for the South Coast Air Basin which will lead to attainment of state and federal ambient air quality standards. New and more stringent air pollution control regulations are planned to further reduce emissions in the South Coast Air Basin.

Table 3.1.8-1
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1] Concentration[3]	California Standards[1] Method[4]	National Standards[2] Primary[3,5]	National Standards[2] Secondary[3,6]	National Standards[2] Method[4,7]
Ozone	1-hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	0.12 ppm (235 $\mu g/m^3$)	Same as Primary Std.	Ethylene Chemiluminescence
Carbon Monoxide	8-hour	9.0 ppm (10 mg/m^3)	Non-dispersive Infrared Spectroscopy (NDIR)	9.0 ppm (10 mg/m^3)		Non-dispersive Infrared Spectroscopy (NDIR)
	1-hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
Nitrogen Dioxide	Annual Average		Gas Phase Chemiluminescence	0.053 ppm (100 $\mu g/m^3$)	Same as Primary Std.	Gas Phase Chemiluminsecence
	1-hour	0.25 ppm (470 $\mu g/m^3$)				
Sulfur Dioxide	Annual Average			80 $\mu g/m^3$ (0.03 ppm)		
	24-hour	0.05 ppm[8] (131 ($\mu g/m^3$)	Ultraviolet Fluorescence	365 $\mu g/m^3$ (0.14 ppm)		Pararosoaniline
	3-hour				1,300 $\mu g/m^3$ (0.5 ppm)	
	1-hour	0.25 ppm (655 $\mu g/m^3$)				
Suspended Particulate Matter PM_{10}	Annual Geometric Mean	30 $\mu g/m^3$	Size Selective Inlet High Volume Sampler and Gravimetric Analysis			Inertial Separation and Gravimetric Analysis
	24-hour	50 $\mu g/m^3$		150 $\mu g/m^3$	Same as Primary Stds	

Table 3.1.8-1 Continued, Page 2 of 3

Pollutant	Averaging Time	California Standards[1] Concentration[3]	California Standards[1] Method[4]	National Standards[2] Primary[3,5]	National Standards[2] Secondary[3,6]	National Standards[2] Method[4,7]
PM_{10} (cont'd)	Annual Arithmetic Mean			50 $\mu g/m^3$		
Sulfates	24-hour	25 $\mu g/m^3$	Turbidimetric Barium Sulfate			
Lead	30-day Average	1.5 $\mu g/m^3$	Atomic Absorption			Atomic Absorption
	Calendar Quarter			1.5 $\mu g/m^3$	Same as Primary Stds.	
Hydrogen Sulfide	1-hour	0.03 ppm (42 $\mu g/m^3$)	Cadmium Hydroxide STRactan			
Vinyl Chloride (chloroethene)	24-hour	0.010 ppm (26 $\mu g/m^3$)	Tedlar Bag Collection, Gas Chromatography			
Visibility Reducing Particles	*1 Observation*	*In sufficient amount to reduce the prevailing* visibility[9] to less than 10 miles when the relative humidity is less than 70%				

Source: California Air Resources Board 1988.

Notes: [1]California standards for ozone, carbon monoxide, sulfur dioxide (1 hour), nitrogen dioxide, and particulate mater - PM_{10}, are values that are not to be exceeded. The sulfates, lead, hydrogen sulfide, vinyl chloride, and visibility reducing particles standards are not to be equaled or exceeded.

[2]National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

[3]Concentration expressed first in units in which it was promulgated. Equivalent units given in parenthesis are bases upon a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference of pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4]Any equivalent procedure which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

[5]National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the EPA.

[6]National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the implementation plan is approved by the EPA.

[7]Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[8]At locations where the state standards for ozone and/or suspended particulate matter are violated. National standards apply elsewhere.

[9]Prevailing visibility is defined as the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.

3.1.8.1 Existing Regional Air Quality

Climate and Meteorology. Los Angeles AFB lies within the South Coast Air Basin which includes approximately 8,630 square miles in southern California. The climate of the basin is classified as Mediterranean, characterized by a pattern of cool, wet winters and warm, dry summers. Typical dry summers are caused by a semi-permanent high-pressure cell located over the eastern Pacific Ocean. This system generally blocks storms from moving into the basin during the summer months.

Temperatures in the vicinity of Los Angeles AFB range from 29 to 101 degrees Fahrenheit (°F), with a mean temperature of about 63 °F. Average annual rainfall in the area is approximately 12 inches. Surface winds in the daytime are typically sea breezes flowing inland at approximately 5 to 8 miles per hour (mph), with the pattern reversed at night. This wind regime is altered greatly during Santa Ana wind conditions when very dry southerly winds can blow in excess of 50 mph.

Existing Air Quality. Los Angeles AFB is located in Los Angeles County, which is included in the federal Metropolitan Los Angeles Air Quality Control Region (AQCR) Number 24 (CFR 1989) and the California South Coast Air Basin. Los Angeles County, including Los Angeles AFB, is under the jurisdiction of the SCAQMD. The air quality in the South Coast Air Basin is very poor. However, it is better in the coastal areas, where Los Angeles AFB is located, then over the interior areas of the Basin. The level of air quality near the Base is depicted by the air monitoring measurements made at the SCAQMD monitoring station in Hawthorne, located about one mile northeast of the Los Angeles AFB. A summary of the maximum pollutant concentration occurring from 1986 to 1988 at Hawthorne is shown in Table 3.1.8-2. A comparison of these concentrations with the ambient air quality standards shown in Table 3.1.8-1 indicates that the standards were exceeded for ozone and carbon monoxide for all three years. The one-hour average state standard for nitrogen dioxide was exceeded in 1988. Sulfur dioxide is the only pollutant that did not exceed standards.

An area is designated as being nonattainment for a particular pollutant if ambient concentrations in that area are above the corresponding standard. The South Coast Air Basin is classified nonattainment for ozone, carbon monoxide, nitrogen dioxide, and particulates. It is classified attainment for sulfur dioxide.

Table 3.1.8-2

Maximum Pollutant Concentration Monitored At the City of Hawthorne Monitoring Station

Pollutant	Averaging Time	1986	1987	1988
Ozone (ppm)	1-hour	0.19	0.20	0.22
Carbon Monoxide (ppm)	1-hour	21.0	22.0	23.0
	8-hour	15.0	14.1	15.9
Nitrogen Dioxide (ppm)	1-hour	0.23	0.23	0.27
	Annual	0.042	0.035	0.036
Sulfur Dioxide (ppm)	1-hour	0.09	0.03	0.15
	24-hour	0.019	0.014	0.024
	Annual	0.005	0.004	0.005
Particulates	24-hour	182.0	150.0	248.0
TSP ($\mu g/m^3$)	Annual GM[1]	69.5	76.5	79.7

Notes: [1]Geometric Mean

Source: South Coast Air Quality Management District, 1989.

3.1.8.2 Air Pollutant Emission Sources

The latest regional emissions inventory for Los Angeles County, extracted from the EPA National Emission Data System, is provided in Table 3.1.8-3. Emissions data were available for PM_{10}, SO_x, NO_x, CO, and volatile organic compounds (VOC), a measure of reactive hydrocarbons. The data include the four most important source categories: fuel combustion in stationary sources, transportation, solid waste disposal, and industrial processes, as well as a fifth source category, miscellaneous. Stationary fuel combustion sources include both area sources and point sources of fuel used for heat and power in residences, industries, institutions, and commercial buildings. The transportation category includes automobiles, trucks, buses, aircraft, trains, and water transportation vessels. Solid waste disposal emissions include those from all sources of open burning and incineration, while emissions from industrial processes include only those industrial air pollutants emitted during the manufacturing process. Miscellaneous emission types vary according to the region involved, but most commonly include fugitive dust, solvent evaporation, agricultural burning, forest fires, and structural fires.

Based on the Los Angeles County emissions inventory, emissions of NO_x and CO are derived from transportation sources. VOC emissions are about equally divided between transportation and miscellaneous categories. For comparison, Los Angeles AFB and Aerospace Corporation emissions from stationary sources in 1989 were as follows:

	Tons Per Year			
Particulates	SO_x	NO_x	VOC	CO
0.58	0.12	7.3	17.0	0.42

3.1.9 Noise

3.1.9.1 Regulatory Setting

On the federal level, the Noise Control Act of 1972 (PL92-574) as amended by the Quiet Communities Act of 1978 (PL95-609), created within EPA, an Office of Noise Abatement and Control (ONAC) with the mandate to identify major sources of noise; regulate those identified sources of noise;

Table 3.1.8-3

Los Angeles County Emission Inventory for 1987 (Tons Per Year)

Source Category	Particulates	SO_x	NO_x	VOC	CO
Fuel Combustion					
External	3,510	7,790	49,886	5,086	16,389
Internal	256	242	13,056	1,508	9,550
Industrial Process	2,927	12,473	17,199	31,192	1,425
Solid Waste Disposal	10,600	504	1,208	25,407	76,394
Transportation	137,906	44,671	224,620	212,268	1,201,549
Miscellaneous	143,432	7	380	233,437	14,945
Total	298,631	65,687	306,349	508,898	1,320,252

Source: Environmental Protection Agency 1988.

regulate those identified sources; propose aircraft noise standards to the FAA; label noisy products; engage in research, technical assistance, and dissemination of public information; and coordinate all federal noise control activities. Under this act, the EPA provides noise-level guidelines to protect public health and welfare with a sufficient margin of safety. The guidelines provide a basin for assessing the effectiveness of noise regulations and land use policies.

At the state level, the California Office of Noise Control has developed Noise Compatibility Guidelines for evaluating land use compatibility with different noise levels. The guidelines evaluate noise levels for various land uses and determine the acceptability or compatibility of a noise level with a specific land use. These guidelines are consistent with EPA noise-level guidelines.

On the local level, the City of El Segundo Comprehensive Plan Noise Element, identifies noise sources and related impacts and establishes methods for noise abatement. The purpose of the Noise Element is to evaluate noise levels and develop specific policies to reduce or mitigate noise problems. These policies are in compliance with federal and state standards.

3.1.9.2 Existing Noise Sources

The principal source of noise in the vicinity of Los Angeles AFB and Aerospace Corporation is vehicular traffic on the San Diego Freeway and major arterial streets adjacent to the facilities. These latter streets include Aviation Boulevard, El Segundo Boulevard, and Rosecrans Avenue. Vehicular noise consists of the varied sounds of horns, engines, tire squeals, and sirens. The L_{dn} noise levels range form 70 to 75 dbA at a distance of 50 feet from the highways. The noise levels decrease with increasing distance from the highways lowering to 65 to 60 dbA at 150 to 200 feet from the traffic sources.

A secondary noise source is the aircraft traffic utilizing the Los Angeles International Airport (LAX). The airport is located approximately 1.5 miles northwest of the Los Angeles AFB facilities. L_{dn} noise levels, resulting from LAX traffic operations, in the vicinity of the Los Angeles AFB range from 60 dBA to 65 dBA.

3.1.10 Biological Resources

3.1.10.1 Vegetation

Los Angeles AFB and Aerospace Corporation. Los Angeles AFB (Areas A and B) and Aerospace Corporation are located in an urban environment. No major forms of native vegetation occur at either location. Buildings and parking lots cover a majority of the areas. Vegetation primarily consists of landscaping (e.g., lawns, shrubs, and trees) with non-native species. The areas adjacent to Los Angeles AFB and Aerospace Corporation facilities are a similar urban environment landscaped with non-native vegetative species.

Lawndale Annex No. 3. Lawndale Annex No. 3 is located in a similar urban environment. No natural vegetation communities occur at the Lawndale Annex and only scattered plantings of ornamental grasses, trees, and shrubs are present onsite. More extensive landscape vegetation occurs at the TRW facility located west of Lawndale Annex No. 3, and a highly disturbed vegetative area of naturalized weedy species occurs on the right-of-way of the Southern California Edison switching station adjacent to the property.

Fort MacArthur Housing Area. The Fort MacArthur Housing Area consists almost entirely of buildings, paved areas, and lawns. The site does not include any significant forms of native vegetation. Landscape vegetation includes ornamental shrubs adjacent to the residential structures and a large stand (approximately 110 trees) of Washington palms (Washingtonia robusta), that surround the parade grounds. The areas surrounding the housing area, contain no major forms of native vegetation. A tidal area below the bluff has been recreated as a nature preserve for the West Channel/Cabrillo Beach project. A small amount of native vegetation has been reestablished in the area.

Pacific Height and Pacific Crest Housing Areas. The Pacific Height and Pacific Crest Housing Areas also consist of buildings, paved areas, and roads. The housing areas do not contain any major forms of native vegetation. Both housing areas have been landscaped with non-native trees, ornamental shrubs, and lawns. The Pacific Height Housing Area is primarily surrounded by residential/commercial facilities with similar landscape vegetation. A small, highly disturbed area of naturalized weedy species occurs adjacent to the housing area.

The commercial/residential areas surrounding the Pacific Crest Housing Area do not contain any native vegetation. To the south of the housing area, White Point City Park consists of an extensive tract of undeveloped land, and the site supports a mix of ruderal species characteristic of highly disturbed areas. In a previous field study, only 8 of the 56 plant species identified on the site were native; however, none of the eight species were abundant. The composition of the vegetation at the park has not changed to a great extent since the survey was conducted.

3.1.10.2 Wildlife

Los Angeles AFB and Aerospace Corporation. Wildlife diversity is low at Los Angeles AFB (Areas A and B) and Aerospace Corporation because of the limited existing habitat and extensive human activity. Typical urban birds that may occur include the English sparrow (Passer domesticus), mourning dove (Zenaidura macroura), and raven (Corvus corox). Mammalian species are limited to cottontail rabbits (Sylvilagus audobonii), mice (e.g., Peromyscus maniculatus), and possibly moles (e.g., Scapanus townsendi). Herptile species may include the western garter snake (Thamnophis sirtalis), western skunk (Eumeces skiltonianus), western toad (Bufo boreas), and western fence lizard (Sceloporus occidentalis). It is assumed the same species also inhabit the urban environment which extends in all directions surrounding the Los Angeles AFB and Aerospace Corporation complexes.

Lawndale Annex No. 3. The Lawndale Annex No. 3 area is similar to the Los Angeles AFB and Aerospace Corporation complexes. Because it is a developed urban environment, there is limited existing habitat. Landscaping consisting of trees, shrubs, and grasses provides a foraging area for the same species listed above. The intensively landscaped areas and the naturalized section near Lawndale Annex No. 3 likely support a greater abundance of wildlife species, but the diversity can be assumed low because of the quality of the homogeneous vegetation.

Fort MacArthur Housing Area. Landscaping at the Fort MacArthur Housing Area (e.g., shrubs and lawns) provides limited habitat for wildlife with the exception of the large stand of Washington palms, which supports a significant bird population. Human activities and restricted habitat limit wildlife diversity in this area. Species that have a high tolerance for human activity can be expected in the area. Typical species expected include the house mouse (Mus musculus), desert cottontail rabbit (Sylvilagus audubonii), California ground squirrels (Spermophilus beecheyi), western fence lizards

(Sceloporus occidentalis), and gopher snakes (Pituophis melanoleucus). The area surrounding the Fort MacArthur Housing Area supports similar wildlife. Because of the close proximity of this area to the Pacific Ocean, there are a number of resident and migratory waterfowl species present.

Pacific Heights and Pacific Crest Housing Areas. Restricted habitat and human activity limit wildlife diversity in the Pacific Heights and Pacific Crest Housing Areas. Because of their proximity and habitat similarity to the Fort MacArthur Housing Area, wildlife species would be expected to be similar to the species identified for the Fort MacArthur Housing Area.

Similar cultivated areas surrounding the Pacific Heights and Pacific Crest Housing Areas support the same types of wildlife found in the housing areas. White Point Park's homogeneous grass-dominated vegetation is not capable of supporting as diverse a wildlife as the native vegetation once did, but it does support a more diverse population than in the housing areas. Weedy vegetation in the park does provide a significant food resource for seed-eating birds and rodents.

3.1.10.3 Threatened and Endangered Species

Los Angeles AFB, Aerospace Corporation, and Lawndale Annex No. 3. No threatened or endangered species are expected to occur on these sites or in the vicinity, because of the absence of native habitat.

Fort MacArthur Housing Area. No threatened or endangered species are expected to occur, because of the absence of native habitat.

Pacific Crest and Pacific Heights Housing Areas. Previously, there has been special interest in the surrounding area as a habitat for the Palos Verdes Blue (Glaucopsyche lygdamus palosverdesensis) butterfly. The Palos Verdes Blue is a federally-listed endangered species which inhabits the cool, coastal areas of California. The larval form feeds on the Astragalus trichopodus leucopsis, of which two plants were found in 1986 at White Point Park. Field surveys will confirm or refute the presence of these plants.

3.1.11 Cultural and Paleontological Resources

3.1.11.1 Prehistoric Resources

Prehistoric site types in the region include villages, camps, shell middens, and hunting and milling locations. Sites range in age from the Millingstone Period (5,000 B.C.-1,500 B.C.) to the Late Prehistoric Period (A.D. 800 - A.D. 1542). Approximately 90 percent of the White Point area (including the Pacific Height Housing Area), 85 percent of the Pacific Crest Housing Area, and 70 percent of the Fort MacArthur have been inventoried for cultural resources. An inventory was completed for Fort MacArthur in 1979.

One prehistoric site was previously identified in the Pacific Heights Housing Area. This site consisted of a shell and lithic scatter and was located on several adjoining terraces. Two sites were recorded in the Pacific Crest Housing Area. A testing and evaluation project for prehistoric resources was implemented in both areas prior to housing construction. Several prehistoric sites were tested and mitigated.

At present, no cultural resource surveys have been conducted at Lawndale Annex No. 3 because the areas have been previously developed and are covered with asphalt. However, the California SHPO recommended cultural monitoring if any ground disturbing activities occur in the future.

The Gabrielino Indians traditionally occupied this area along the southern California coast. Several historic village locations, some with archaeological materials, have been identified within ten miles of White Point. Rock art, cremation pits, and ceremonial enclosures may be associated with large coastal village sites and would be of concern to Gabrielino groups.

3.1.11.2 Historic Resources

The Middle Reservation of Fort MacArthur contains a National Register Historic District and the Trona Plant, an NRHP-eligible site. The National Register Historic District consists of 40 acres and includes the original 500 Varas tract established by the Mexican government in 1846, the 100 Varas tract and Hide House location, and Fort MacArthur, established in 1888 and representing military architecture from 1916 to 1919 and 1924 to 1934. The District contains 30 standing structures from

the Fort MacArthur period representing Mission Revival, California Craftsman bungalow, and Spanish Colonial Revival architectural styles. The Trona Plant (built 1903-1906) is an NRHP-eligible site located south of the District and is an example of an industrial process and as unique architecture with its exposed timber construction.

No historic structures were found during a survey of the Pacific Crest area.

No historic structures or archaeological sites occur in the Pacific Heights area. However, several historic sites are located to the south. Two seacoast armament batteries were constructed during World War II and housed 16-inch rifles. The guns were removed after the war, but the concrete bunkers remain. White Point Village is located southwest of the Pacific Heights area and consists of an 1880s Japanese abalone processing location, and pre-1930s hotel and hot springs location. There are no standing structures associated with this site; however, White Point Village is considered eligible for the NRHP.

Existing structures at Lawndale Annex No. 3 were built in 1958 and not considered historic structures because they do not meet the 50-year requirement.

3.1.11.3 Paleontological Resources

The geological formation, with surface exposures near the Middle Reservation area, is the Miocene Monterey Formation. Two paleontological localities containing Pleistocene marine fauna are located east of the Middle Reservation near the base of the bluffs.

The geological formations, with surface exposures in the Pacific Crest and Pacific Heights Housing areas, are the Altamira Member of the Miocene Monterey Formation and Upper Pleistocene deposits. The Altamira Member consists of shales, sandstones, and siltstones containing marine fossils. Fish scales, fish bone, a shark's tooth, and bivalve mollusc were identified in the northern part of the Pacific Heights and Pacific Crest areas. Four paleontological localities have been identified within one mile of the two project areas; three are in the cliff edge south of the White Point area. Paleontological materials in the Altamira deposits consists of Miocene marine fauna such as whale, sea lion, porpoise, fish, birds, fossil seaweed, and land plants. Upper Pleistocene deposits similar in

age to the Palos Verdes Sand contained intertidal rocky shore fauna such as bivalve molluscs and gastropods.

Two geological formations occur at Lawndale Annex No. 3: the Lakewood formation and Older Dune Sand. Both deposits are Late Pleistocene and may contain vertebrate and invertebrate fauna. Several paleontological localities within six mile of Lawndale Annex No. 3 have been identified and have produced diverse invertebrate fauna as well as typical Rancholabrean terrestrial vertebrate assemblages.

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3.2 NORTON AIR FORCE BASE, CALIFORNIA - TBS

Address cumulative impacts: - SLC 7
- Bixby Ranch

3.3 VANDENBERG AIR FORCE BASE, CALIFORNIA

Vandenberg Air Force Base (AFB), with an area of 98,385 acres (98,303 acres are fee-owned and 82 acres are leased), is located in Santa Barbara County along the Pacific Ocean in California (Figures 3.1-1 and 3.3-1). The base is divided into the northern half and southern half by State Highway 246. Vandenberg AFB is the third largest Air Force base in the continental United States. The host organization at this Strategic Air Command base is the 1st Strategic Aerospace Division. Major tenants at the base include the Western Space and Missile Center and Detachment (Det) 1, 2nd Satellite Tracking Group.

Vandenberg AFB employed 3,536 permanent party military personnel, 109 military trainees, 1,105 appropriated fund civilian personnel, 4,362 contractor personnel, and 726 other civilians at the end of fiscal year (FY) 1989. Approximately 85 percent of the military personnel live on Vandenberg AFB, and 15 percent live in communities near the base.

The City of Lompoc, approximately two miles from the base, is the host community for Vandenberg AFB. Most of the personnel living offbase reside in Lompoc or the city of Santa Maria, ten miles northeast of the base. In addition, some personnel live in small communities near the base, including Orcutt, Mission Hills, Vandenberg Village, and Tanglewood.

is on the largest base

History. Vandenberg AFB, originally known as Camp Cooke, was activated in 1941 as an artillery and tank training area for the Army during World War II. Most of the camp's 92,000 acres were used for tank maneuvers and artillery firing. Camp Cooke was deactivated in June 1946 and remained idle until August 1950 when it was reactivated in its previous role for the Korean War. Camp Cooke was again deactivated in February 1953. The Air Force acquired the northern half of the idle camp in 1957 for use as a missile launching and training site, and renamed it Cooke AFB. In 1958, the base was renamed in honor of the late Gen. Hoyt S. Vandenberg.

Over the years, the Air Force gained more of what had been Camp Cooke, and acquired the Navy's Point Arguello Launch Complex (the northern half of South Vandenberg AFB). In the early 1960s, the Sudden Ranch property (the south-facing coastal land extending to Jalama Beach) was acquired for development of Space Launch Complex (SLC)-6 for the Manned Orbiting Lab Program.

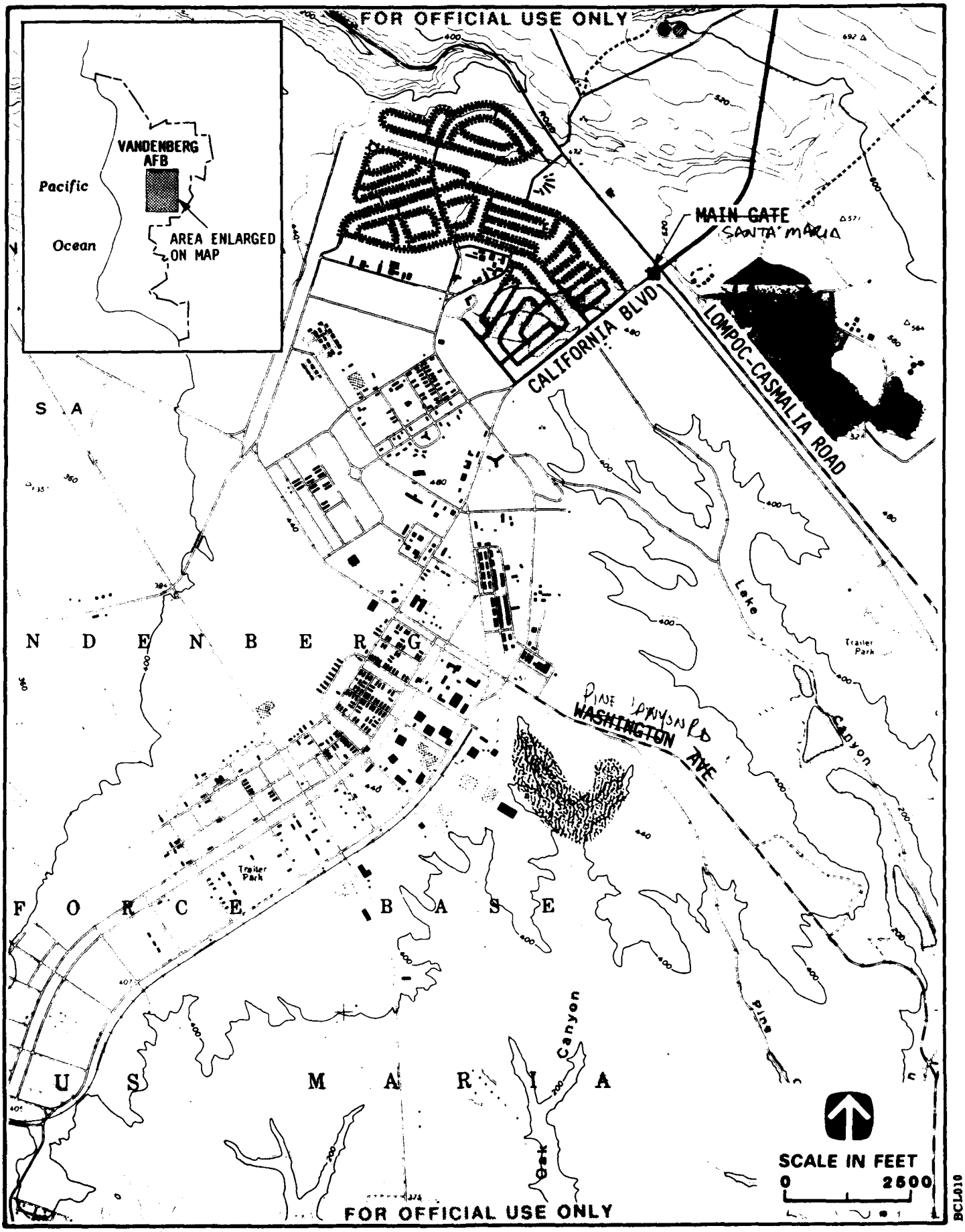


FIGURE 3.3-1 LOCAL VICINITY MAP FOR BASE SUPPORT AREA, VANDENBERG AFB, SANTA BARBARA COUNTY, CALIFORNIA

Over 1,600 launches have occurred since the first launch in December 1958. Most prominent are Minuteman ICBMs that are sent to Vandenberg AFB from distant operational sites to be launched unarmed to a target over 4,000 miles away in the Kwajalein Islands area. Space boosters of all sizes have orbited more than 500 unmanned satellites since the first polar-orbit satellite in history was launched from Vandenberg AFB in February 1959.

Mission. Vandenberg AFB facilities are also used by more than 40 DOD and non-DOD government organizations and over 70 civilian contractors, that are involved with space and missile launch programs. Vandenberg AFB is the only site in the free world from which ICBMs and polar-orbiting satellites are launched. It is the pioneer missile base of SAC and headquarters of the 1st Strategic Aerospace Division (1STRAD). 1STRAD is the largest missile unit in SAC. Its primary mission is to train SAC missile crew members; test and evaluate ICBM operations; and provide host support for the many tenant organizations and contractors located at Vandenberg AFB. 1STRAD is also responsible for all base facilities and serves units from other Major Commands, nonmilitary government agencies, and about 70 contractors.

In addition to 1STRAD, the following major units are located at Vandenberg AFB.

4392nd Aerospace Support Wing (ASW). The 4392nd ASW provides the administration services, civil engineering, transportation, comptroller, chapel, security and law enforcement, personnel division, ~~public affairs~~, airfield operations, contract professionals and morale, welfare, and recreation facilities for Vandenberg AFB.

Western Space and Missile Center (WSMC). An Air Force Systems Command (AFSC) unit, the WSMC provides support for the launching, testing, and evaluation of missile and space systems; support to DOD and other aeronautical and guided missile and space programs; and management and operations of the Western Test Range.

Detachment (Det) 1, 2nd Satellite Tracking Group. This AFSC unit is responsible for commanding, tracking, and receiving telemetry from orbiting DOD satellites.

1369th Audiovisual Squadron (AVS). This Military Airlift Command (MAC) unit provides audiovisual support to various space and missile organizations including audiovisual documentation, high-speed photo instrumentation, and laboratory processing and television production.

Det. 8, 37th Aerospace Rescue & Recovery Squadron (AARS). This MAC unit provides search and rescue operations for the Central Coast and helicopter support for Vandenberg AFB space and missile programs.

392nd Communications Group (CG). This Air Force Communications Command (AFCC) unit provides common user information systems and air traffic services and instrumentation support.

Det. 41, Headquarters, Ogden Air Logistics Center. This Air Force Logistics Command unit is responsible for onsite logistics, engineering, depot maintenance, and technical data tasks in support of base space and missile programs.

3.3.1 Community Setting

3.3.1.1 Population and Employment

Population. Vandenberg AFB has a population of 13,080, composed of 7,750 military employees and 5,330 military dependents. Nearly 80 percent of base personnel live onbase; the rest live primarily in the Santa Maria and Lompoc areas. There are 5,781 military retirees living near the base.

Santa Barbara County has a population of 345,000. The largest cities are Santa Barbara, Santa Maria, and Lompoc with populations of 79,000, 53,000, and 32,000, respectively. Population in the county rose by 16 percent between 1980 and 1988. ~~The north county area experienced the greatest portion of this increase, growing by 20 percent, due to increased activity at Vandenberg AFB, more tourism, and greater development of offshore oil and gas. The southern coastal area grew significantly between 1970 and 1980, but growth has slowed there dramatically in recent years because of water and housing constraints.~~

MAP Showing Santa Barbara County

Population projections call for the population of Santa Barbara County to increase to 425,000 by 2005. This represents a 24 percent increase from 1985. Approximately 73 percent of the growth is expected to occur in the northern county area. Santa Maria will see its population grow by 61 percent, the Santa Ynez Valley by 55 percent, and Lompoc by 27 percent. ~~These increases will be caused primarily by a steady inmigration, a declining mortality rate at all age levels, and continued economic expansion.~~

Employment. The number of people employed at Vandenberg AFB has declined from 16,000 in 1985 to 11,097, currently. Of these, 7,161 are civilian workers. The base generates 4,309 jobs for the local economy, and has an overall monetary impact of $506,206,870 on the base's economic impact region. Vandenberg employs 40 percent of Lompoc's labor force and 9 percent of Santa Maria's.

Santa Barbara County has a widely diversified economy. The largest employers in the county are services, retail trade, government, and manufacturing. In 1985, the county's employment level stood at 147,200, having grown by approximately 50 percent in the previous ten years with most of the growth occurring in the manufacturing sector. Projections call for employment in the county to grow to 211,000 by 2005, a 43 percent increase from the employment level in 1985. The county-wide unemployment rate is currently 5 percent and is projected to remain between 5 and 5.5 percent through the year 2005. The primary growth constraints on Santa Barbara County will be water and residential land shortages. ~~Limited housing development and escalating home prices will make it difficult for both the southern coastal and the northern county areas to recruit workers.~~

3.3.1.2 Housing

In Santa Barbara County, there are 131,000 housing units. This represents a 20 percent increase from 1980. Temporary dwellings account for 8,500 of these units. A water shortage has caused a moratorium on new residential construction in Goleta Valley, Montecito, and Summerland, which has increased the demand for housing in the rest of Santa Barbara County. ~~The northern county area is expected to see the greatest increase in home construction caused by relatively low housing costs and an overabundance of vacant land designated as residential.~~

In 1980, the average cost of a home in Santa Barbara County was $104,000; today that figure is approximately $150,000. Ten years ago, the average home rental cost was $300; in 1990 the average

rental is $825. Housing vacancy rates hovered between 3 and 6 percent in 1982 and stood at 4.2 percent in 1989.

At Vandenberg AFB, there are 2,078 housing units: 1,804 single-family homes, 84 duplexes, 25 fourplexes, and 1 sixplex. The base also has 172 mobile home spaces, 29 guest housing units, and 1,618 dormitory spaces. Construction plans call for expanding housing units in the Capehart housing and, east housing areas and trailer park. Vacancy rates on Vandenberg AFB are currently 10 percent for housing units 40 percent for dormitories.

3.3.1.3 Education

Vandenberg AFB ~~operates~~ contains two elementary schools, one ~~junior high~~ middle school, and one senior high school for military dependents.

In 1980, student enrollment in Santa Barbara County was 48,089. By 1990, enrollment had grown to 57,700, a 25 percent increase in ten years. Lompoc School District has a current enrollment of 9,813 and projects an enrollment of 10,235 in 1991. Lompoc's elementary and junior high schools are near capacity, while its high schools are well below capacity. ~~The City of Santa Barbara has 12,594 students and forecasts an increase to 16,414 by the year 2000, a 30 percent increase.~~ Santa Barbara elementary schools are near capacity, and its junior and senior high schools are well below capacity. In Santa Maria, there is a total current enrollment of 12,776 students. Only moderate growth of the student body is expected in the near future. New construction is underway at the elementary level, while Santa Maria's high schools do not anticipate much new construction in the near term.

3.3.1.4 Community Services

Lompoc, Santa Maria, and Guadalupe ~~are responsible for~~ provide basic services such as police and fire protection in the areas around Vandenberg AFB. The Santa Barbara County Sheriff and Fire Departments also provide service to Vandenberg AFB. In Lompoc, the number of city employees per 1,000 residents is 10, while the figure is 4.4 for Santa Barbara and 14.6 for Santa Maria.

Medical care at Vandenberg AFB is available at a 45-bed facility which provides such services as obstetrics, internal medicine, pediatrics, dentistry, psychiatry, orthopedics, podiatry, and ophthalmology.

3.3.2 Land Use

3.3.2.1 Existing Land Use Patterns

Vandenberg AFB is located in western Santa Barbara County, California. The cities of Lompoc and Santa Maria, and the unincorporated communities of Mission Hills, Orcutt and Vandenberg Village, border Vandenberg AFB. The Base Support Area is located in the center of the northern half of Vandenberg AFB. Vandenberg Village is located approximately 3.7 miles and Mission Hills 5.1 miles southeast of the Base Support Area. The existing facilities of the Base Support Area are located on approximately 1,500 developed acres (Figure 3.3.2-1).

Residential. Vandenberg AFB has accompanied and unaccompanied residential housing. Accompanied housing consists of Capehart Incremental Nos. 1 through No. 5 and the mobile home park. Capehart Incremental No. 3 consists of 399 units located outside the Santa Maria Gate on the northern side of the Lompoc-Casmalia Road segment of State Route 1. Capehart Incremental No. 4 consists of 150 units, and Capehart Incremental No. 5 consists of 124 units, and are adjacent to Capehart Incremental No. 3. They collectively form the northern extension of the Base Support Area (Figure 3.3.2-1).

Capehart Incremental No. 1, with 880 dwelling units, is the oldest accompanied housing on Vandenberg AFB. This housing area is located inside the Santa Maria Gate. The Lake Canyon Trailer Court consists of approximately 170 spaces south of the Lompoc-Casmalia Road, approximately 0.5 miles southwest of the Capehart Incremental Nos. 3 through 5 complex. This mobile home park is located outside the Santa Maria Gate and is separate from the Base Support Area (Figure 3.3.2-1).

Unaccompanied housing consists of 60 dwelling units with a capacity of 1,555 personnel. This housing is located on 65 acres south of the Capehart Incremental Nos. 1 and 2 housing areas (Figure 3.3.2-1) in the west-central part of the Base Support Area.

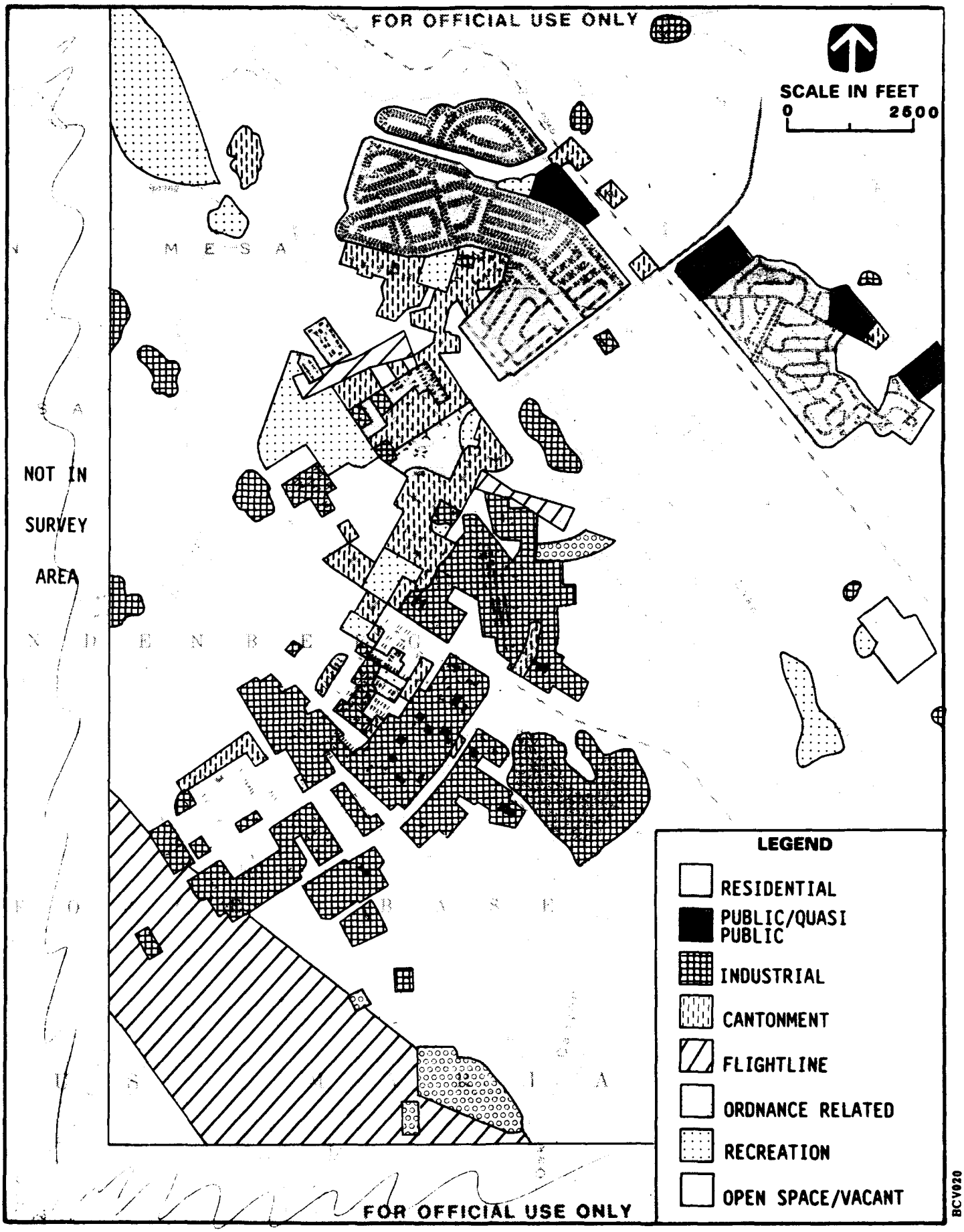


FIGURE 3.3.2-1 LAND USE OF BASE SUPPORT AREA AND SURROUNDING VICINITY, VANDENBERG AFB, CALIFORNIA

Public/Quasi Public. Public/quasi public facilities at Vandenberg AFB are ~~Maple High School~~, Vandenberg ~~Junior High~~ Middle School, and ~~Las~~ Los Padres Elementary School, adjacent to the Capehart Incremental Nos. 3 through 5 housing complex, and Crest View Elementary, which is adjacent to Capehart Incremental No. 1 housing area (Figure 3.3.2-1).

Cantonment. The facilities designated administrative, community (commercial), community (service [with exception of public schools]), and medical, in the Vandenberg AFB Comprehensive Plan, have been combined into the cantonment designation of this land use analysis. The cantonment designation generally is concentrated in the central portion of the Base Support Area from the Capehart Housing Areas south to the area in the vicinity of 13th Street. The cantonment designation consists of approximately 350 acres.

Industrial. This designation consists of those facilities designated industrial in the Vandenberg AFB Comprehensive Plan, excepting those facilities which concern ordnance and are designated "ordnance related". The industrial designation area is generally concentrated in the central and southern portions of the Base Support Area (Figure 3.3.2-1).

Flightline. The flightline is located within the southernmost section of the Base Support Area, with the exception of two helicopter pads and approach zones, located in the central Base Support Area. Figure 3.3.2-1 shows only a portion of the total flightline area of Vandenberg AFB. The flightline includes the runways, taxiways, and nonpaved areas within the runway clear/approach zones. The Aircraft Operations and Maintenance areas are generally undeveloped and give Vandenberg AFB its rural appearance.

Ordnance Related. The ordnance-related areas consist of the Explosive Ordnance Disposal (EOD) area in the east-central portion of the Base Support Area, the Weapons Storage Area (WSA), and two adjacent facilities south of the Base Support Area (Figure 3.3.2-1).

Recreation. Recreation areas consist of scattered inholdings as shown in Figure 3.3.2-1. The facilities include baseball diamonds, football/soccer fields, basketball and tennis courts, a running track, fishing lakes, a model airplane field, and an off-road vehicle (ORV) area.

Open Space. Open space generally surrounds the Base Support Area with some scattered vacant lots within the developed area. Open space includes the undisturbed vacant land of Burton Mesa, the explosive safety zones, lands reserved for environmental protection, and future development sites. Much of the open space area permits outdoor activities such as hunting and equestrian activity.

3.3.2.2 Land Use Plans and Policies

Vandenberg AFB. The adopted Vandenberg AFB Comprehensive Plan is the planning document for future base physical facilities planning and the protection of environmental and cultural resources. The plan is designed to eliminate inefficient land use, help reduce future siting conflicts, avoid incompatible future development, reduce or eliminate unnecessary project expenditures, and protect the environmental resources of Vandenberg AFB. The Military Family Housing Community plan, adopted in March 1990, is designed to address the future upgrading of existing onbase housing units and community surroundings from FY 1991 through FY 2002. This plan recognizes the possible need for constructing housing units if new missions are moved to Vandenberg AFB from bases that are now being studied for closure. The plan is flexible and comprehensive, and can be amended to meet future needs.

The Vandenberg AFB Comprehensive Plan has designated three residential reserves adjacent to Capehart Increments Nos. 1 through 5 and located north of Utah Avenue within the Base Support Area. ~~It also states that these areas may contain sensitive environmental resources that would require further study~~.

Offbase. The cities of Lompoc and Santa Maria, and the County of Santa Barbara, have adopted their respective general plans. These plans consider the impacts and needs of Vandenberg AFB upon their jurisdictions. The City of Lompoc is characterized by a tight development pattern with an absence of leapfrog development. The policies of the Land Use Element restrict residential development to the urbanized area. The urbanized area, as of 1989, contained approximately 98 acres of vacant developable residential land. ~~The city has encouraged growth to the north, away from the prime and unique farmland soils adjacent to the city on the west and east.~~

[define in glossary]

The Local Agency Formation Commission (LAFCO) recently decided to limit the northward residential expansion of the city to Purisima Road. ~~As a result, the city is nearing total buildout that probably may be reached in the middle 1990s.~~ LAFCO has determined that 148 acres of future developable residential area, with a potential density of approximately 840 dwelling units, be subject to the jurisdiction of the County of Santa Barbara for land planning and be served by the Mission Hills Community Service District. As a result, the acreage will be developed under the policies of the Santa Barbara County general plan. As with Lompoc, the County general plan has designated Mission Hills and Vandenberg Village as urbanized areas; the surrounding private land is designated low rural densities ranging from 40- to 100-acre minimum lot sizes. The County has adopted policies in the general plan to protect the environmental and agricultural resources. ~~Therefore, as with Lompoc~~, there is a possibility that the unincorporated areas would also reach total buildout soon.

The County of Santa Barbara administers the Orcutt, Tanglewood, and other unincorporated areas under the County general plan. The policies mentioned above would be consistent with those in the Santa Maria area.

The City of Santa Maria general plan is governed by policies designed to promote growth in a controlled and orderly manner to avoid leapfrog development. It promotes infill and is protective toward the surrounding prime farmlands. The policies protecting prime farmland are designed to prevent premature or unnecessary conversion to nonagricultural uses. The City at present has room for 5,000 additional dwelling units. The draft land use element is anticipated to provide for more dwelling units in the future. The city historically has had a growth rate of 350 to 650 housing units per year. The draft land use element is designed to accommodate phased growth to a planned future population of 80,000 to 85,000 (current population is 53,000).

3.3.2.3 Visual Resources

The Base Support Area is sited on Burton Mesa, an uplifted marine terrace adjacent to the coastal plain of the Pacific Ocean. This area takes the form of an "S," an inherited form of the former cantonment area of Camp Cooke. The surrounding landscape is composed of open space lands with pristine stands of Burton Mesa chaparral and varying degrees of man-made disturbance, including the former developed areas of Camp Cooke that are now vacant. The Base Support Area is divided according to use: residential and public school areas to the north; administrative, industrial and

support facilities in the middle; and flight operations to the south. The area is characterized by pockets of intensive development separated by windbreaks, vacant areas, and recreational and natural areas, and is surrounded by vast areas of open space which give the installation a park-like quality. The highly intensive industrial and flight operations areas are effectively screened from sensitive residential and community service areas.

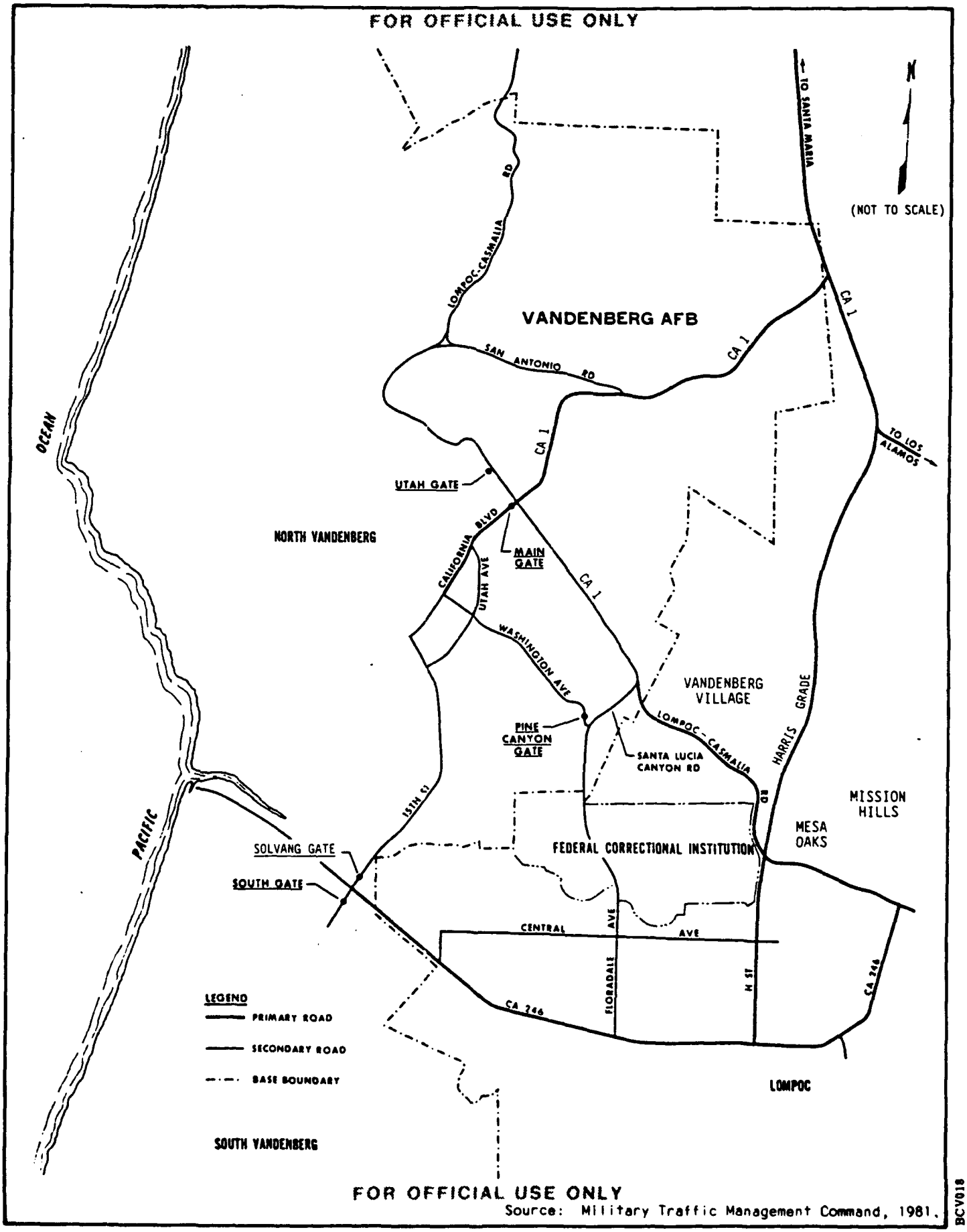
3.3.3 Transportation

3.3.3.1 Traffic

Existing Conditions. Regional access to Vandenberg AFB is provided by State Routes 1, 20 and 246; Lompoc-Casmalia Road, and Santa Lucia Canyon Road. State Route 246 divides the base (North Half and South Half). Four entrance/exit gates provide primary access to the base. The Main Gate (Santa Maria Gate) is located near the intersection of California Avenue and Lompoc-Casmalia Road and provides access from the Orcutt and Santa Maria area north of the base. The Utah Gate, located on Utah Avenue east of Lompoc-Casmalia Road, also provides access from Orcutt and Santa Maria. The Pine Canyon Gate is located on Washington Avenue north of Santa Lucia Canyon Road and provides access from the Lompoc area to the south and east. The 13th Street (Solvang) Gate, located on 13th Street north of California Route 246, provides access from the south and west. Figure 3.3.3-1 illustrates the major roads in the Vandenberg AFB area.

The principal routes into Vandenberg AFB from Lompoc and areas to the south are via H Street to Lompoc-Casmalia Road (State Route 1) and then north to the Main Gate; via Floradale Avenue, which continues as Santa Lucia Canyon Road outside of Lompoc, north to Washington Avenue and the Pine Canyon Gate; or west on California Route 246 (Ocean Avenue) to ~~13th~~ 15th Street and the Solvang Gate. The principal routes into Vandenberg AFB from Santa Maria and Orcutt are via Orcutt Road to State Route 1 (known locally as Vandenberg Road) and the Main Gate, or via the circuitous Black Road to Lompoc-Casmalia Road and the Utah Gate.

Roadway Characteristics. H Street (State Route 1) is a four-lane divided roadway extending from Olive Avenue north through the City of Lompoc. H Street becomes Harris Grade Road outside of the city. Ocean Avenue (California Route 246) is a four-lane divided roadway between 7th Street and V Street



Source: Military Traffic Management Command, 1981.

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FIGURE 3.3.3-1 GENERAL ROAD SYSTEM VANDENBERG AFB, CALIFORNIA

in the city. East of 7th Street, Ocean Avenue is a three-lane divided roadway and west of V Street, it is a two-lane divided roadway.

Existing Traffic Volumes. Current traffic volumes for Lompoc were obtained from the City of Lompoc Circulation Element of the General Plan. The traffic volumes are based on counts made between 1985 and 1987 (Table 3.3.3-1 [TBS])

Operating Conditions On Roadways. An analysis of daily operating conditions on the roadways in the City of Lompoc was conducted. Existing daily traffic volumes were compared to Level of Service (LOS) E roadway capacities to arrive at a volume-to-capacity ratio and corresponding level of service of operation. A comparison of daily traffic volumes and volume-to-capacity ratios for selected roadway segments is provided in Table 3.3.3-1 (TBS). All roadway segments analyzed operate at LOS C or better.

3.3.3.2 Airports - include quantification

Commercial intercity air passenger service is available at the City of Santa Maria. Currently two scheduled airlines provide Santa Maria and the surrounding region with flights to Los Angeles and San Francisco. Currently, Sky West Airlines flies to Los Angeles International and has a shuttle service to Delta Airlines. West Air flies to Los Angeles and San Francisco and has a shuttle service to United Airlines.

(Lompoc turning airport over to Lompoc?)

3.3.4 Utilities

Northern Santa Barbara County is identified as the area where community and public utility services may be directly or indirectly affected by the proposed action. Santa Maria, the largest city in the area, is expected to receive significant immigration. Because of its proximity to Vandenberg AFB, Lompoc is also expected to have some increased immigration.

use a table to summary all utilities

3.3.4.1 Water Supply

The City of Santa Maria provides potable water to its residents from groundwater sources. The system presently has a capacity of 18 million gallons per day (MGD). The average daily demand in 1989 was 11 MGD, or 61 percent of the treatment system's capacity. Projected population increases will result in an average daily demand of 13.19 MGD by 1996 and 13.62 MGD by 1997 based on an estimated demand of 200 gallons per capita per day (gpcd). The City of Lompoc service area extends to the city and areas surrounding the city. The city's treatment facility was recently upgraded to a 7 MGD capacity. Present average daily demand is 5.76 MGD, with projected demands in 1996 and 1997 of 6.38 MGD and 6.49 MGD, respectively (based on per capita use of 180 gpcd). Present plans are to upgrade the facility to 10 MGD to meet future demands.

Potable water demand at Vandenberg AFB was 4.1 MGD in FY 1989. The base provides its own water from ground water sources with an operating capacity of 11 MGD. The present per capita use is 291 gpcd and is expected to remain constant.

3.3.4.2 Wastewater

Wastewater treatment for Santa Maria occurs at a city-owned activated sludge treatment plant. The facility currently processes 5.6 MGD and is operating at 72 percent of its 7.8 MGD capacity. The city is planning to expand the facility to 8.7 MGD to meet future increased demand. Projected population increases will result in an average daily flow of 6.99 MGD in 1996 and 7.22 MGD in 1997 (based on 100 gpcd).

The 5 MGD treatment facility owned by the City of Lompoc services the city and areas surrounding the city, including Vandenberg AFB. The average daily flow in 1989 was 3.56 MGD, including .9 MGD from the base. The projected flow (based on 85 gpcd) will be 3.91 MGD in 1996 and 3.96 MGD in 1997. The facility has a design capacity of 10 MGD to meet future needs. The present contract with Vandenberg AFB allows for the treatment of a daily average of 1.53 MGD and peak demand of 3.4 MGD.

3.3.4.3 Solid Waste

Solid waste is collected by the city of Santa Maria and disposed of in a City-owned landfill. The city generated 535 tons per day (T/day) in 1989. ~~Based on local planning estimates, a 5.1 percent increase is expected by 1995, or an addition 26.8 tons daily~~. The City landfill is projected to have a 10 to 12 year lifespan. The City of Lompoc Solid Waste Division collected an average of 170 T/day in 1989. Refuse is disposed of in a City-operated landfill. ~~The Solid Waste Division of the Public Works Department projects an expected 3 percent increase in solid waste generation annually~~. The landfill has sufficient capacity to handle wastes for an additional 20 to 30 years.

A private contractor collects solid waste on Vandenberg AFB and disposes of it in a landfill on the base. Approximately 35 T/day were generated in FY 1989. The landfill has a projected lifespan of 35 years. ~~Solid waste generation on the base is expected to stay constant~~.

3.3.4.4. Energy

Electricity. Pacific Gas and Electric Company (PG&E) provides electrical service to Vandenberg AFB and most of the surrounding area including Santa Maria. PG&E provides natural gas and electrical service to 11.5 million people in northern and central California. In 1989, peak electrical reached approximately 17,000 megawatts (MW). PG&E projects peak demand will increase to approximately 22,800 MW by the year 2009, with an annual growth rate of 1.5 percent. The company's present capacity is 23,244 MW. No new projects are presently planned for additional electrical supply. Any increased demand will be met by purchased power.

The City of Lompoc is a member of Northern California Power Agency (NCPA). NCPA is a non-profit joint agency comprised of 11 cities, 1 rural electric cooperative, and 1 irrigation district that was formed to purchase, generate, transmit, interchange, and pool electrical energy and capacity for its members. The peak demand of 1,352 MW was met with resources from a system with a capacity of approximately 1,500 MW. NCPA projects a 2.5 percent annual increase in peak demand. To meet projected peak demands, NCPA will rely on purchased power and a new hydroelectric project presently under construction. The system capacity for Lompoc is 75 megavolt-amperes (MVA), and a third transformer substation is presently under construction. Peak use in 1989 was 21 MVA.

Vandenberg AFB has ten substations on the base to provide electricity to facilities throughout the installation. These substations are capable of supplying 92.0 MVA. Total electrical consumption in FY 1989 was 10,800,000 KW with a peak demand of 52 MVA. Demand is expected to stay constant.

Natural Gas. Southern California Gas Company supplies natural gas to central and southern California. In 1989, the company provided service to 4.5 million customers and sales totaled 593 billion cubic feet (bcf). The company has interstate supply sources and storage to meet future projected demands of 2.5 to 3.0 percent annual growth. Average annual residential consumption is 10 thousand cubic feet (Mcf) within its service area. The City of Santa Maria's annual consumption in 1989 was 1,820,945 Mcf with a December peak of 192,186 Mcf. The City of Lompoc's annual consumption was 1,139,000 Mcf with a December peak of 104,000 Mcf. Vandenberg AFB in FY 1989 consumed 599,620 Mcf of natural gas with a January peak of 75,460 Mcf. Demand is expected to stay constant.

3.3.5 Hazardous Materials/Waste

Hazardous waste at Vandenberg AFB is managed by the Defense Reutilization and Marketing Office (DRMO). Typical hazardous wastes include oils, paints, thinners, solvents, and other regulated materials. The hazardous wastes are stored in an onbase conforming storage area, and then transported to licensed treatment and disposal facilities.

Nine Installation Restoration Programs (IRP) sites have been identified in proximity of the proposed project areas. No Further Action documents have been prepared for three of the sites. Phase II investigations will be conducted for the other six sites. These sites are: Base Exchange Service Station (Site 1), Old Service Station (Site 2), Landfill No. 2 (Site 3), Laundry Site (Site 4), Landfill No 1/Drum Disposal Site (Site 26), and Entomology Wash Back (Site 24).

3.3.6 Geology and Soils

3.3.6.1 Geology

Regional Geology. Vandenberg AFB lies in the western portion of the Transverse Ranges Physiographic Province of California. This region of west-trending mountains is divided by a series of valleys

oriented by subsurface faulting. The west-central part of the base is characterized by an extensively uplifted marine terrace which is dissected into three erosion surfaces. The terraces are bounded by the Casmalia Hills to the north and Cypress Ridge of the Santa Ynez Mountain Range to the south. San Antonio Terrace (north) and Burton Mesa (center) are both uplifted marine terraces separated by San Antonio Creek. The San Ynez River, to the south, separates Burton Mesa from Lompoc Terrace (Figure 3.3.6-1). The surfaces of the Mesa have been altered by eolian or wind transported deposits. A dendritic pattern of incised ephemeral streams, tributaries to either the Santa Ynez River, San Antonio Creek, or independent streams which drain to the west into the Pacific Ocean, have also altered the topography. The Base Support Area is sited on a broad plain of Burton Mesa with surface drainage flowing into the surrounding dendritic drainage basins.

Geologic Hazards. Potential geologic hazards at Vandenberg AFB include landslides, surface fault ruptures, seismicity liquefaction, tsunamis, and seiche. The physical location of the Base Support Area limits the potential effects of these geologic hazards on the base.

Fault Rupture. Vandenberg AFB is located in a region of highly complex geologic compositions. The base is located in the Hosgri Fault System, which is located on and offshore. Burton Mesa is situated between the Lion's Head Fault to the north and Hosgri Fault and Santa Ynez River Fault to the south (Figure 3.3.6-2). The Hosgri Fault is considered to be an active fault, evidenced by seismicity or displacement in the last 11,000 years (Holocene Epoch). The Santa Ynez River Fault has been classified as potentially active because evidence shows displacement 11,000 to 500,000 years old. The Lion's Head Fault shows no evidence of displacement in the last 500,000 years; however, fault evidence may be masked by erosion or vegetation. There is no evidence of faults present in the vicinity of the Base Support Area.

Seismicity or Strong Ground Motion. Seismicity or strong ground motion is associated with the effects of fault rupture, both subsurface and surface. The Vandenberg AFB area has experienced 90 minor earthquakes in the past 65 years with magnitudes ranging from 3.0 to 7.3 (Richter scale), including a 7.3 magnitude event in 1927 located offshore near Point Arguello.

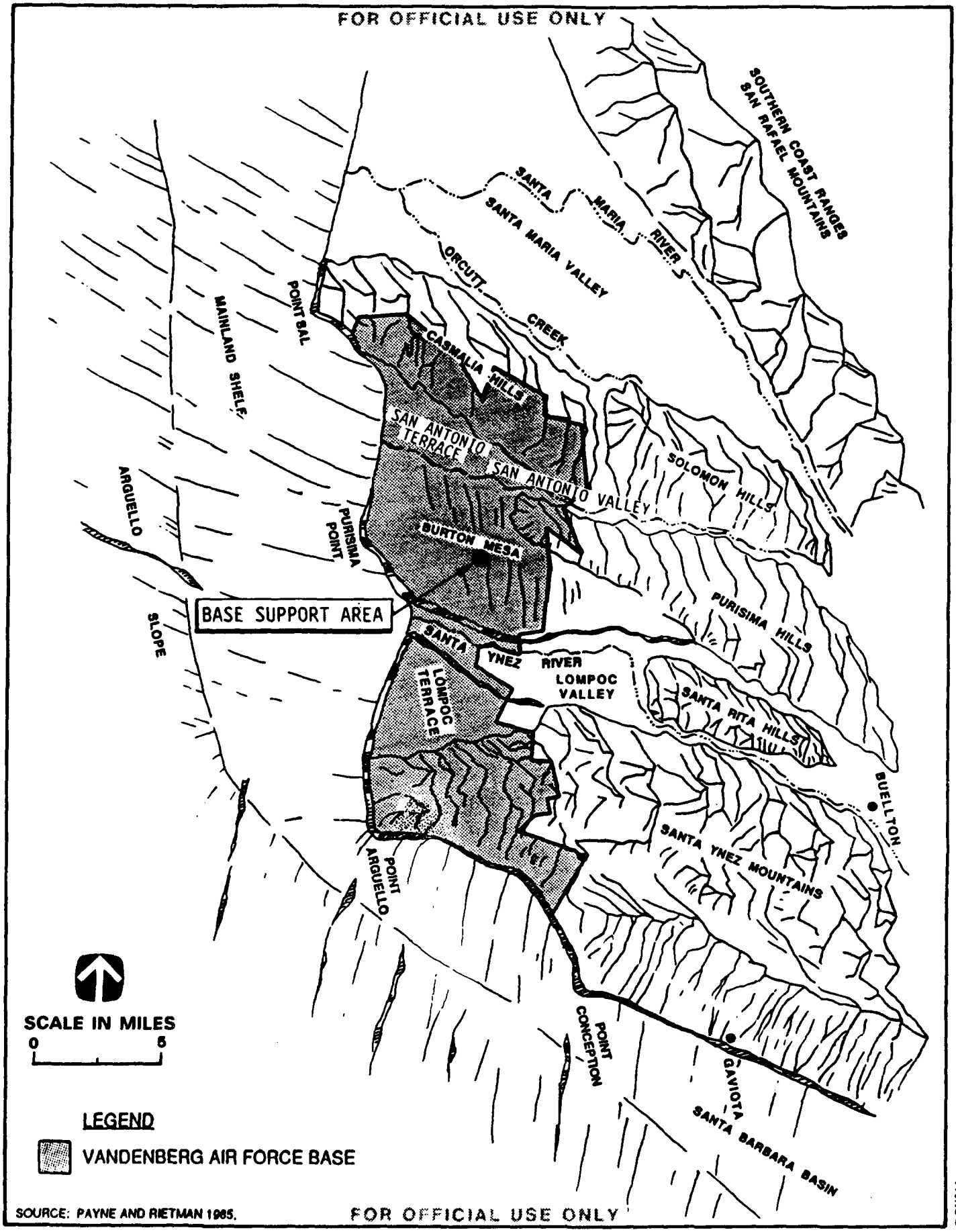

FIGURE 3.3.6-1 PHYSIOGRAPHIC FEATURES MAP, VANDENBERG AFB, CALIFORNIA

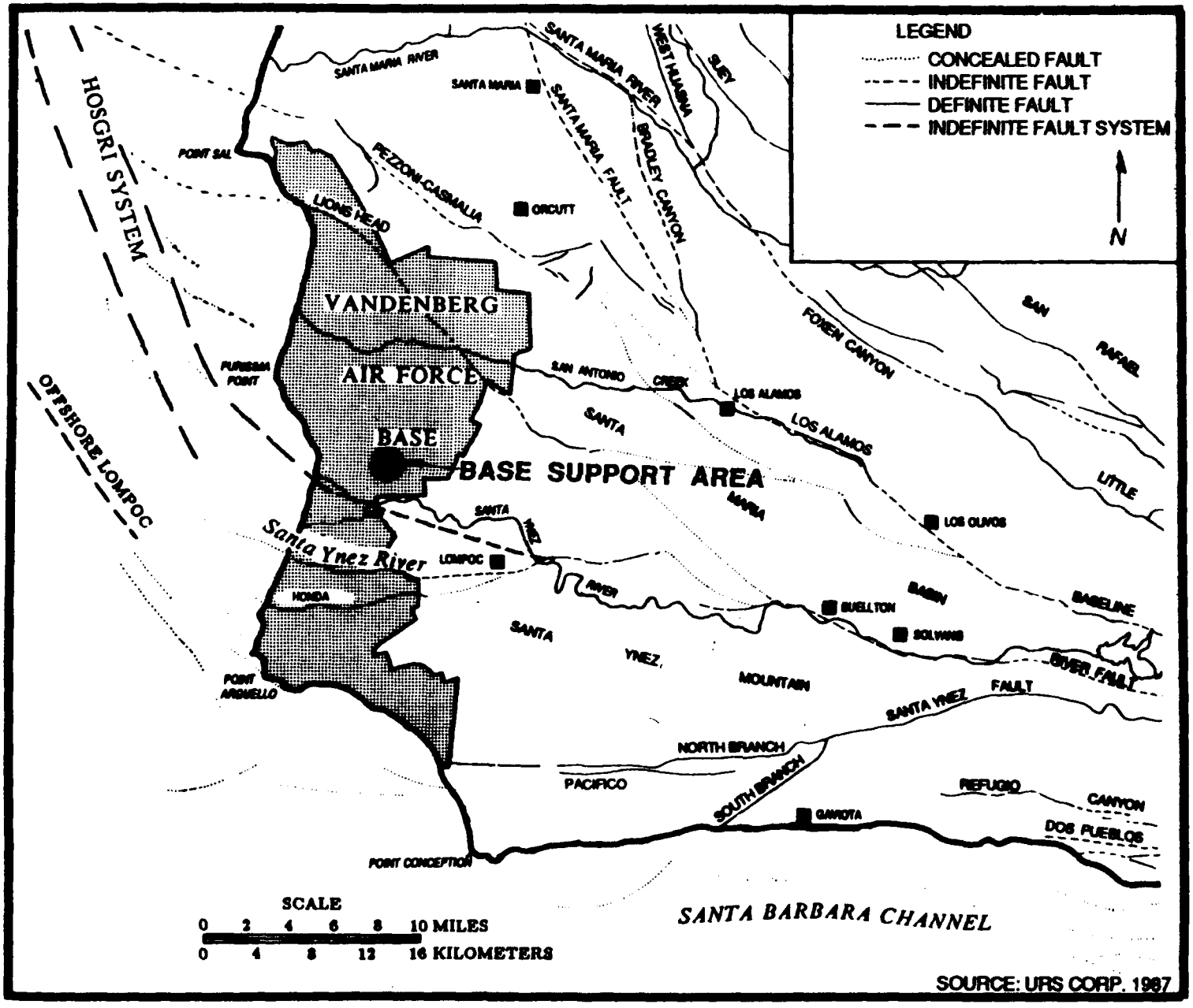

FIGURE 3.3.6-2 LOCATION OF FAULTS IN THE VANDENBERG AFB, CALIFORNIA AREA

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Other hazards associated with surface rupture and ground motion are liquefaction, tsunamis, and seiche. Liquefaction and tsunami hazards can be discounted because the liquefaction prone areas at Vandenberg AFB are located in the high groundwater areas associated with San Antonio Creek and the Santa Ynez River. The tsunami hazard to the Base Support Area can be considered minimal as the area is over two miles from and over 300 feet higher than the ocean. Seiche is an induced wave setup by a force, such as ground motion from an earthquake, in an enclosed fluid body such as a lake, pond, or storage tank. The hazard is posed by the overtopping of water behind a dam or through the rupture of a tank. Potential seiche hazard to the Base Support Area is limited to small areas located downhill from petroleum, oil, and lubricant (POL) storage tanks and large water tanks. The three Pine Canyon lakes are located below the Base Support Area and, therefore, do not present a potential hazard.

3.3.6.2 Soils

Within the Base Support Area, two soil series describe the majority of the soil resources: the Narlon Loamy Sand and the Tangair Sand. The two soil series vary in particle size classification and slope throughout the Base Support Area. Within the northwestern portion of the area identified for the realignment, the Tangair sand is the representative soil series. This soil is found in the Tangair-Narlon Association and ranges from nearly level to strongly sloping. The Tangair Sand ranges from being poorly drained to moderately well drained soil and is located on the terraces commonly found at Vandenberg AFB. The Narlon Loamy Sand is the representative soil for the southern and eastern portion of the area identified for the realignment project. This soil is also identified with the Tangair-Narlon Association and shares common physical properties with the Tangair Sand.

The potential for water erosion to the Tangair Sand ranges from none to slight because of the rapid permeability of this soil. The potential for windblown erosion is high because of the coarse texture of this soil. The Narlon Loamy Sand's potential for water erosion ranges from none to slight because of the rapid permeability of this soil. As this soil is slightly less coarse in texture, the potential for windblown erosion is moderate.

No prime farmland is located within the area identified for the realignment. All the soils in this area have severe limitations that make them unsuitable for cultivation and limit their use to pasture, range, woodland, or wildlife habitat.

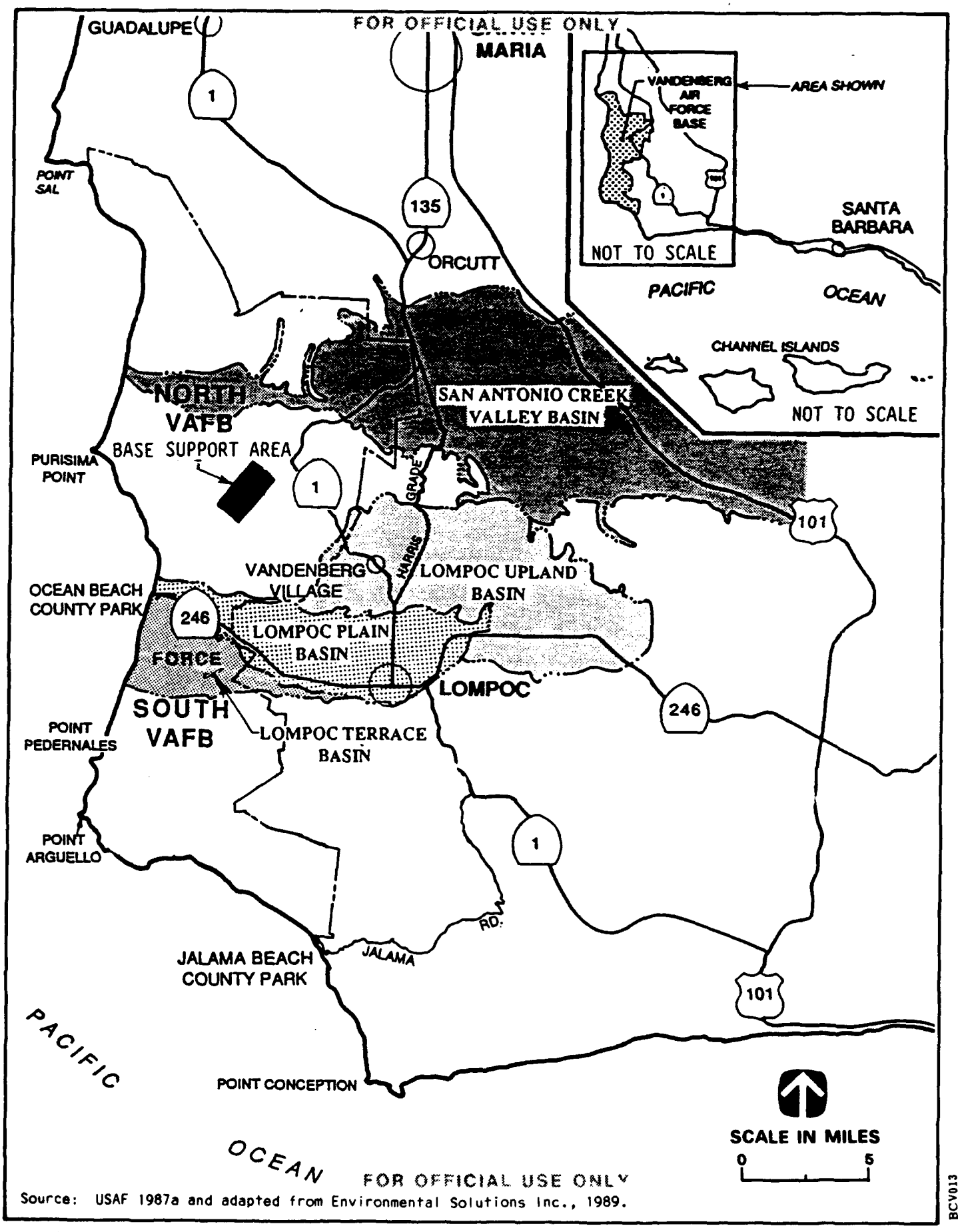
3.3.7 Water Resources

3.3.7.1 Groundwater

The cities of Lompoc and Santa Maria and the unincorporated communities of northern Santa Barbara County and Vandenberg AFB receive their domestic water supply from the groundwater of the Santa Maria River, San Antonio Creek, and Santa Ynez River basins. The Base Support Area, sited upon Burton Mesa, is underlain by bed rock; therefore, water is extracted from wells outside Burton Mesa. The City of Santa Maria and nearby unincorporated areas pump approximately 12,000 acre-ft/yr from the Santa Maria River Valley Basin. In 1985, it was estimated that this basin was being overdrawn at a rate of 21,000 acre-ft/yr. Vandenberg AFB does not draw any water from this basin.

The San Antonio Creek Valley Basin has approximately 20,000 acre-ft/yr drawn from its groundwater supplies of which Vandenberg AFB draws approximately 4,000 acre-ft/yr. This supplies 70 percent of the water for the northern portion of the base. The Air Force estimates that the San Antonio Creek Basin is overdrafted by 12,000 acre-ft/yr. The safe yield for this Basin is estimated to be 8,000 acre-ft/yr. Approximately 300 acre-ft/yr is for municipal and industrial uses at the unincorporated town of Los Alamos; 16,000 acre-ft/yr is used for agriculture located upstream from Vandenberg AFB. Because of the continuous overdraft conditions, Vandenberg AFB established an ongoing monitoring program to study the effects the lowering water table has on wetlands.

The Santa Ynez River Basin is divided into the upper subarea basin of the Santa Ynez Valley and the lower subarea basin, which includes the Lompoc Valley. The lower subarea consists of three hydrologically-linked basins known as the Lompoc Upland Basin, Lompoc Plain Basin and Lompoc Terrace Basin (Figure 3.3.7-1). Vandenberg AFB does not extract groundwater from the Lompoc Upland Basin. However, the City of Lompoc and unincorporated water users in the Lompoc Valley do extract water from this groundwater basin. Vandenberg AFB, the City of Lompoc, and unincorporated water users all extract water from the Lompoc Plain Basin. The Lompoc Plain Basin furnishes approximately 30 percent of the water used by North Vandenberg AFB or approximately 1,700 acre-ft/yr. The Lompoc Terrace Basin is occupied by South Vandenberg AFB which is currently the only extractor of groundwater. The South Vandenberg AFB water system is independent of that for North Vandenberg AFB. Current water usage is 260 acre-ft/yr from two wells. A high extraction rate occurred in 1984 with 350 acre-ft/yr, a rate which exceeded the average natural



Source: USAF 1987a and adapted from Environmental Solutions Inc., 1989.

FIGURE 3.3.7-1 GROUNDWATER BASINS IN THE VANDENBERG AFB, CALIFORNIA AREA

recharge by approximately 100 acre-ft/yr. Current usage is approximately 10 acre-ft/yr below average natural recharge resulting in a long-term stable water supply.

The lower subarea of the Lompoc Upland and Lompoc Plain basins collectively have a total extraction rate of 38,000 acre-ft/yr resulting in an overdraft of 5,000 acre-ft/yr. Groundwater quality is monitored by the base and conforms to federal water quality standards with the exceptions of well No. 3 which has shown excessive chromium values and well No. 6 which has intermittent and unduplicated trace amounts of several pesticides.

3.3.7.2 Surface Water

The Base Support Area is sited upon an uplifted marine terrace called Burton Mesa. Burton Mesa is drained by a dendritic pattern of minor ephemeral stream courses (water flows in a stream channel only during and shortly after a rainstorm) which radiate in a circular pattern around the Base Support Area and drain away from the installation. There are three major ephemeral stream systems: the tributaries of San Antonio Creek which drain to the north; the Santa Ynez River which drains to the south; and four small streams which drain to the west. San Antonio Creek and the Santa Ynez River allow surface water to infiltrate through the sand into the ocean. Occasionally during periods of high stream flow, the sand deposits are temporarily breached, and surface water flows directly into the ocean, but these breaches are soon closed by the migrating action of the sand deposits.

The San Antonio Creek Drainage Basin is approximately 154 square miles in area. The creek is characterized by perennial flows with intermittent flows upstream of Barka Slough. Marshlands border much of its course south of the Barka Slough Marsh. Water quality in San Antonio Creek has been classified poor with total dissolved solids (TDS) in 1983 ranging from 1,400 to 3,600 parts per million (ppm).

The Santa Ynez River has a drainage basin of approximately 900 square miles. The natural flow has been severely altered by several dams, the largest being Cachuma Dam which impounds Lake Cachuma Reservoir. The waters of Lake Cachuma are exported out of the Santa Ynez River Basin to the City of Santa Barbara.

Downstream from the City of Lompoc and Lake Cachuma, a stream gage was formerly located near the confluence of the Santa Ynez River and Pine Canyon Creek (a drainage course of Burton Mesa) near the Federal Prison at Lompoc. The gage measurements indicated the average flow of the Santa Ynez River between the months of June and November was less than 7 cubic feet per second (cfs). This flow included the effluent from the Lompoc regional sewer plant facility. The TDS levels in 1983 ranged from 602 to 1,180 ppm and indicate poor water quality.

3.3.8 Air Quality

3.3.8.1 Regulatory Setting

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) which must be maintained during the operation of any emission source (Table 3.3.8-1). The Clean Air Act delegates to states and local agencies the authority to establish air quality rules and regulations which must be at least as restrictive as the federal requirements. The California Air Resource Board (CARB) has established air quality standards which are more stringent than some of the NAAQS and which also regulate pollutants for which there are currently no federal standards (Table 3.3.8-1). Rules adopted by local air pollution control districts, and accepted by the CARB, are included in the state implementation plan (SIP). When approved by the EPA, these rules become federally enforceable. The Santa Barbara County Air Pollution Control District (SBAPCD), having received the necessary approvals, regulates stationary sources in Santa Barbara County which including Vandenberg AFB. SBAPCD has the authority for granting permits to stationary sources in the county. However, CARB reviews most stationary source permit applications in Santa Barbara County to ensure that the APCD rules and regulations are implemented.

3.3.8.2 Regional Air Quality

Meteorology and Climate. Vandenberg AFB is characterized by a coastal Mediterranean climate which experiences an unusual amount of fog, especially during the summer. September and October are the warmest months of the year with an average high of 69 degrees. The average maximum temperatures for December through August range from 60 to 65 degrees; lows range from the 40s to the low 50s.

Table 3.3.8-1

Maximum Pollutant Concentrations Monitored in Northern Santa Barbara County

Pollutant	Averaging Time	Maximum Concentration								
		Lompoc			Santa Maria			Vandenberg AFB		
		1986	1987	1988	1986	1987	1988	1986	1987	1988[1]
Ozone (ppm)	1-hour	0.11	0.11	0.10	0.08	0.10	0.08	0.10	0.15	--
Carbon Monoxide (ppm)	1-hour	6.0	7.0	6.0	NM	NM	NM	1.0	1.0	--
	8-hour	3.3	2.3	2.4	NM	NM	NM	1.0	1.0	--
Nitrogen Dioxide (ppm)	1-hour	0.05	0.04	0.06	0.05	--	--	0.04	0.03	--
	Annual	0.011	0.009	0.012	0.010	--	--	0.002	0.002	--
Sulfur Dioxide (ppm)	1-hour	0.05	0.03	0.03	0.19	0.07	0.03	0.01	0.01	--
	24-hour	0.016	0.010	0.009	0.023	0.015	0.008	0.010	0.002	--
	Annual	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	--
Particulates PM_{10} $\mu g/m^3$	24-hour	NM	NM	NM	73	61	60	NM	NM	NM
	Annual GM[2]	NM	NM	NM	29.3	27.3	32.3	NM	NM	NM
	Annual AM[3]	NM	NM	NM	31.9	29.7	34.7	NM	NM	NM
TSP $\mu g/m^3$	24-hour	94	126	120	512	263	388	69	131	--
	Annual GM[2]	45.8	46.9	47.9	65.9	74.1	65.4	31.8	36.5	--

Notes: [1]Measurements discontinued June 1988.
[2]Geometric Mean.
[3]Arithmetic Mean.
NM = Not Monitored.

Source: California Air Resources Board 1988.

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Existing Air Quality. Vandenberg AFB is included in the Central Coast Air Quality Control Region (AQCR Number 32) (CFR,1989) and the California South Central Coast Air Basin. Air quality in the northern part of the county is generally quite good. This is evident from the maximum pollutant concentrations measured from 1986 to 1988 at three North County monitoring stations (Table 3.3.8-1). Except for ozone and particulates, the maximum concentrations of pollutants are below the national and state ambient Air Quality Standards (Table 3.3.8-1).

An area is designated as being in attainment for a particular pollutant if ambient concentrations in that area are below the corresponding standard. The present EPA designations for Santa Barbara County are shown in Table 3.3.8-2. The county is divided into two areas: the south coast is the Air Quality Management Area (AQMA), and the remainder of the county is the non-AQMA. The Santa Maria area is nonattainment for particulates and the AQMA area is nonattainment for ozone. Because the ozone standard has been exceeded in the non-AQMA area, the SBCAPCD has requested the EPA to redesignate this area nonattainment for ozone.

3.3.8.3 Emission Sources

Emission estimates for stationary and mobile sources in Santa Barbara County during 1987 are presented in Table 3.3.8-2. The table shows that the largest contributors to total and reactive organic gases (TOG and ROG) were petroleum processes. Mobil sources were the largest contributors to carbon monoxide (CO), nitrogen oxides (NO_x), and sulfur oxides (SO_x). Particulate emissions were generated largely by stationary sources.

Stationary source emissions in 1987 for Vandenberg AFB were as follows:

Tons per Day

NO_x	ROC	SO_x	PM
.248	.032	.031	.028

These emission estimates are included in the stationary sources emission totals shown in Table 3.3.8-2.

Table 3.3.8-2

Santa Barbara County Emission Inventory for 1987 (DRAFT)[1]

Source Category	TOG	ROG	CO	NO_x	SO_x	PM	PM_{10}
STATIONARY							
Fuel Combustion	4.63	1.03	2.85	12.72	.59	.28	.24
Waste Burning	2.42	1.75	13.11	.02	.01	6.27	6.08
Solvent Use	12.94	11.12	.00	.00	.00	.00	.00
Petroleum Process, Storage, & Transfer	53.58	24.26	.01	.00	.03	.01	.01
Industrial Processes	.14	.12	.26	.01	.00	1.66	.89
Miscellaneous Processes	93.39	11.61	10.64	.16	.00	98.95	46.14
Miscellaneous	.94	.43	.17	.89	.38	.22	.13
Subtotal	168.04	50.33	27.04	13.80	1.01	107.39	53.48
MOBILE							
Onroad Vehicle	16.81	15.30	123.15	19.74	1.08	2.88	1.74
Other Mobile	4.85	4.56	32.63	6.44	.64	.64	.61
Subtotal	21.86	19.89	155.78	26.18	1.72	3.51	2.35
TOTAL:	203.90	76.89	187.11	51.69	8.86	111.39	56.29

Notes: [1]Includes Vandenberg AFB

Source: Santa Barbara Air Pollution Control District 1987.

3.3.9 Noise

3.3.9.1 Regulatory Setting

The principal document that prescribes guidelines for developing compatible land use planning and zoning on Vandenberg AFB is the Air Installation Compatible Use Zone (AICUZ) study. It incorporates federal and California state noise standards and addresses issues related to hazards caused by aircraft accidents, and noise from aircraft and airfield operations. The study contains specific noise policy and implementation guidelines, as well as methods for assessing noise impacts associated with air installation land uses. The document describes compatible use zones which are a function of noise and accident potential.

The Noise Control Act of 1972 (PL 92-574) created within the EPA an Office of Noise Abatement and Control (ONAC) with the mandate to identify major sources of noise; regulate those identified sources; propose aircraft noise standards to the FAA; label noisy products; engage in research, technical assistance, and dissemination of public information; and coordinate all federal noise control activities. The Quiet Communication Act of 1978 (PL 95-609) amended the Noise Control Act of 1972. The 1978 Act required the EPA to administer a national Quiet Communities Program which included but was never limited to developing an abatement plan for areas around major transportation facilities (including airports, highways, and railroads) and other major stationary sources of noise and, where appropriate, for the facility or source itself.

The Santa Barbara County noise element of the comprehensive plan identifies noise sources and related impacts and establishes methods for noise abatement. The purpose is to evaluate noise levels and develop specific policies to reduce or mitigate noise problems. These policies are in compliance with federal and state standards.

3.3.9.2 Existing Noise Sources

The principal noise sources on Vandenberg AFB include missile launch activities; aircraft operations, railroad traffic on the Southern Pacific Railroad that crosses Vandenberg AFB; and vehicular traffic on roads in the Base Support Area and on traffic arteries carrying base operations traffic, both onbase and offbase.

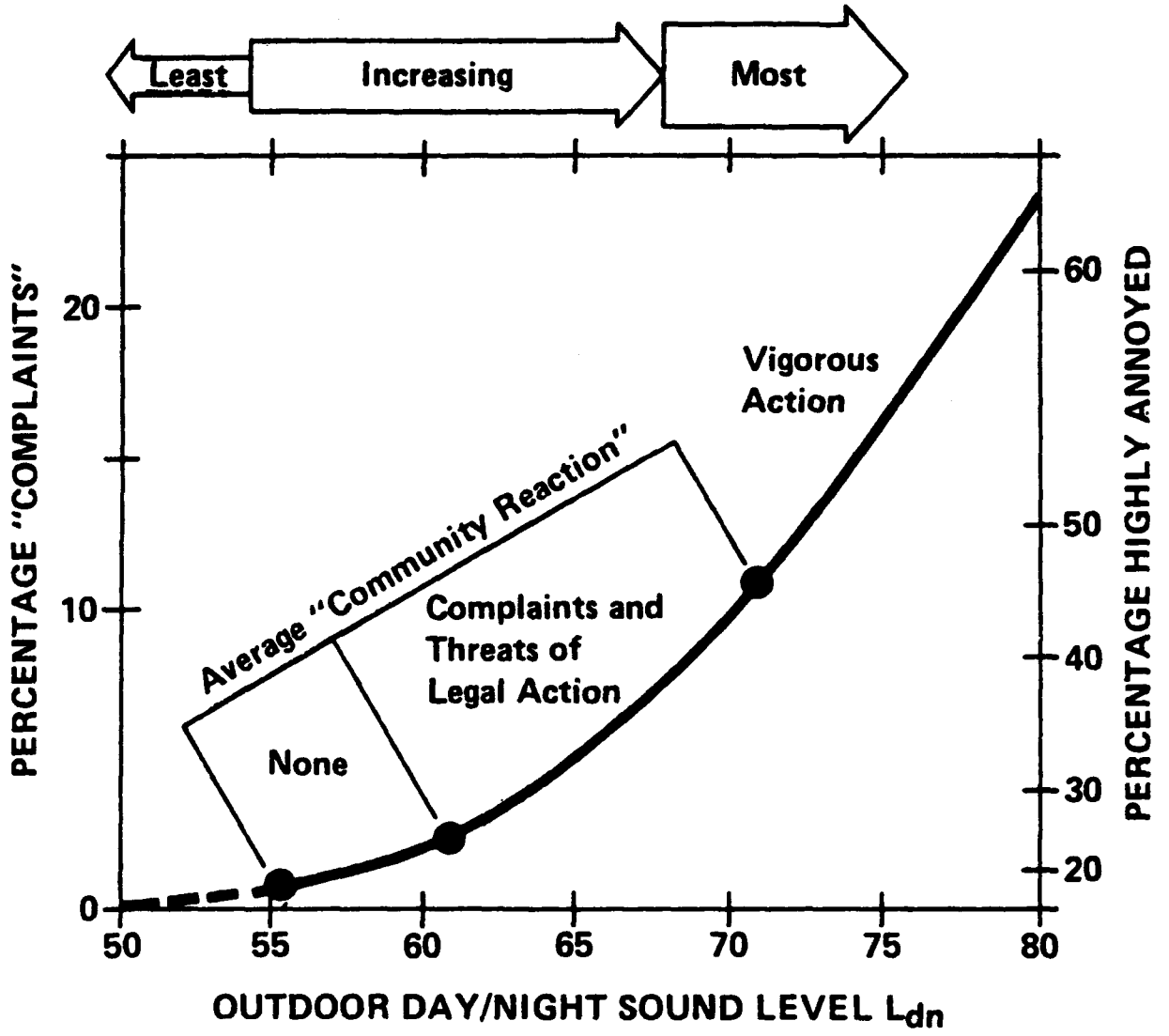
Missile launches register the highest noise levels and can range from 60 decibels on the A-weighted scale (dBA) to 100 dBA in the Lompoc and Santa Maria areas. However, because the missile launches occur infrequently, the resulting noise has little impact on the L_{dn} or Community Noise Equivalent Levels (CNEL) in these areas.

Aircraft operations at Vandenberg AFB produces the next highest noise levels. The AICUZ noise contour map for Vandenberg AFB indicates an L_{dn} noise level of 80 dBA near the airfield runway, with a noise level of 65 dBA extending five miles southeast of the runway.

An average of ten trains (two Amtrack passenger trains and eight freight trains) pass through the base every 24 hours on the Southern Pacific Railroad. Railroad noise on Vandenberg AFB has not been measured. However, the results from a railroad noise prediction model indicate the L_{dn} noise levels for the Southern Pacific Railroad traffic would range from about 66 to 72 dBA at 100 feet from the track and from about 57 to 63 dBA at 400 feet from the track.

Vehicular traffic noise impacts residential areas located along the highways. L_{dn} noise levels measured in the residential area of the Base Support Area range from 46 to 85 dBA. Other sensitive residential areas lie along State Route 1 in Vandenberg Village and along State Route 1/135 in Orcutt. Noise measurements have not been made in these areas. However, utilizing traffic information along these routes and the Federal Highway Administration STAMINA 2.0 noise model, L_{dn} noise levels are estimated to range from 56 to 62 dBA at a distance of 100 feet from the highway.

In order to relate the above L_{dn} levels to annoyance levels, a summary of the relationship between L_{dn} noise levels and the percent likely to complain and be highly annoyed is shown in Figure 3.3.9-1, including the average community reaction and a scale of the relative importance of aircraft noise as a factor in the desirability of an area. When the outdoor L_{dn} is 60 dB, approximately 2 percent of the households might be expected to complain, although 23 percent of the people might respond as highly annoyed when questioned. Some reaction would be expected from a typical community. If the levels surpasses 65 dB, more than 5 percent may be expected to complain, and over 35 percent would respond as highly annoyed. At higher levels, increasingly vigorous community reaction would be expected, and noise would become a dominant factor in disliking an area.



Source: EPA, 1974.

BCV017

FIGURE 3.3.9-1 SUMMARY OF ANNOYANCE SURVEY AND COMMUNITY REACTION RESULTS

3.3.10 Biological Resources

3.3.10.1 Vegetation

The Vandenberg VAFB area sustains many different vegetation types. Several of these once flourished in Santa Barbara County, but now occupy only a portion of their original range because of development. Natural vegetation communities which exist onbase, but outside proposed project areas include oak woodlands (moist valleys and north slopes), oak savanna (upland areas), Bishop pine forest (clusters around chaparral areas that receive an ample amount of precipitation or fog condensation to supplement soil moisture and in areas with relatively infertile soil), tanbark oak forest (steep canyons and peaks where more moisture or better soil conditions are present than in the Bishop pine areas), coastal strand (beaches and fore dunes), and coastal dune scrub (firmly established back dunes)(Figure 3.3.10-1). The California Department of Fish and Game (CDFG) nongame Natural Heritage Program has identified Bishop pine forest, coastal strand, and coastal dune scrub as rare natural communities.

Most of the areas in the proposed project areas are either developed or dominated by highly disturbed grasslands. Common species in the grasslands include wildoats (Avena spp.), bromes (Bromus spp.), and fescues (Festuca spp.). Many of these areas are mowed regularly and are dominated by filaree (Erodium spp.). Introduced trees, such as pines (Pinus spp.) and Eucalyptus (Eucalyptus spp.) have been planted throughout these areas. Other important vegetation types in the affected areas include coastal sage scrub, Burton Mesa chaparral, and riparian woodlands.

The coastal sage scrub is a diversified community that thrives on steep, dry slopes from the coast to the inland foothills of southern California. It borders grassland, chaparral, dunes, and wooded areas. The dominant species include California sage brush (Artemisia californica), black sage (Salvia mellifera), purple sage (Salvia leucophylla), deerweed (Lotus scoparius), and poison oak (Toxicodendron diversilobum), which are all partially or completely drought-deciduous during the summer. Coyote bush (Baccharis pilularis), coffee berry (Rhamnus californica), and the giant rye (Elymus condensatus) are the evergreen associates.

Burton Mesa chaparral is a rare form of coastal chaparral existing on sandy and shaley soils of moderately flat upland sites on and around the Burton Mesa. The soil is substantially more moist than

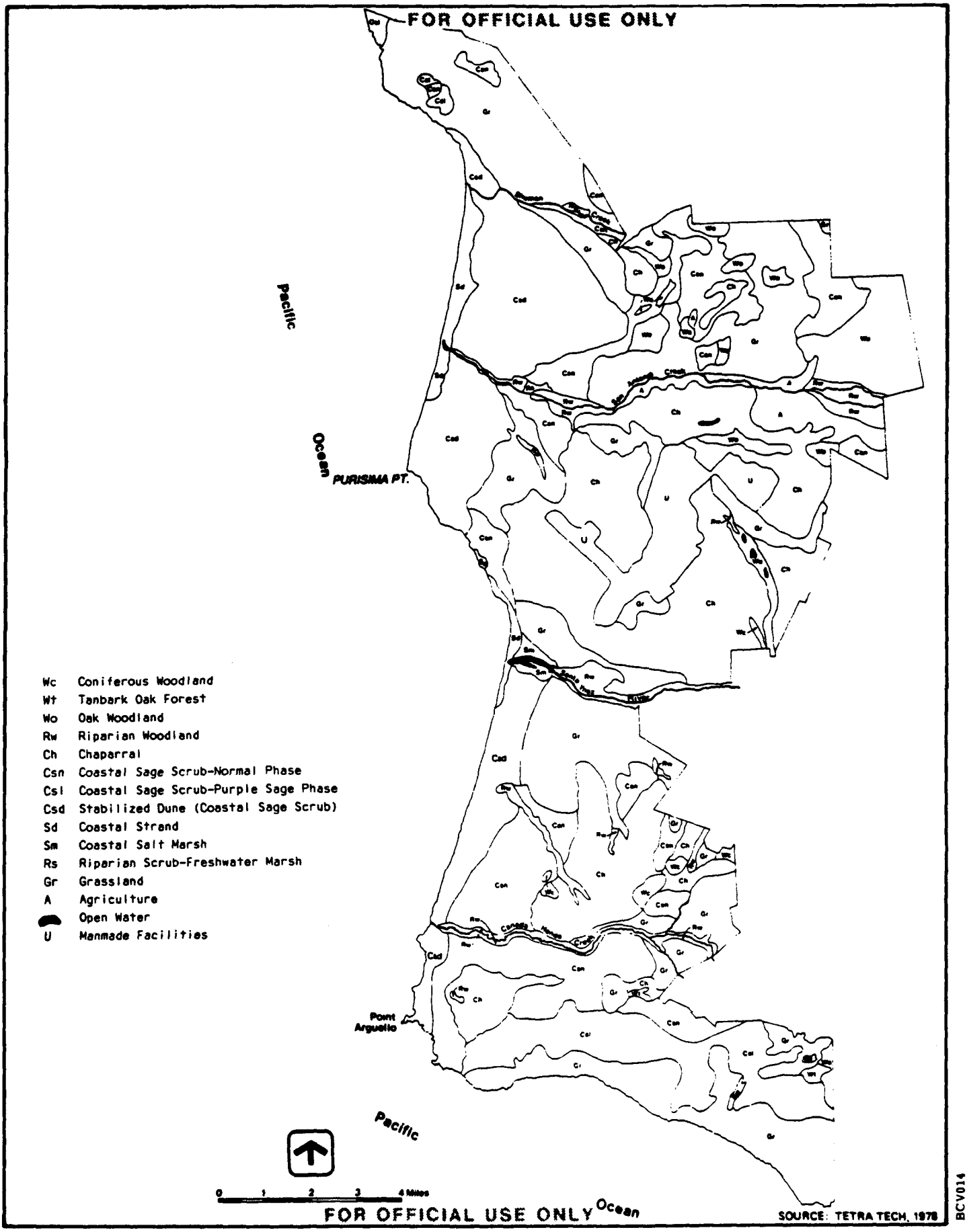


FIGURE 3.3.10-1 VEGETATION MAP OF VANDENBERG AFB, CALIFORNIA

in the coastal sage scrub and thus provides a habitat for dense evergreen shrubs. Dune areas may also contain this chaparral. Two endemic manzanitas, Purisima manzanita (Arctostaphylos purissima) and Shagbark manzanita (Arctostaphylos rudis), typify the community along with Santa Barbara ceanothus (Ceanothus impressus var. impressus). A multistemmed variant of (Quercus agrifolia) is also unique to the area. Burton Mesa chaparral contains a number of U.S. Fish and Wildlife Service (USFWS) candidate species (see Threatened and Endangered Species discussion below) and has been classified G1, S1 by the CDFG nongame Natural Heritage Program. This classification is reserved for the rarest plant communities.

Riparian woodlands thrive along streams and lakes and in areas where the soil moisture is higher than in the surrounding uplands. The woodlands are predominantly comprised of willow (Salix spp.), Pacific wax myrtle (Myrica californica), and cottonwood (Populus spp.). A variety of shrubs and smaller plants, including mule fat (Baccharis glutinosa), cattails (Typha latifolia), wild raspberry (Rubus ursinus), and poison oak (Toxicodendron diversilobum), contribute to this biologically diverse zone for plants and wildlife.

A brief description of the vegetation of each of the proposed project areas follows.

Site 1. This site is regularly mowed and dominated by filaree and nonnative grasses, with introduced trees scattered throughout.

Site 2A. The portion of this site south of California Boulevard is very similar to Site 1, but has fewer trees. The area west of the intersection of California Boulevard and Washington Avenue is not mowed as frequently, resulting in a species composition in which bromes, wildoats, and fescues are more prevalent than filaree. Small "islands" of Burton Mesa chaparral occur throughout this area, becoming more contiguous west of the site.

Site 2B. This area is presently developed. The land southeast of the site is highly erodible sand supporting iceplant, filaree, and veldt grass (Erharta sp.) with vestiges of Burton Mesa chaparral adjacent to the landfill to the east.

Proposed Housing Area 1. This site is primarily disturbed grassland with planted pines and eucalyptus on the west and east sides of the site. The northern and southern boundaries are riparian woodlands dominated by arroyo willow (Salix lasiolepis) and Pacific wax myrtle. These riparian areas are fed by runoff from roads and residential areas.

Proposed Housing Area 2. This is a large stand of relatively undisturbed Burton Mesa chaparral. Several USFWS category 2 candidate species and other sensitive plants (see discussion above) occur here. Willow-dominated riparian woodlands cut across the southern and northern regions of the site.

3.3.10.2 Wildlife

The plant communities on and near Vandenberg AFB support a wide variety of wildlife species. Those which occur in the proposed project areas that may be affected are discussed below.

Grasslands on and offbase support a large population of California ground squirrels (Spermophilus beechevi). Other small mammals which can be expected include black-tailed jackrabbits (Lepus californicus), agile kangaroo rats (Dipodomys agilis), and deer mice (Peromyscus maniculatus).

These and other small animals provide forage for a number of raptors. These include the red-tailed hawk (Buteo jamaicensis), red-shouldered hawk (Buteo lineatus), black-shouldered kite (Elans caeruleus) and American kestrel (Falco sparverius). Other avian species expected in and around the grasslands include California quail (Lophortyx californicus), mourning dove (Zenaida macroura), and a variety of songbirds.

Reptiles expected in the grasslands include the western fence lizard (Sceloporus occidentalis), pacific rattlesnake (Crotalus viridis var. helleri), southern alligator lizard (Cerrhonotus multicarinatus var. multicarinatus), and gopher snake (Pituophis melanoleucus var. annectens).

Burton Mesa chaparral provides excellent forage and dense cover and can be expected to support a variety of small mammals including the California vole (Microtus californicus), deer mouse (Peromyscus maniculatus), western harvest mouse (Reithrodontomys megalotis), and brush rabbit (Sylvilagus bachmani). Larger mammals in the Burton Mesa chaparral include coyote (Canis latrans),

mule deer (Odocoileus hemionus), bobcat (Lynx rufus), and badger (Taxidea taxus). Mountain lion (Felis concolor californica), opossum (Didelphis virginiana virginiana), and long-tailed weasels (Mustela frenata) are probably also present.

The dense cover of this shrubland probably allows fewer foraging opportunities for raptors, but those occurring in neighboring grasslands can be expected in the area occasionally. Other avian species would be expected to occur in greater numbers and variety than in the grasslands.

In addition to the reptiles occurring in the grassland habitats, the California striped racer (Masticophis lateralis var. lateralis), western terrestrial garter snake (Thamnophis elegans var. terrestris) and possibly the western skink (Eumeces skiltonianus var. skiltonianus) occur in Burton Mesa chaparral (USAF 1989).

Riparian Woodlands support most of the same mammalian species found in Burton Mesa chaparral. In addition to many of those occurring in the grasslands and shrublands, the dusky-footed woodrat (Neotoma fescipes), racoon (Procyon lotor), California mole (Scapanus latimanus), and Feral pigs (Sus scrofa) occur in these areas.

A number of wetland associated birds occur in the riparian woodlands, either as residents or during migration. The more common of these include the great blue heron (Ardea herodias), red-winged blackbird (Agelaius phoeniceus), common flicker (Colaptes auratus), Allen's hummingbird (Selasphorus sasin), great horned owl (Bubo virginianus), Hutton's vireo (Vireo huttoni), and Nuttall's woodpecker (Picoides nuttallii).

Most of the reptile species discussed in the above communities also occur in and around the riparian woodlands. In addition, a number of amphibians are associated with these areas, including the western toad (Bufo boreas var. halophilus), pacific tree frog (Hyla regilla) and western spadefoot toad (Scaphiopus hammondi). The arboreal salamander (Aneides lugubrus) may also occur in riparian woodland in the area.

3.3.10.3 Threatened and Endangered Species

Four federally listed endangered species occur within the area expected to be affected by the proposed action. Bald eagles are known to forage onbase but are not expected to nest in the vicinity of the proposed project areas. American peregrine falcons also forage onbase, and a pair may be nesting nearby. This nest is not believed to be within the proposed project areas. The least Bell's vireo is expected in the riparian woodlands onbase, and the California least tern may also occur in these areas. The bay checkerspot butterfly, a federally-listed threatened species, is expected to occur in the less disturbed grasslands onbase.

Fourteen federal candidate species occur, or are expected to occur within the proposed project areas. Two of these, the ferruginous hawk and Swainson's hawk, are believed to forage in the area but are not known to nest in the affected areas. The tri-colored blackbird and California yellow-billed cuckoo may be residents of the riparian woodlands in the area, and mountain plover and white-faced ibis may visit these areas.

The Burton Mesa chaparral, especially the large, relatively undisturbed area designated as proposed Housing Site 2, support eight federal candidate species, of which two (Purisima and Shagbark manzanita) are plants endemic to the area. The CDFG Nongame Natural Heritage Program has classified Burton Mesa chaparral G1, S1 - their rarest plant community designation.

3.3.10.4 Wetlands

Wetlands occur at the boundaries of both of the proposed housing sites. These are drainages which are fed primarily by carwashing, lawn watering, and road runoff from the nearby family housing areas. These drainages support willow- and wax myrtle-dominated riparian woodlands. Delineation of these wetlands in subsequent field studies will provide acreage and species composition necessary for impact assessment.

3.3.11 Cultural and Paleontological Resources

A variety of cultural resources related to Indian and Euroamerican occupations have been identified on Vandenberg AFB. These are of three types: archaeological, architectural, and modern Native

American. The most frequently encountered resources are prehistoric, protohistoric, and early historic Indian sites.

There are more than 675 known archaeological sites on Vandenberg AFB. These range from a shell midden site 9,000 years old to railroad construction camps less than 100 years old. Among the identified functional prehistoric site types of Vandenberg are seasonal residential bases which contain evidence of food processing, tool maintenance, and the final stages of tool manufacture; overnight hunting camps which contain tool manufacturing debris, shell, and evidence of fire; day-use hunting locations indicated by small scatters of lithic flakes and occasional tools; villages; general camps; and rock quarry sites.

Archaeological surveys of Vandenberg AFB conducted during the 1970s and '80s have varied in quality and level of effort. Perhaps as much as 90 percent of the 90,000-acre base area has been checked with at least minimal reconnaissance efforts. However, only an estimated 20 to 30 percent of the base area has been intensively surveyed in accordance with the current standards of cultural resource management. Even these surveys probably did not detect all sites because much of the surface is obscured by vegetation. Moreover, many sites on Vandenberg AFB are known to be buried in aeolian sand, alluvium, or other sediments. Considering all factors, it is estimated that less than two percent of the base has been surveyed with sufficient intensity such that all extant surface sites have been discovered. A cultural resources survey is currently being conducted in the proposed project areas.

3.3.11.1 Prehistoric Resources

The prehistory of the Vandenberg region, as currently documented, extends from approximately 9,000 years ago to 1769 when the Spanish Portola Expedition first encountered Chumash Indians. The Chumash culture, one of the most socially and economically complex hunting-gathering cultures in North America, attained its full development 800 to 150 years ago. The Chumash occupied the south-central coastal region of California from Malibu Canyon to San Luis Obispo and inland as far as the western edge of the San Joaquin Valley. The tribe was divided into several dialect groups which corresponded with lands around the various Spanish missions. The people who occupied the Vandenberg area were Purismeno Chumash named for the La Purisima Concepcion Mission founded in 1788.

Overall, the Chumash culture was predominately a maritime adoption centered on sea mammal hunting and fishing and supplemented by the collecting of shellfish and plant foods and the hunting of medium and terrestrial game. The unprotected north-south trending coast in the Vandenberg AFB area, however, was unsuitable for plant canoes, and the Indians of the area subsisted as hunters and gatherers exploiting a great variety of plants and animals including fish and shellfish. As a consequence, archaeological sites are found in a diversity of environmental settings in the Vandenberg AFB area. Numerous small campsites are found along the coast while lesser numbers are found elsewhere. Village sites are found along the coast and along the fluvial channels of the inland valleys. The rugged upland areas of Vandenberg AFB were not suitable for habitation but do contain hunting locations, lithic quarry sites and, occasionally, rock art locations. Sites are also found in sand dune fields, interdunal wetlands, and major wetland environments such as Barka Slough.

Some researchers maintain that Chumash culture has been developing in place for more than 7,000 years. The prehistory of the Santa Barbara Channel region can be divided into three periods: Early (7000 to 3350 B.P.), Middle (3350 to 800 B.P.), and Late (800 to 150 B.P.). This chronology is based on bead and ornament stylistic changes and has limited usefulness for dating sites other than cemeteries. Nevertheless, the chronology has been used in the Vandenberg AFB region.

The proposed project areas are located on Burton Mesa, a Pleistocene marine terrace with multiple risers overlain by the Orcutt Sand. The southernmost Beddown area is close to outcrops of the upper shale unit of the Miocene Monterey formation. These outcrops may have been exploited by the Chumash for Monterey chert as lithic raw material. The northernmost proposed SSD Beddown Area is just east of a freshwater spring. If that spring was active throughout the Holocene, its environs would have been attractive for habitation.

A National Register of Historic Places (NRHP) Archaeological District was established on the San Antonio Terrace and an Historic Preservation Plan was prepared to guide ICBM-related and other future projects affecting cultural resources within the district. No comparable National Register District or specific planning document covers the proposed SSD beddown areas on Burton Mesa.

The proposed project areas have not been archaeologically surveyed or tested. It is expected, however, that prehistoric and historic resources will occur especially near springs and outcrops of rock useful for tool making. The prehistoric site types which might be encountered include overnight

hunting camps, day-use hunting locations, quarry sites and possibly seasonal residential bases. Artifact classes which might be encountered include lithic flakes, unifacially and bifacially worked tools, projectile points, groundstone, fire-affected rock, and butchered and/or burned bone. Asphaltum nodules and culturally procured plant material might also be recovered.

3.3.11.2 Historic Resources

The 1769 expedition of Gaspar de Portola marked the beginning of Spanish influence in the Vandenberg AFB area. Mission La Purisima Concepcion was founded in 1787 and dominated the area's economy for many years. Archaeological evidence of the mission period is scarce on Vandenberg AFB. By 1834, the mission played a small role, and land holdings were granted in the form of ranchos. In the Vandenberg area, Ranchos Jesus Maria, Todos Santas, and San Antonio were granted to the Olivera family in the 1830s, and ruins of the Olivera abode are protected on Vandenberg AFB.

Many of the ranchos were subdivided and sold in the 1860s to Americans who continued to use the lands for ranching. Marshallia Ranch and Sudden Ranch date to this period. Gradually farming increased, and the regional economy diversified. Beans, corn, wheat, mustard, and potatoes were introduced. Dairy farming was established near the Santa Ynez River.

In 1896, the Southern Pacific rail line was extended south from San Luis Obispo to the Santa Ynez River, and the community of Surf was established. The remains of railroad construction camps are located on Vandenberg AFB, and a Chinese workers' camp may have existed at Point Purisima. The Union Sugar Company was established in the San Antonio Valley in 1910 for the processing of sugar beets. It was used until 1940, and no structures survive today. Oil was discovered in the Santa Maria area in 1901, and the Vandenberg area was explored during the early part of the century. Oil drilling pads still exist on the base today, but not near the proposed project areas.

Military use of the region began in 1941 when the federal government condemned 90,000 acres of ranch land and established Camp Cooke as an Army post. The camp was used for training and maneuvers and as a prisoner-of-war camp. In 1957, the Air Force took over Camp Cooke and renamed it Vandenberg AFB. Sites and structures dating to both the Army and early Air Force tenures are found throughout the base.

The local Chumash of the Santa Ynez Reservation have expressed concern regarding sites that are important to their culture. These include burials, spiritual sites, archaeological sites associated with historically documented villages, and various floral and faunal habitats, especially those found in wetlands.

3.3.11.3 Paleontological Resources

The proposed project area is located in the Surf Quadrangle (U.S. Geologic Survey, 7.5 minute series). The surficial geology of this quad has been mapped by Dibblee (1988). Most of the proposed project areas are located on the aeolian Orcutt Sand of late Pleistocene age. The upper shale unit of the Miocene Monterey Shale outcrops just south of the Base Support Area. This unit of chert siliceous shale contains marine microfossils. Fossil evidence of marine diatoms is found in the late Miocene Sisquoc formation as diatomite and diatomaceous mudstone. The Pliocene Foxen claystone, late Pliocene Carenga Sand, late Pliocene to Pleistocene Paso Robles formation sands and conglomerates are not noted as being fossiliferous. Late Pleistocene and Holocene sands are similarly nonfossiliferous.

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3.4 MARCH AIR FORCE BASE, CALIFORNIA

March Air Force Base (AFB), with an area of approximately 6,806 acres (6,594 acres are fee-owned and 212 acres are easement), is located in Riverside County, California (Figures 3.1-1 and 3.4-1). The base is divided by Interstate 215, with the area east of the Interstate is known as the Main Base and the area to the west as West March.

The Main Base contains the flightline and related facilities, administrative and operational support facilities, unaccompanied and family housing, recreation facilities, and the base hospital. Facilities located on West March include Headquarters (HQ) 15th Air Force, the Non-Commissioned Officers (NCO) Professional Military Education Center, 15th Air Force band center, Weapons Storage Area (WSA), wastewater treatment plant, base golf course, and the military family housing area known as Arnold Heights. A Veterans Administration National Cemetery and Air Force Village West, a retirement community, are located in the West March area on land that was formerly part of the base.

The host organization at this Strategic Air Command (SAC) base is the 22nd Air Refueling Wing (AREFW) with KC-10A and KC-135E tanker aircraft. Major tenants at March AFB include Headquarters, 15th Air Force; the Air Force Reserve 452nd AREFW; and the California Air National Guard (ANG) 163rd Tactical Fighter Group (TFG). Several additional units will be added to March AFB in fiscal year (FY) 1994. These units will be relocated to the base as a result of the closure of Norton AFB in San Bernardino, California.

March AFB employed 3,851 permanent party military personnel (697 officers and 3,154 enlisted), 2,068 Air Force Reserve personnel, 1,703 California ANG personnel, 1,394 appropriate fund civilian personnel, and 696 other civilian personnel at the end of FY 1989. The relocation of various units from Norton AFB will increase the number of personnel at the base by approximately 1,200. Approximately 45 percent of the permanent party military personnel live onbase, and 55 percent live in communities surrounding the base. The cities of Riverside, Moreno Valley, and Perris, surrounding the base, are the host communities for March AFB. Most of the personnel living offbase reside in these three communities, but some personnel live in other communities near the base including some communities in nearby San Bernardino County.

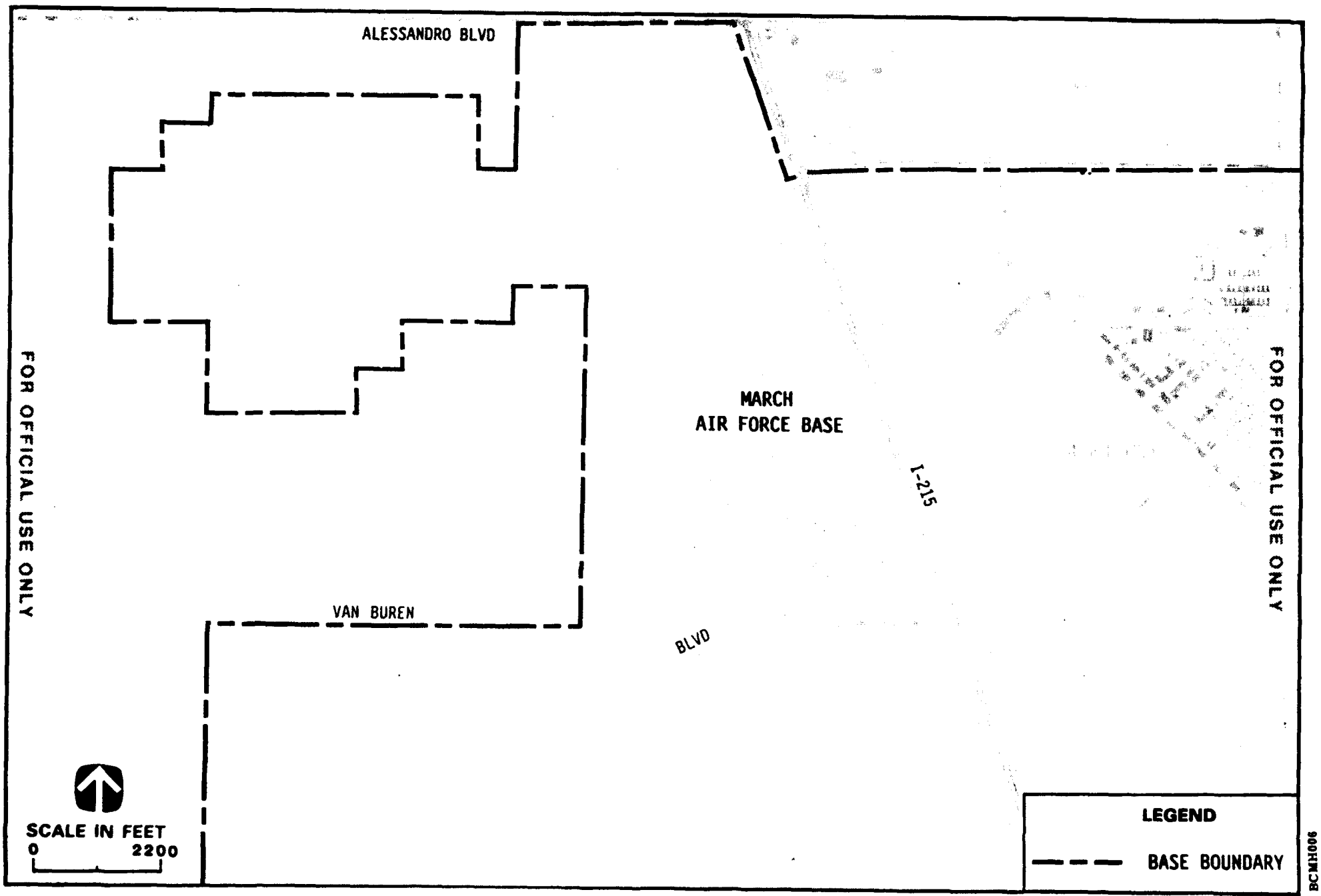

FIGURE 3.4-1 LOCAL VICINITY MAP FOR MARCH AFB, RIVERSIDE COUNTY, CALIFORNIA

History. As the oldest Air Force base in the west, March has had a long history of progressive and steady growth. Through the efforts of the Riverside community, Alessandro Aviation Field was officially opened in March 1918 as part of the War Department's national buildup of aviation training facilities. Named March Field in honor of 2nd Lt Peyton C. March, Jr., the base was initially used to train World War I "Jenny" pilots.

Following World War I, the base was closed for approximately four years and was reactivated in 1927 as a primary flying school. In 1938, March Field became the central base for West Coast bombing and gunnery training. In the 1940s, anti-aircraft protection training and the testing of new ideas and equipment, such as jet-assisted and liquid rocket takeoffs, occurred at March Field.

West March was the location of Camp Haan from 1941 to 1946. Camp Haan served as an anti-aircraft artillery replacement training center, an Army Service Forces Depot, a prisoner-of-war camp, and a separation center during World War II. As many as 80,000 personnel were reportedly stationed there at one time and many of the building foundations still remain near the Arnold Heights housing area and HQ 15th Air Force.

Following World War II, March AFB retained its role as an operational fighter base until SAC took over control in 1949. The 22nd Bombardment Wing was assigned as the senior host tactical unit and HQ 15th Air Force was transferred to March AFB at about the same time. After a 42-year history of service, the 22nd Bombardment Wing was redesignated the 22nd AREFW in October 1982.

Mission. The mission of the 22nd AREFW is to develop and maintain the capability to conduct air refueling operations in support of Air Force Operations in any part of the world. It operates in that role as part of the SAC commitment to world peace through readiness and the deterrence of armed aggression including the support of the Department of Defense (DOD) in many contingency situations, such as strategic force projection and strategic force mobility.

HQ 15th Air Force is responsible for SAC operations in the western United States, Alaska, and the Pacific. This includes responsibility for more than 85 percent of the intercontinental ballistic missile (ICBM) force, approximately 40 percent of SAC's bomber and tanker forces, and most of SAC's strategic reconnaissance resources.

The 452 AREFW was the first Air Force Reserve organization assigned a mission to provide air refueling tankers and crews to support SAC's global air refueling commitment. The 452nd became the first reserve unit to stand continuous alert with SAC active Air Force personnel in October 1977.

The 163rd TFG, which flies F-4E fighters, is a tenant unit assigned to the Tactical Air Command (TAC) and the California ANG. Its primary mission is to provide air support as necessary utilizing conventional weapons.

The 943rd Tactical Airlift Group (TAG) consists of the headquarters section and several missions. One unique mission is that of supporting the U.S. Forest Service in airdropping Phos-Chek fire retardant over active forest fires. C-130B aircraft are used in accomplishing the mission of the 943rd TAG.

Other missions at March AFB include the SAC NCO Professional Military Education Center; the Southwest Air Defense Sector; 15th Air Force Band; the 33rd Communications Group; Field Training Detachment (Det.) 507; Det. 7, 9th Weather Squadron; Det. 24, 3904th Management Engineering Squadron; HQ, 9th Weather Squadron; and the U.S. Customs Aviation Operations Center West.

3.4.1 Community Setting

3.4.1.1 Population and Employment

Population. The population of Riverside County in 1989 was 1,014,800, a 52.8 percent increase from a 1980 population of 663, 923. The cities of Moreno Valley, Perris, and Riverside, all in the vicinity of the March AFB, made up approximately one third of the population of Riverside County in 1989. Moreno Valley and Perris have both experienced much greater annual growth rates in recent years than Riverside. The City of Perris had an annual average growth rate of 6 percent between 1980 and 1986, and a 22.2 percent increase between 1988 and 1989. Moreno Valley had an average annual growth rate of 17.8 percent between 1980 and 1987 and 11.6 percent between 1988 and 1989. The City of Riverside has had a steady increase over the last ten years of approximately 3 percent per year.

Employment. Wage and salary employment in the Riverside and San Bernardino counties expanded at an annual rate of 4 percent in 1988. Total employment reached 648,200 for the year with an

unemployment rate of approximately 5.9 percent. The growth rates for the resident civilian work force for 1985, 1986, and 1987 were 8.6 percent, 6.8 percent, and 6.6 percent, respectively, with 1988 recording a 39.4 percent decline from the prior year to a 4 percent growth. New jobs were found in all major industrial groups except mining, with most new employment opportunities occurring in services, government, construction, and retail trade.

Government payrolls expanded at a rate of 4.7 percent during 1988. There was a total of 125,900 employed in the government sector, 20,000 in the federal, and 105,900 in the state and local sector. The California Development Department forecasted for 1990 an increase to 134,900 government jobs, 21,600 federal, and 113,300 state and local. Employment is expected to increase in all areas, except mining. The growth fueled by the rapid population expansion is expected to be somewhat slower than recent years. This decline is primarily due to the contraction of the business cycle which has been expanding for the last six years.

3.4.1.2 Housing

The housing stock in Riverside County has increased substantially to accommodate the population growth over the past three decades. The Demographic Research Unit of the California Department of Finance estimated a total of 475,534 total units for Riverside County in January 1989, with a 5.98 percent vacancy rate. The three cities in the vicinity of March AFB; Moreno Valley, Perris, and Riverside had 32,173, 5,896 and 76,611 units, respectively. The vacancy rate is 2.96 percent for Moreno Valley, 12.43 percent for Perris, and 4.11 percent for Riverside. The Southern California Association of Governments (1989) growth forecast policy estimated a slight increase in the number of jobs relative to housing, which may have the effect of lowering vacancy rates as housing demand increases relative to supply.

The nationwide median residential sales price was $93,400 in the 3rd quarter of 1989. In Riverside and San Bernardino counties, the June 1989 price median was $123,600 and in California as a whole, the median price was $196,300. Housing prices in areas surrounding March AFB consequently are 32 percent higher than the national median, but 37 percent lower than the state median. The average monthly rental rates vary from $413/month average for a one-bedroom apartment to $819/month average for a three bedroom house. Rental rates are approximately 30 percent above the national median.

March AFB has military family housing located in three areas: Green Acres on the Main Base with 129 units, Arnold Heights (Wherry Housing) in West March with 582 units, and Sunnybrook, a new apartment complex with 200 units located 10 miles from the base in the City of Perris. Green Acres has housing for all officer ranks and junior NCOs. Arnold Heights has two, three, and four bedroom units available for company grade officers and all enlisted ranks. Sunnybrook has two bedroom units for families of junior enlisted personnel. A private sector financed housing project is slated for development on a 130-acre parcel in West March south of Van Buren Boulevard. This proposed housing area will consist of approximately 700 military housing units.

3.4.1.3 Education

Four school districts serve the areas surrounding March AFB: Moreno Valley Unified School District, Riverside Unified School District, Val Verde Elementary School District, Perris Union High School District.

Moreno Valley Unifed School District has 19 elementary schools, 7 junior high schools, and three high schools. Enrollment in the 1989-1990 school year is 26,841 and projected to increase to 45,592 in the 1994-1995 school year. Arnold Heights Elementary School is located within the Moreno Valley Unified School District boundaries.

Riverside Unified School District has 25 elementary schools, 5 middle schools, 4 high schools, a continuation school, and an adult school. The total enrollment for the 1988-89 school year was approximately 27,000 in 1989. Four new elementary schools are planned for construction in the 1990s. The system is currently operating beyond capacity with approximately 40 relocatable classrooms being utilized.

Val Verde School District is one of five elementary school districts within the Perris Union High School District. Due to rapid growth in recent years, temporary classrooms have been used to supplement the school's facilities. Enrollment in the 1989-90 school year is 2,891. California State Office of Local Assistance projects an increased enrollment to 3,342 pupils by the 1991-92 school year.

Perris Union High School District school year 1989-90 enrollment totaled approximately 4,000 pupils. The high school is currently beyond capacity with 2,400 students. The facility has added over 16

relocatable classrooms. Construction has begun on a second high school and construction for a third middle school is planned for 1992.

3.4.1.4 Community Services

The County of Riverside provides a variety of services for the unincorporated areas surrounding March AFB, including fire and police protection. The City of Riverside, Perris, and Moreno Valley provide a variety of services such as police and fire protection, recreation, public works, and libraries for the residents of each respective community. The area surrounding March AFB is served by four general hospitals in the City of Riverside (1200-bed capacity) and a general hospital in Perris with a 36-bed capacity. Moreno Valley does not presently have a hospital, however, a new County hospital is proposed for construction. March AFB provides medical care to military personnel, their dependents, and military retirees. The hospital provides consultant services and is a referral facility for other military installations in Southern California, Nevada and Arizona. The hospital has a 125-bed capacity.

3.4.2 Land Use

3.4.2.1 Existing Land Use

The Main Base area is bordered by the City of Moreno Valley on the north and east and the City of Perris on the south. West March is bordered by the City of Riverside on the north and west and includes a deep enclave into West March. This area, known as Orangecrest, is currently being developed into residential housing with some commmercial and industrial land uses. The remaining land surrounding West March consists of unincorporated County land, including a small inholding north of the WSA and a large area bordering West March on the south.

The March AFB land use study area considers West March and that portion of the Main Base located between Interstate 215 and the main runway (Figure 3.4.2-1).

Residential. Residential housing on West March consists of accompanied and unaccompanied units and Air Force Village West. Accompanied housing consists of the Arnold Heights Family Housing Area composed of Wherry-type housing. Arnold Heights, constructed in 1953, consists of 582 units. The

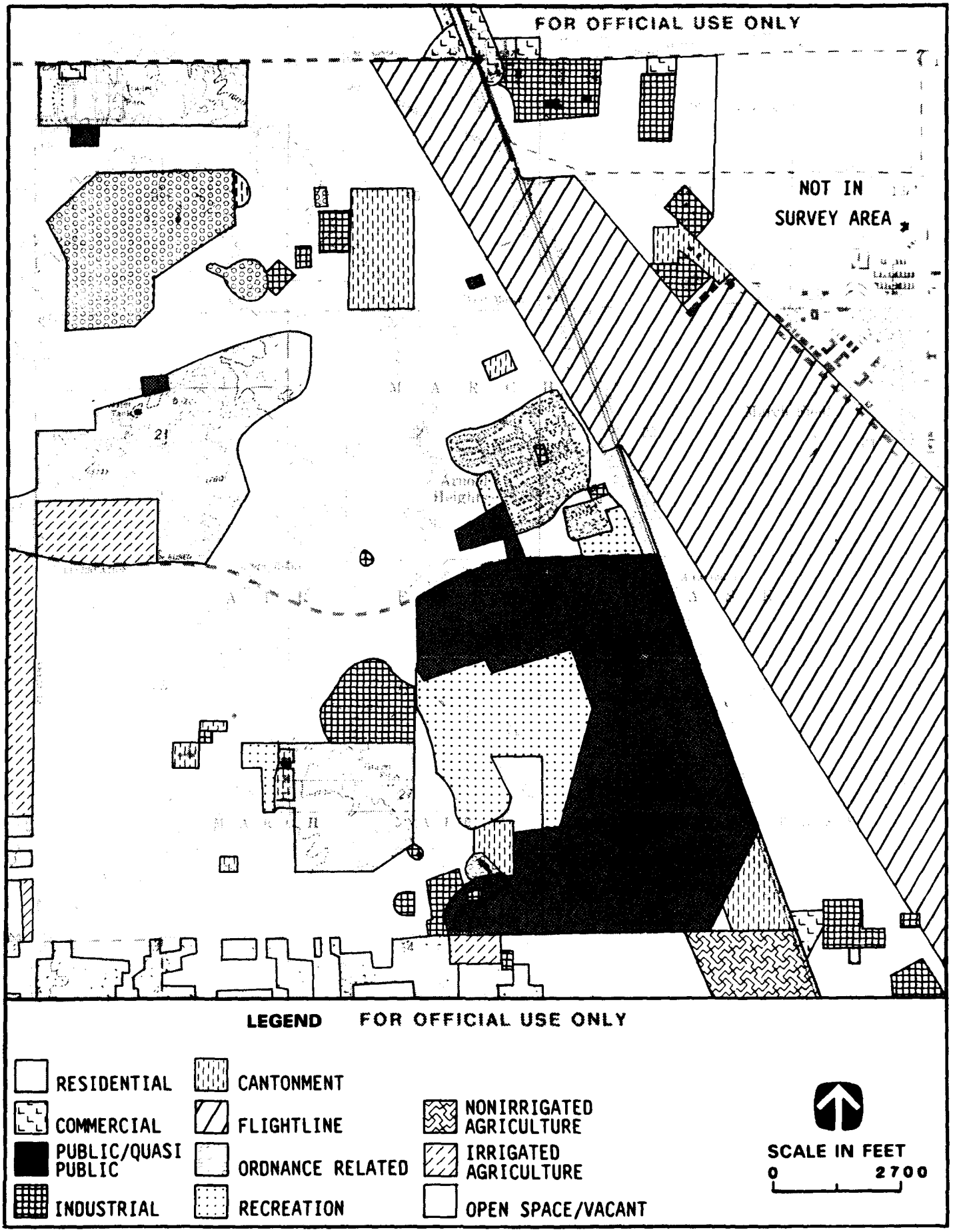

FIGURE 3.4.2-1 LAND USE OF WEST MARCH AFB, CALIFORNIA AND VICINITY

unaccompanied housing consists of the NCO Professional Military Education Center (PME Center). Air Force Village West, a planned retirement community for retired military officers, spouses, widows, or widowers, consists of 942 units and includes apartments, duplexes, and single-family residences built on 153 acres in the south part of West March.

Public/Quasi-Public. Facilities classified public/quasi public on West March included the Arnold Heights Elementary School, west of the Arnold Heights Family Housing Area; the Veterans Administration Riverside National Cemetery; a Boy Scout Hut north of Arnold Heights Family Housing Area; and a large water storage tank owned by the Eastern Municipal Water District (EMWD) north of the WSA. An area between the main runway and Interstate 215 is planned as the site for a new March Field Museum, which will be relocated from its present location along the flightline on the Main Base.

Cantonment. Cantonment land uses consist of administrative, community (excluding public schools), medical, and mission-related facilities. Cantonment land uses on West March include the Security Police Dog Kennels adjacent to the WSA; two "Prime Beef Mobility Area" encampment sites north of Arnold Heights; the chapel in Arnold Heights; non-housing/recreational uses in the Arnold Heights Housing Area; HQ 15th Air Force; the NCO Professional Military Education Center; the 33rd Communications Group facilities; and a Security Police Mobility Area.

Industrial. The primary industrial land use on West March is the March AFB wastewater treatment plant. Other industrial activity in West March is scattered in small areas within the Arnold Heights Family Housing Area, near the HQ 15th Air Force, and other areas in the southern section of West March. The Army Air Force Exchange Service (AAFES) and the Defense and Reutilization Marketing Office (DRMO), which are being relocated to March AFB from Norton AFB, are planning to construct facilities north of Arnold Heights and south of Cactus Avenue.

Ordnance-Related. The WSA, Explosive Ordnance Disposal (EOD) Area, and Small Arms Range are ordnance-related uses on West March. The explosives safety zones surrounding the WSA and EOD area are designated open space. The Small Arms Range, operated by the Security Police, is located adjacent to the Security Police Mobility Area.

Flightline. The flightline designation includes the runway and surrounding aircraft operations area, including the approach zone, clear zone, and accident potential zones (APZ) 1 and 2.

Open Space. March AFB has a large amount of open space including areas west of Arnold Hights, near HQ 15th Air Force, surrounding the WSA, and between the flightline area and Interstate 215.

Recreation. Recreation facilities on West March include the base golf course, recreation facilities at the NCO Professional Military Education, and recreation facilities in the Arnold Heights Housing Area.

OffBase Land Use. Commercial and industrial areas of the cities of Moreno Valley and Riverside are located at the intersection of Interstate 215 and Alessandro Boulevard, adjacent to the northeast corner of West March. A developing residential area, consisting of single-family residences and a mobile home subdivision in an unincorporated area of Riverside County, is located south of Alessandro Boulevard and north of the WSA. The Orangecrest development in the City of Riverside is rapidly developing into a densely population residential community. Land to the west remains open space and consists of commercial citrus groves and grasslands, most of which will be developed in the near future. The area south of West March includes a mixture of commercial citrus groves, low-density residential development, and some nonirrigated grainland farming activities in the unincorporated community of Mead Valley.

3.4.2.2 Land Use Plans and Policies

Onbase. The March AFB Comprehensive Plan, adopted in 1985, is the planning document which guides base physical facilities planning for the future and the protection of environmental and cultural resources. The plan is designated to eliminate inefficient land use, help reduce future siting conflicts, avoid incompatible future development, reduce or eliminate unnecessary project expenditures, and protect the environmental resources of March AFB.

The comprehensive plan has been amended to plan for the relocation of the AAFES and DRMO facilities from Norton AFB to West March. The southern area of West March, south of Van Buren Boulevard, has been planned for future and replacement military family housing on a 130-acre parcel. In addition, a 110-acre golf course addition is planned.

The Air Installation Compatible Use (AICUZ) Plan for March AFB provides for land use decisions within the flight operations area of the base as well as a guide for land use planning by the County of Riverside and the cities of Moreno Valley, Perris, Riverside with regard to flying activities at the base.

Offbase. The cities of Moreno Valley, Perris and Riverside and the County of Riverside have adopted their respective general plan elements. The City of Riverside adopted the Orange Crest Specific Plan and Alessandro Heights Specific Plan for the areas west of Arnold Heights and the WSA, respectively. The City of Moreno Valley adopted the Gate Way Specific Plan, which considers the area north of Cactus Avenue and east of Interstate 215.

3.4.2.3 Visual Resources

The land east of Interstate 215 is a flat landscape where the flightline operations are centered. Lands to the north, west, and south have remained an open space landscape barren of all but facilities that support base operations. The area west of March is also a flat plain parallel to Interstate 215 and gradually rises to the Canyon Crest divide which includes some steep hills composed of grasslands which presents a rural type setting surrounded by a rapidly urbanizing area. HQ 15th Air Force and the WSA are on the upper elevations of the Canyon Crest with views toward the east which dominate the main part of the base and the urbanized communities of Moreno Valley and Perris.

3.4.3 Transportation

3.4.3.1 Traffic

Existing Conditions. Regional access to March AFB is provided by Interstate 215, the north-south highway which divides the base in half. The California Department of Transportation plans to construct improvements to Interstate 215 between State Route 60 and the base including an interchange at Cactus Avenue. The improvements will upgrade Interstate 215 to freeway status. The contract for the segment between State Route 60 and Van Buren Boulevard will be let in April 1990; it will include new Cactus Avenue ramps to provide access to the West and Main Gates. A contract to improve the segment between Van Buren and Nuevo Road will be let in September 1990. Construction for both of these segments is expected to be completed by 1993. The environmental impacts of each segment

were considered in the Final Route 215 EIS (October 1984) and in a Finding of No Significant Impact (FONSI): Van Buren Boulevard to Nuevo Road in Perris, Negative Declaration and Environmental Assessment.

Local access to the Main Base is provided by three primary arterial roadways: Cactus Avenue, Graham Street, and John F. Kennedy Drive in the city of Moreno Valley. Access to West March is provided from the north by Alessandro Boulevard and from the south by Van Buren Boulevard.

Roadway Characteristics. Cactus Avenue, which runs east and west along the northern boundary of the Main Base, provides access from the west, including the Arnold Heights housing area on West March. Cactus Avenue terminates in West March. To the east, Cactus Avenue extends approximately one-quarter mile past the Main Gate and terminates in a cul-de-sac. Cactus Avenue resumes again at Heacock Avenue and continues through the city of Moreno Valley.

Graham Street provides access to the Main Base from the north, and intersects Cactus Avenue on the northern edge of the base. Within the base boundaries, Graham Street continues as Riverside Drive. John F. Kennedy Drive intersects the eastern boundary of the Main Base and connects the base with residential developments to the east. Within the base, John F. Kennedy Drive continues as Meyer Drive.

Alessandro Boulevard is a primary arterial extending from the City of Riverside through the City of Moreno Valley to Gilman Springs Road in an unincorporated area of Riverside County. Alessandro Boulevard provides access to West March from the west. Van Buren Boulevard is a four-lane highway which extends from north of the State Route 91 (Riverside Freeway), southeast through the West March area to Interstate 215, west of the Main Base. Van Buren Boulevard also provides access to West March from the west.

Three gates provide access to the Main Base. The Main Gate is located on Riverside Drive, south of Cactus Avenue, and currently accommodates an average of 62 percent of the total daily gate traffic. The West Gate is located on Graeber Street, south of Cactus Avenue, and provides access for approximately 20 percent of the daily traffic. The East Gate is located on Meyer Drive, east of Heacock Street, and provides access for approximately 18 percent of daily traffic.

3.4.3.2 Airports

The primary airport serving the March AFB area is Ontario International Airport, approximately 30 miles west of the base. Ontario International Airport is served by eleven major airlines and several smaller airlines. Passenger traffic has steadily increased each year and exceeded 4 million passengers in 1989. As a result, the number of flights available has also increased. Other airports in the region included Palm Springs International Airport and John Wayne Orange County Airport.

3.4.4 Utilities

Riverside and San Bernardino counties are identified as the area where community and public utilities would be directly or indirectly affected by the proposed action. The cities of Riverside, Moreno Valley, and Perris are expected to receive the majority of the population immigration.

3.4.4.1 Water Supply

Riverside Public Utility (RPU) a municipal corporation, provides potable water to residents of the City of Riverside, primarily from groundwater sources. Average daily demand in 1989 was 58.2 million gallons per day (MGD) with a peak demand of 89 MGD. The system capacity is 100 MGD. Average per capita consumption is 225 gallons per capita per day (gpcd). Average annual growth is projected to be 1.5 to 2 percent. Estimated average daily demand will increase to approximately 61.58 MGD in 1996 and 62.07 MGD in 1997. Riverside currently purchases 5 percent of its water from the Metropolitan Water District (MWD) of Southern California, the principal water purveyor in the southern California region to meet peak demands.

Eastern Municipal Water District (EMWD) supplies Moreno Valley, Perris, and March AFB with potable water. EMWD purchases its water from MWD and obtains it from the MWD H. J. Mills Filtration Plant in Riverside. The water is a blend obtained from California State Water Project and the Colorado River. The system has an operating capacity of 71 MGD, and the district daily average demand was 66 MGD in 1989 with a peak demand of 71 MGD. EMWD has requested a larger connection from MWD. Projected growth for Moreno Valley and Perris will increase the average daily demand in 1996 and 1997 to 75.3 MGD and 76.6 MGD, respectively. Per capita use is approximately 200 gpcd.

March AFB is supplied potable water by EMWD through an 18-inch connection at the West gate and a second connection at East gate. The connections have delivery capacities of 2,700 gallons per minute (gpm), and 1,800 gpm, respectively. Average daily potable water use at March AFB was 1.61 MGD in FY 1989. Per capita demand was approximately 166 gpcd. Average daily demand is projected to increase to 1.8 MGD by 1996.

3.4.4.2 Wastewater

The City of Riverside operates a tertiary wastewater treatment plant with an operating capacity of 32 MGD. The average daily flow in 1989 was approximately 29 MGD. Projected growth of 1.5 percent to 2 percent annually will increase flows to approximately 30.5 MGD by 1996 and 30.7 MGD by 1997. The present system is presently being upgraded to 40 MGD.

EMWD operates secondary treatment facilities for both Moreno Valley and Perris. The Moreno Valley treatment facility is being expanded to increase the operating capacity from 10 to 16 MGD, and upgrade the facility to tertiary treatment. Present wastewater flows are approximately 8 MGD and are projected to increase to 14.0 MGD and 14.6 MGD by 1997. Present wastewater flows at the Perris treatment facility are approximately 1.7 MGD and are projected to increase to 2.2 MGD by 1996 and 2.3 MGD by 1997. Expansion plans for the facility are currently being designed for incremental increases in capacity of 3, 6, 12, and 18 MGD, and upgrading to tertiary treatment.

March AFB operates a biofiltration secondary treatment facility. The flow capacity of the plant is 1.25 MGD; the plant currently treats 0.5 MGD. Present flow is expected to increase 0.75 MGD with the relocation of units and personnel from Norton AFB. The present facility is expected to meet future demands.

3.4.4.3 Solid Waste

The County of Riverside Waste Management Department owns and operates the three sanitary landfills that serve the cities of Riverside, Moreno Valley, and Perris, and March AFB. The City of Riverside generates approximately 910 tons per day (T/day) of solid waste and utilizes the Hydro landfill which is scheduled for closure in 1996. Collection of solid waste for March AFB and Moreno Valley is done by contract haulers which use the Badlands landfill. The landfill received 334 T/day of solid waste

in 1988. March AFB generated 36.5 T/day in 1989; solid waste generation is expected to increase to 38.9 T/day with the relocation of units and personnel from Norton AFB. The County Solid Waste Management Plan predicts the Badlands landfill will receive an increase of 440 tons over the next few years, with anticipated closure in the year 2042. The City of Perris collection is performed by contract waste haulers, and the refuse is disposed of at the Mead Valley landfill. The landfill is utilized by four other small communities in the area. Currently, 375 T/day of solid waste is disposed of, and the amount is expected to increase to 460 T/day over the next 5 years. Residential per capita generation is estimated at 3.5 pounds/day/person.

3.4.4.4 Energy

Electricity. (RPU) megawatt-hours provides electricity to the residents of the City of Riverside. RPU had a power supply of 1,460 megawatt-hours (MWh) in 1989 with a peak demand of 367,200 kilowatts (kW). The number of electric customers increased by 2.5 percent in 1989; a 2 percent average annual growth is projected over the next five years. The cities anticipate that additional seasonal and peaking capacity supply contracts will be required by 1995 and 1997, and negotiations are in progress to increase contractual commitments. Average annual residential use in 1989 was 6,611 kW.

Southern California Edison (SCE) provides electrical power to the Moreno Valley, Perris, March AFB and most of central and southern California. In 1989, peak demand reached 15,632 MW; SCE has a total capacity of 20,136 MW. Additional demands will be met by increasing power purchases and maintaining current generating facilities.

SCE provides March AFB with electrical service delivered at 34.5 megavolt-ampres (MVA) to a main substation located on the base. Approximately 53,803 MWh were consumed in FY 1989, with a peak demand of 12,840 kW. The relocation of units and personnel from Norton AFB is expected to increase the peak demand to 26 MVA.

Natural Gas. Southern California Gas Company, the utility division of Pacific Enterprises, provides natural gas to over four million customers in central and southern California including March AFB and the area surrounding the base. The company sold 1,032 billion cubic feet in 1989; the company expects sales to slow to less than the 5 percent increase experienced in 1989. Pacific Enterprises Oil

Company, the Oil and Gas Division of Pacific Enterprises, will be able to accommodate future increased demands.

Southern California Gas Company supplies natural gas to March AFB at a metering point in the West March area. The gas is delivered at 65 pounds per square inch (psi) and is reduced to 15 psi for distribution. The base consumed 130,809.87 thousand cubic feet (Mcf) in FY 1989. The present system is adequate to meet projected demands resulting from the relocation of units and personnel from Norton AFB.

3.4.5 Hazardous Waste

Hazardous wastes on March AFB are managed by the base. Currently, no hazardous waste is stored onbase for more than 90 days. Twenty-three sites around March AFB accumulate wastes, and the Norton AFB Defense Reutilization and Marketing Office (DRMO) is responsible for the proper handling of waste and arranging for transport to licensed treatment and disposal facilities in accordance with federal regulations. Typical hazardous wastes include oil, paint thinners, solvents, and other regulated materials. The DRMO facility will be relocated to March AFB as a part of the Norton AFB closure. Appropriate permits will be applied for to meet federal regulations.

The March AFB Installation Restoration Program (IRP) identified no IRP sites on either of the proposed project areas (Sites 1 and 2) or the housing area. There are two identified sites of environmental concern in the vicinity of Site 1. The two sites near Site 1 are described below:

Landfill No. 5 (Site No. 3). This 53-acres site is located in the northwest portion of the base, south of Cactus Avenue and west of Interstate 215. The mode of operation was cut and fill or importing fill to cover wastes dumped into gullies and ravines. The landfill was used between 1954 and 1974 for disposal of garbage, rubbish, demolition debris and possibly small quantities of waste oils, spent solvents, thinners, sludge in drums, and PCB oils. The landfill is currently used for disposal of demolition debris, grass, and tree trimmings.

Munition Residue Burial Site (Site No. 25). This site is located in the northwest part of the base, South of Cactus Avenue. Small-scale munitions disposal has been conducted at this site beginning in the late

1950s. The site consists of a detonation pit and burial trenches. Outdated small arms ammunition, egress items, smoke grenades, starter cartridges and other pyrotechnics were deactivated in the detonation pit. The residues and shell casings were buried in shallow (less than five feet) trenches. The residues could be hazardous if the munitions were not completely deactivated. Also, approximately 300 gallons of acetone were reportedly dumped of at this site or at Landfill No. 5 (Site No.3) in 1981.

Results of the Phase II, Stage 1 Field Investigation program judged these sites to pose minimal potential threats to the environment or public health. It was recommended that no further action under the IRP be taken for these sites.

3.4.6 Geology and Soils

3.4.6.1 Geology

Physiography and Topography. March AFB, located in the northern portion of the Perris Valley and in the Peninsular Ranges physiographic province, is characterized by flat to gently sloping topography. Bedrock surface outcrops include the Perris Block, Gavilan Hills, Lakeview Mountains, and Box Springs Mountains. To the east lie the San Jacinto Mountains and the Colorado Desert; to the west, the Pacific Coastal Plain; and to the north are the Transverse Ranges. The elevation of the valley floor ranges from 1400 to 1800 feet above sea level. As with surface topography on most of the Perris Valley alluvium, relief on the March AFB is slight. There is a gentle grade from an elevation of 1547 feet in the northwest to 1501 feet in the southeast.

Regional Geology. The regional geology of the March AFB area is characterized by igneous and metamorphic crystalline rocks overlain by or protruding through (i.e. bedrock surface outcrops) alluvial sediments of the Perris Valley. Mountains and escarpments in the region date from the Mesozoic era.

The Main Base is located on recent alluvium deposited in the Quaternary period. This alluvium constitutes the floor of the Perris Valley, and generally is composed of unconsolidated stream, river channel, and alluvial fan deposits that reach thicknesses of up to 2000 feet. Both the alluvium and the Perris Block are bounded on the southwest by the Chino and Elsinore fault zones and on the north by

the Cucamonga fault zone (Figure 3.4.6-1). Running roughly parallel northeast of the San Jacinto fault, is the San Andreas fault.

Each of these faults lies within 20 miles of the Main Base. The San Jacinto and San Andreas faults are the most significant for potential groundshaking. The San Jacinto fault, seven miles from the site, is the most active fault in Southern California and regularly produces earthquakes with Richter magnitudes of 6.0 to 7.0. The San Andreas fault, 15 miles from the site, although less active, has the potential for producing earthquakes of Richter magnitude 8.0. No faults are known to be present on the base.

West March is located on the Perris Block, and consists of granitic bedrock terrain dating from the Cretaceous period of the Mesozoic era. West March lies closer than the Main Base to the Chino-Elsinore fault zone, which is not as active as the San Andreas and San Jacinto fault systems.

Geologic Hazards. Earthquakes, originating as shock waves generated by movement along active faults, are the main seismic hazard of the March AFB area. Primary seismic hazards which result from earthquakes are groundshaking and the potential for rupture along surface traces of faults. Secondary seismic hazards result from the effects of groundshaking on soils and bedrock, and include liquefaction, landslides, seiches (damaging standing waves in small bodies of water), and dam collapse.

3.4.6.2 Soils

Two major soil series describe the soil resources in the proposed project areas (Sites 1 and 2): Fallbrook Sandy Loam and Montersate Sandy Loam. These two soil series vary in particle size classification and slope throughout the March AFB area. On the Main Base and in the Arnold Heights housing area, the primary soil series is the Montersate Sandy Loam. This series is located within the Montersate-Arlington-Exeter association and is well drained with nearly level to moderately steep slopes. The surface layer of this association has a sandy loam to loam texture and the entire section can be shallow to deep to a hard pan. The potential for erosion due to water is slight as these soils are well advanced. The coarse texture of this soil indicates a susceptibility toward erosion.

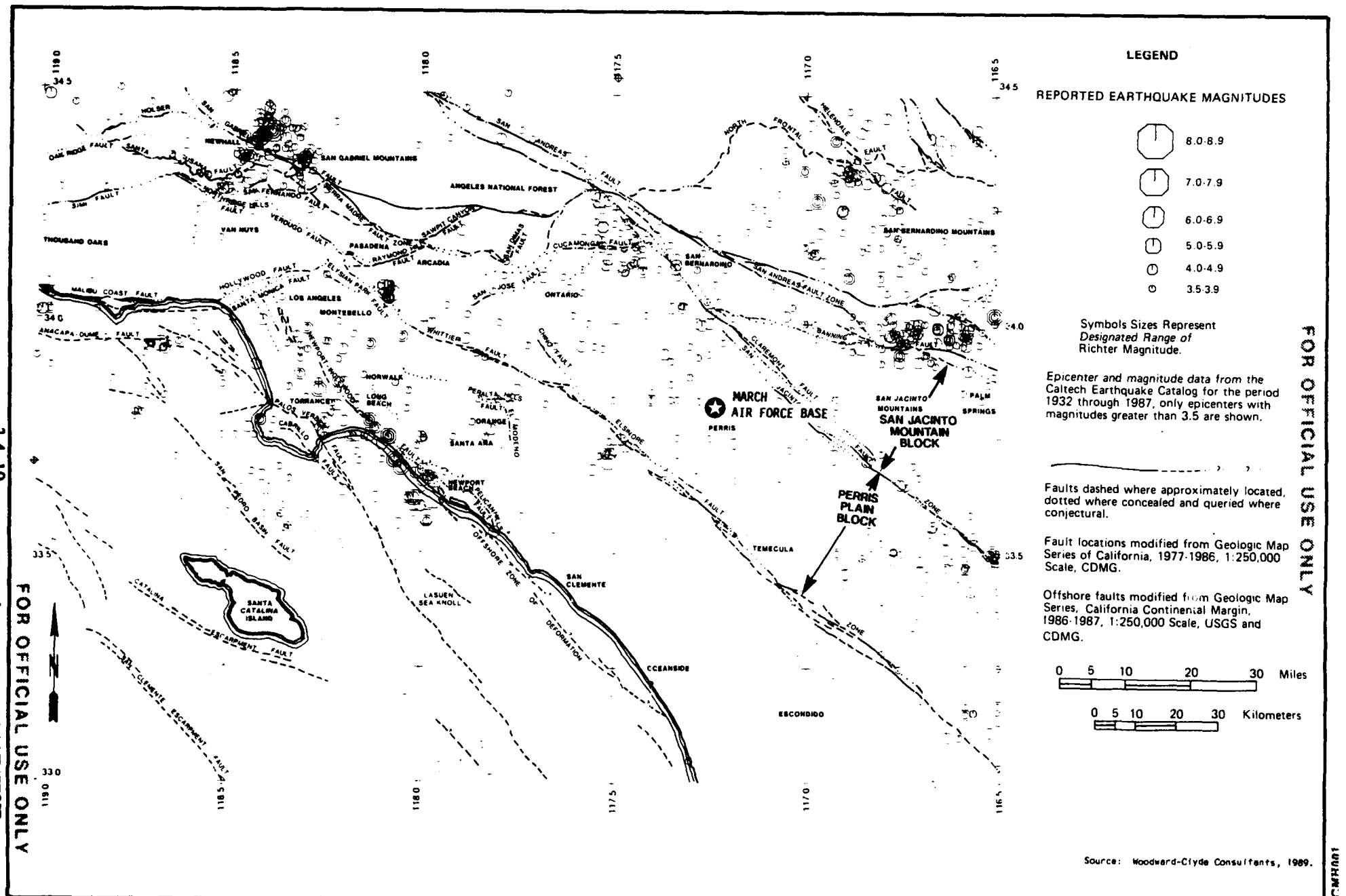

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FIGURE 3.4.6-1 EARTHQUAKE EPICENTER FAULT MAP OF SOUTHERN CALIFORNIA

Within the West March area, the Fallbrook Sandy Loam is the representative soil. This soil series is located within the Cieneba-Rockland-Fallbrook association and is a well-drained to somewhat excessively drained soil with undulating to steep slopes. This soil can be shallow to moderately deep with a surface layer of sandy loam and fine sandy loam texture derived from granitic rock. The potential for erosion due to water is slight as these soils are well drained. The coarse texture of this soil indicates a susceptibility to wind erosion.

The Montersate sandy loam has a capability classification that indicates severe limitations reducing the choice of plants due to the potential for erosion. This soil can be managed to support citrus or avocados, but is not commonly used for this purpose. The Fallbrook Sandy Loam has the same limitations but requires more management than the Montersate Sandy Loam. If irrigated and managed properly, the Fallbrook Sandy Loam can support citrus or avocados. If unirrigated, this soil can support crops or plants adapted to the area.

3.4.7 Water Resources

3.4.7.1 Groundwater

The principal water aquifer in the March AFB area is the San Jacinto Basin. Groundwater in the San Jacinto Basin is contained within a closed aquifer. The aquifer is recharged solely by precipitation and infiltration, not groundwater migration. Runoff from the surrounding mountains of non-waterbearing rocks, percolation from irrigation, and wastewater effluent disposal contribute to recharge. Groundwater occurs in alluvial materials that underlie the Main Base area. Waterbearing sediments are found from approximately 35 to 100 feet. This alluvium is considered as one aquifer, because no confining layers have been found and it is recharged by groundwater flow from the western part of the base.

Under the West March area, groundwater occurs in limited quantities in the shallow weathered rock zone and possibly in fractures and joint systems of the bedrock. Water table depths are generally 15 to 24 feet below the ground surface in the weathered rock zones. Groundwater quality in this area of the base is generally good. Total dissolved solids range from 250 milligrams/liter (mg/l) to 1,000 mg/l, with 400 to 500 mg/l being the most common levels. The potential for groundwater contamination is currently being investigated through the March AFB.

3.4.7.2 Surface Water

March AFB and the Perris Valley lie within the San Jacinto River Basin, which feeds into the Santa Ana River Basin. The climate of the area is considered mediterranean to semiarid with hot, dry summers and cool, moist winters. Annual rainfall at Riverside averages between 10 and 13 inches and peaks seasonally with 90 percent falling between November and May. By contrast, precipitation in the San Jacinto Basin is about 84 inches per year.

Surface drainage at March AFB flows into the San Jacinto River and to tributaries of the upper Santa Ana River. Althoughrunoff is heavy on the base due to the extent of development, flooding is controlled by an extensive system of open drainage channels, including the Perris Valley Storm Drain which circumscribes the northern and eastern boundaries of the Main Base.

3.4.8 Air Quality

3.4.8.1 Regulatory Setting

March AFB is located within the South Coast Air Basin, a 6,600-square-mile area bordered on the north by the San Gabriel and San Bernardino Mountains, on the south by the Santa Ana Mountains, on the east by the San Jacinto Mountains, and on the west by the Pacific Ocean. The Basin includes Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino Counties. The South Coast Air Quality Management District (SCAQMD) is responsible for implementing federal and state air quality regulations, and adopting and implementing additional regulations to bring the Basin into compliance with federal and state ambient air quality standards (Section 3.1.8, Table 3.1.8-1).

The basin does not meet the federal ambient air quality standards for four of the six criteria pollutants. It is in compliance with federal standards for sulfur dioxide (SO_x) and lead (Pb), but is not in compliance for ozone (O_3), carbon monoxide (CO), fine particulate matter (PM_{10}), and nitrogen dioxide (NO_x). In addition, California has set standards for ethylene, hydrogen sulfide, sulfates, visibility, and vinyl chloride. Sulfates and visibility are addressed through control programs for CO, NO_x, O_3, and PM_{10}, whereas the remaining are primarily localized problems handled through permit requirements.

3.4.8.2 Regional Air Quality

Meteorology and Climate. The climate of the area is considered mediterranean to semiarid with hot, dry summers and cool, moist winters. It is not uncommon for the temperature to vary from 50 to 60 degrees in a 24-hour period. Daily recorded high temperatures in the summer months are very often in excess of 100° Fahrenheit (F); daily minimum temperatures in the winter have been as low as 32° F. The average annual temperature is 62° F. Killing frosts are generally experienced only in the months of December and January and many years are frost-free.

Prevailing winds throughout the year are from the northwest and the mean wind speed from that direction is 9.3 miles per hour. Prevailing winds are affected by local and regional weather conditions and topography (mountains). Santa Ana winds occur when northerly or easterly winds flow from Southern California deserts, through the Santa Ana and other river canyons, toward the coast. These dry, strong winds can travel at speeds greater than 35 miles per hour; these winds generally occur between October and March and can last for several days. The area is almost completely enclosed by mountains on the north and east. This geographic configuration and the location relative to the Pacific Ocean allows the wind direction to change daily from offshore at night to onshore during the day.

During the winter, fog from the ocean can move inland or fog can develop locally. Maritime fog develops when temperature inversions occur at elevations less than 1,600 feet. Between May and October, stratus from inversions greater than 1,600 feet m.s.l. occur often at March AFB.

Air quality within the basin is affected greatly by climatic variations. The climate of the basin is mild and characterized by cool sea breezes. Occasionally, the mild climate is interrupted by periods of extremely hot weather, winter storms, or Santa Ana winds, which transport hot air into the basin from inland deserts. The characteristics of some weather patterns within the basin serve to disperse air pollutants better than others. The meteorological factors that are most important in the dispersion of air pollutants are wind speed and direction, and atmospheric temperature inversions. During the spring and early summer, pollutants are usually blown out of the basin into the inland desert areas. In the late summer and winter months, wind speeds are typically very light which allows a build-up of air pollutants to occur in the basin. This build-up of air pollutants is further concentrated if a temperature inversion blocks the vertical dispersion of air pollutants. Usually, the temperature of the air decreases with altitude, however an inversion occurs when the temperature of an air mass increases

with altitude. When an inversion occurs, the vertical movement of air stops and pollutants are "trapped" below an altitude that is often less than 1,000 feet. Inversion layers and the buildup of air contaminants typically occur in the area in the late summer months.

Existing Air Quality. The SCAQMD monitors air quality at 37 locations in the South Coast Air Basin, including two locations in the City of Riverside and one in the City of Perris. March AFB is located approximately eight miles south of Riverside and approximately eight miles north of Perris, so the air quality at March AFB is assumed to be similar to the air quality at these monitoring stations. The results of the 1986, 1987, and 1988 air quality monitoring by the SCAQMD are presented in Table 3.4.8-1. The federal air quality standards for ozone and particulate matter and the state standards for carbon monoxide, ozone, and particulate matter were exceeded at the monitoring stations during in each year. State and federal standards for ozone and the state standard for suspended particulates were exceeded at the Perris monitoring station. These pollutant were not monitored in 1987 at the Riverside (Magnolia) station. Additionally, monitoring of visibility at March AFB indicated that the state visibility standard of ten miles, on days when the relative humidity is less than 70 percent, was not met during 168 days in 1986, 198 days in 1987, and 215 days in 1988.

3.4.8.3 Emission Sources

March AFB currently has 84 permits from the SCAQMD to operate various sources of pollutants such as generators, fuel tanks, and boilers. The emissions data for March AFB were obtained from a summary of emission data prepared by March AFB for the SCAQMD. The factors used in compiling the emission summary were taken from EPA Publication AP-42, Compilation of Air Pollutant Emission Factors, or were provided by the SCAQMD. Total 1988 emissions from these sources included 146 tons per year of reactive organic gases (ROG), 120 tons of NO_x, 6 tons of SO_x, 598 tons of CO, and 9 tons of particulate matter. March AFB currently has 1,973,100 square feet in industrial building floor area. These buildings require natural gas for heating and electrical energy which result in the production of criteria air pollutants.

Table 3.4.8-1

Air Quality Data for SCAQMD Monitoring Stations in the
Cities of Riverside and Perris
1986-1988

	City of Riverside (Rubidoux)			City of Riverside (Magnolia)			City of Perris		
	1986	1987	1988	1986	1987	1988	1986	1987	1988
Carbon Monoxide									
Maximum Concentration									
(ppm[2]/ 1 hour)	9	9	9	14	13	17	NM	NM	NM
No. of Days Standard Exceeded									
Federal (>9.1 ppm, 8 hours)	0	0	0	0	0	0	NM	NM	NM
(>35 ppm, 1 hour)	0	0	0	0	0	0	NM	NM	NM
State (>9.1 ppm, 8 hours)									
(>20 ppm, 1 hour)	0	0	0	0	0	0	NM	NM	NM
Ozone									
Maximum Concentration									
(ppm, 1 hour)	.25	.29	.28	NM	NM	NM	.22	.20	.23
No. of Days Standard Exceeded									
Federal (>.12 ppm, 1 hour)	106	113	123	NM	NM	NM	79	82	82
State (>.10 ppm, 1 hour)	161	168	178	NM	NM	NM	133	136	137

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Table 3.4.8-1 Continued, Page 2 of 4

	City of Riverside (Rubidoux)			City of Riverside (Magnolia)			City of Perris		
	1986	1987	1988	1986	1987	1988	1986	1987	1988
Nitrogen Dioxide									
Maximum Concentration									
(ppm, 1 hour)	.16			.21	.19	NM	NM	NM	NM
No. of Days Standard Exceeded									
(>.25 ppm, 1 hour)				0	0	0	NM	NM	NM
Sulfur Dioxide									
Maximum Concentration									
(ppm, 1 hour)	.02	.02	.02	NM	NM	NM	NM	NM	NM
No. of Days Standard Exceeded									
Federal (>.14 ppm, 24 hours)	0	0	0	NM	NM	NM	NM	NM	NM
(>.5 ppm, 3 hours)	0	0	0	NM	NM	NM	NM	NM	NM
State (>.05 ppm, 24 hours)	0	0	0	NM	NM	NM	NM	NM	NM
(>.25 ppm, 1 hour)									
Total Suspended Particulates									
Maximum Concentration									
($\mu g/m^3$, [a] 24 hours)	347	305	313	326	234	307	215	255	260
No. of Samples Standard Exceeded									
Federal (>260 $\mu g/m^3$, 24 hours)	1	3	2	1	0	3	0	0	0
State (>15 $\mu g/m^3$, 24 hours)	24	25	26	8	21	22	8	13	7

Table 3.4.8-1 Continued, Page 3 of 4

	City of Riverside (Rubidoux)			City of Riverside (Magnolia)			City of Perris		
	1986	1987	1988	1986	1987	1988	1986	1987	1988
Lead									
Maximum Concentration ($\mu g/m^3$, 24 hours)	.34			.51	.27		.16		
No. of Occasions Standard Exceeded									
Federal (>1.5 $\mu g/m^3$, Qtr. Avg.)	0	0	0	0	0	0	0	0	0
State (>1.5 $\mu g/m^3$, No. Avg.)	0	0	0	0	0	0	0	0	0
Sulfate									
Maximum Concentration ($\mu g/m^3$, 24 hours)	18.4	16.1	23.6	18.5	19.7	19.0	14	15.6	11.5
No. of Samples Standard Exceeded									
State (>.25 $\mu g/m^3$, 24 hours)	0	0	0	0	0	0	0	0	0
Suspended Particulates PM									
Maximum Concentration ($\mu g/m^3$, 24 hours)	294	219	252	NM	NM	NM	NM	137	164
No. of Samples Standard Exceeded									
State (>50 $\mu g/m3$, 24 hours)	48	46	38	NM	NM	NM	NM	5	35

Table 3.4.8-1 Continued, Page 4 of 4

Notes: [1] not monitored.
[2] parts per million.
[3] micrograms per cubic meter of air.
[4] fine particulates with an aerodynamic diameter of 10 micrometers or less.

Source: South Coast Air Quality Management District 1986, 1987, and 1988.

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3.4.9 Noise

3.4.9.1 Regulatory Setting

Noise at March AFB resulting from flying operations is considered in the Air Installation Compatible Use Zone (AICUZ) report for the base. The Air Force AICUZ concept is designed to promote land se development near its airfields in a manner that not only protects adjacent communities from the noise and safety hazards associated with aircraft operations but also preserves the operational integrity of the airfields. The AICUZ report specifies a wide variety of types and intensities of land usage by a series of districts that consider noise exposure and accident potential near an airfield.

The current AICUZ report for March AFB was prepared in 1984, but is being updated to include the changes in aircraft operations that will result from the realignment activities at the base, including the addition of C-141 aircraft from Norton AFB.

3.4.9.2 Existing Noise Sources

Noise contours are the mapped expression of average noise levels surrounding a single source of noise, such as a highway or airport. In this case the noise contours are measured in terms of Day/Night Average Sound Level (Lnd), an index based on a 24-hour average of noise levels, with nighttime sound levels weighted. According to the California Office of Noise Control (CONC), residential uses should be discouraged and considered normally unacceptable uses in areas with average noise exposure levels greater than 65 decibels (dB). The Arnold Heights housing area, constructed prior to use of modern jet aircraft, lies within the 70 to 80 dB range of noise generated from the base airfield. Within residential areas on the base, there are an estimated 32,778 housing units containing about 88,500 persons who are affected by the 65 dB noise level or greater. Approximately 74 percent of this population is within the 65 dB to 70 dB noise zone. An undetermined number of persons located within the commercial, industrial, or open land use categories are also affected by 65 dB or greater generated by aircraft operations.

Approximately 69 percent of the land area within the 65 dB or greater zones is classified as "open," which is either agricultural, vacant, park, or undevelopable land. It also includes the open space of the March AFB runway and land adjacent to it. Residential land use accounts for 27 percent of the total

area, with the remaining 4 percent containing commercial and industrial activities. Table 3.4.9-1 provides, by noise zone, the affected population for residential areas, land use categories in acres, and total acres.

3.4.10 Biological Resources

3.4.10.1 Vegetation

Historically, much of the West March area supported grasslands and coastal sage scrub. Discing and other disturbances have resulted in replacement of native communities with grasslands of mostly ruderal species and small remnant areas of degraded coastal sage scrub. The disturbed grassland community is primarily colonized by introduced species such as wild oats (Avena barbata), red brome (Bromus rubens), ripgut grass (B. diandrus), and foxtail (Hordeum sp.). Coastal sage scrub occurs in unplowed, steep, rocky locations and is dominated by California sage brush, (Artemisia californica), California buckwheat (Eriogonum fasciculatum), horehound (Marrubium vulgare), mock heather (Haplopappus ericoides ssp. blakei), coastal isocoma (Haplopappus venetus ssp. vernonioides, San Joaquin matchweek (Gutierrezia bracteata), valley cholla (Opuntia parrvi), beavertail cactus (Opuntia basilaris), and weedy species such as wild radish (Raphanus sativus) and Sisymbrium orientale.

Woody riparian vegetation occurs in the intermittent stream drainages in limited areas around proposed Site 1 and in the northwest corner of the proposed housing area. Common species include willows (Salix sp.), mulefat (Baccharis glutinosa) and cottonwood (Populus aremontii). Other species found within these disturbed channels are narrow-leaved cattail (Typha sp.) and sow-thistle (Sonchus sp.).

The proposed Site 2 is now occupied by base housing, and habitat is limited to cultivated species associated with residential areas. To the west of this site are areas which support vegetation similar to that described for proposed Site 1 and are dominated by ruderal species with scattered rock outcroppings.

3.4.10.2 Wildlife

Wildlife diversity in the areas near proposed Site 1 and the proposed housing site is low because of the homogeneous nature and disturbed condition of the vegetation. Mammals commonly found in these

Table 3.4.9-1

Existing Development With Baseline Ldn Noise Contours
(Population and Acres)

Noise Zone	Estimated Population	Land Use Category (in acres)				Total Acres
		Residential	Commercial	Industrial	Agricultural/Vacant	
65	65,078	8,773	216	382	14,236	23,607
70	18,400	2,903	425	190	10,481	13,999
75	3,352	801	194	290	3,671	4,956
80	1,710	343	60	234	3,882	4,519
TOTAL:	88,540	12,820	895	1,096	32,270	47,081

Source: U.S. Air Force 1984

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areas include the California ground squirrels (Spermophilus beecheyi) desert cottontails (Sylvilagus auduboni), black-tailed jackrabbits (Lepus californicus), deer mice (Peromyscus maniculatus), and little pocket mice (Perognathus longimembris). Predatory mammals may include coyotes (Canis latrans), long-tailed weasels (Mustela frenata), and striped skunks (Mephitis mephitis).

Reptile species commonly found in the area include western fence lizards (Sceloporus occidentalis), side-blotched lizards (Uta stansburiana), gopher snakes (Pituophis melanoleucus), and coachwhips (Masticophis flagellum). Amphibian species, generally limited to the riparian areas, may include the western toad (Bufo boreas), the Pacific tree frog (Hyla regilla), and true frogs (Rana sp.).

Because of the abundance of rodents, the area is frequently used as a foraging area for raptors. In previous field studies, northern harriers (Circus syaneus), red tail-hawks (Buteo jamaicensis), ferruginous hawks (Buteo regalis), prairie falcons (Falco mexicanus), Cooper's hawks (Accipter cooperi), red-shouldered hawks (Buteo lineatus), golden eagles (Aquila chrysaetos), American kestrels (Falco sparverius), common barn owls (Tyto alba), burrowing owls (Athene cunicularia), and turkey vultures (Cathartes aura) have been found foraging in the area. Other avian species commonly found in the area include rock dove (Columbia livia), mourning dove (Zenaida macroura), wate pipit (Anthus spinoletta), horned lark (Eremophilia alpestris), american crow (Corvus brachyrhynchos), common raven (Corvus corax), house finch (Carpodacus mexicanus) and western meadowlark (Sturnella neclecta).

Because of the limited habitat available and the high degree of human activity, wildlife diversity at proposed Site 2 is low. The grasslands to the west can be expected to support the same type of wildlife species as reported for proposed Site 1.

3.4.10.3 Threatened and Endangered Species

Sensitive plant species which could be present at March AFB are listed in Table 3.4.10-1. The slender-horned spine flower is a federally-listed endangered species. Because of the highly disturbed nature of the proposed sites, none of these species is expected to occur.

Seven sensitive animal species, the orange-throated whiptail (Cnemidophorus hyperythrus), San Diego coast horned lizard (Phrynosoma coronatum blainvillei), Stephen's kangaroo rat (Dipodomys stephensi),

Table 3.4.10-1

Possible Sensitive Plant Resources at March AFB

Species	Common Name	CNPS listing[1]	U.S. FWS listing[2]	Habitat and Elevation	Flowering season
1. Allium fumbriatum Wats. var. munzii Ownby and Aase.	Munz' onion	1	/C2	Restricted populations, dry slopes and flats, often in heavy soils, at 1000-2000 ft.	April-May
2. Dudleya multicaulis (Rose) Moran.	Many-stemmed dudleya	1	/C2	Dry stony places, in coastal sage scrub and chaparral, below 2000 ft.	May-June
3. Harpagonella palmeri (Gray) var. palmeri	Palmer's grappling hook	2		Rare and localized populations, dry slopes and mesas, in chaparral, sometimes in clay soils, below 1500 ft.	March-April
4. Brodiaea filifolia Wats.	Thread-leaved hookera	1	CE/C2	Local in heavy clay soil, coastal sage scrub and chaparral, below 2000 ft.	May-June
5. Caulanthus simulans Pays.	Payson's caulanthus	4	/C2	Uncommon in rocky places, chaparral, pinyon juniper woodland, 2000-5500 ft.	April-June
6. Ribes canthariforme Wiggins	Moreno currant	1	/C2	Chaparral in the vicinity of Moreno Dam (San Diego County).	February-April
7. Centrostegia leptoceras (Gray) Wats.	Slender-horned chorizanthe/Spine-flower	1	CE/FE	Occasional, sandy places, coastal sage scrub.	April-June

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Table 3.4.10-1 Continued, Page 2 of 2

Notes: [1]CNPS Inventory Lists

List 1 - Plants of the highest priority
List 2 - Plants rare or endangered in California, but common elsewhere
List 3 - Plants about which more information is needed
List 4 - Plants of limited distribution (a watch list)

[2]State/Federal Status Species Listings

CE - State-listed endangered
CT - State-listed threatened
CR - State-listed rare
FE - Federally-listed endangered
FT - Federally-listed threatened
C1 - Federal candidate (enough information to list)
C1*- Federal candidate (enough information to list, but presumed extinct)
C2 - Federal candidate (need more information)
C2*- Federal candidate (need more information, but presumed extinct)
C3a- Extinct
C3b- Taxinomically invalid
C3c- Too common and/or not threatened

Source: U.S. Air Force 1988.

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northern harrier, burrowing owl, prairie falcon, and ferruginous hawks are known to occur in the area. These species have been given special recognition by federal, state, and local conservation agencies and organizations because of their declining, limited, and threatened populations. In most cases, the primary reason for their decline is loss of habitat.

The two reptiles are listed by the U.S. Fish and Wildlife Service (USFWS) as Category 2 candidate species. These lizards usually remain in relatively open, sandy spaces near rock outcroppings in the coastal sage scrub plant community.

The Stephen's kangaroo rat (Dipodomys stephensi) is listed as a federally endangered species and as threatened by the California Department of Fish and Game. It is found in the open, grassland areas at the edge of the degrated coastal sage scrub plant community. The species occurs in the grassland areas of Site 1 and the proposed housing site as well as adjacent to Site 2 in trace abundance (1 to 2 burrows per hectare). In addition, a number of small and two large areas of concentrated populations are located near the proposed sites. One of the large areas is bisected by the access road to the WSA. The other is southwest of proposed Site 2.

The USFWS, March AFB, the County of Riverside and other agencies are currently designing a habitat conservation plan (HCP) for the Stephen's kangaroo rat. This HCP will provide for the establishment of a preserve/corridor to connect the scattered populations on and off March AFB and prevent the genetic isolation which could drive this species to extinction.

The ferruginous hawk and prairie falcon are Federal Category 2 candidate species, and the northern harrier on and the California Department of Fish and Game list of "Species of Special Concern." All of these raptors forage in and around the proposed sites. They are supported by the area's large population of small mammals which also provide forage for a colony of burrowing owls which dwells in the building foundations remaining from Camp Haan in the southwest section of the proposed housing area. The burrowing owl is currently a California Department of Fish and Game "Species of Special Concern", but its decline throughout its range is expected to lead to a rapid elevation to protected status. The colony in the proposed housing area appears to be larger than average.

3.4.10.4 Wetlands

Preliminary studies indicate that the small riparian areas in the proposed sites are not part of drainages large enough to be considered jurisdictional wetlands.

3.4.11 Cultural and Paleontological Resources

3.4.11.1 Prehistoric Resources

Prehistoric site types that occur in the March AFB area include camps, and hunting and milling locations. Approximately 24 percent of the base has been previously inventoried for cultural resources; one historic site and 18 prehistoric sites were identified. No prehistoric sites were recommended as eligible for listing on the National Register of Historic Places (NRHP). A cultural resources inventory is currently being conducted on proposed project areas (Sites 1 and 2) at March AFB.

Four cultural resource inventories have been conducted on West March AFB; approximately 30 percent of West March has been previously surveyed. Thirty-one prehistoric sites and three isolated finds were recorded. All of the sites consisted of bedrock mortars or grinding slicks. The grinding slicks or bedrock mortars are portions of natural rock with shallow basins used by prehistoric populations to grind seeds and plants. The grinding slicks on West March are not datable and there are no associated villages or camps. Because the grinding slicks represent limited activity locations and are not associated with other materials, they are not considered eligible for the NRHP. However, Swope and Neiditch (1987) did recommend preserving the boulders containing the grinding slicks in place.

Research conducted at the nearby Perris Reservoir documents that the San Jacinto Plain was occupied by 2,300 B.P. Evidence of earlier occupation has not yet been recovered. A significant population influx appears to have occurred approximately 500 B.P. This may have been related to the dessication of Lake Cahuilla in the Salton Basin to the southeast. Ethnographically, the March AFB area was associated with the Luiseno and Cahuilla Indians. Historic villages have generally been identified along the Whitewater River 70 miles southeast of March AFB. Petroglyphs, pictographs, ceremonial houses, sweatlodges, shrines, cremation locations and historic cemeteries may be considered sensitive sites or features and will be of concern to local Cahuilla groups.

3.4.11.2 Historic Resources

A preliminary historical inventory of the Main Base was conducted in 1985, and a portion of the Main Base is considered a potential National Register Historic District. A one-square-mile area of the Main Base is considered a National Register Historic District even though it has not been officially nominated. This area represents the original Army flying field established in 1918 and contains a complex of buildings, site features, and landscaping constructed from 1928 to 1934 and a series of 1939 to 1942 modifications. Only one building from the original flying field remains; it was originally used as a bakery or servant's quarters.

Portions of Camp Haan have been recorded during several cultural resource surveys on West March. Camp Haan was a World War II anti-aircraft artillery replacement training center, an Army Service Force depot, and prisoner-of-war camp. Numerous foundations and one standing structure are all that remain from Camp Haan. Because Camp Haan lacks integrity, it is not a good example of World War II era activities nor is it representative of a particular architectural style. Camp Haan is considered not eligible for the NRHP and, presently, some of the building foundations are being removed.

3.4.11.3 Paleontological Resources

The eastern portion of March AFB is situated on Quaternary alluvium; the western part of the base contains outcrops of Cretaceous period granitic bedrock (tonalite and diorite). Pleistocene vertebrate fossils could occur in the Quaternary deposits; however, no known localities have been previously identified. The granitic bedrock on West March does not contain any paleontological materials.

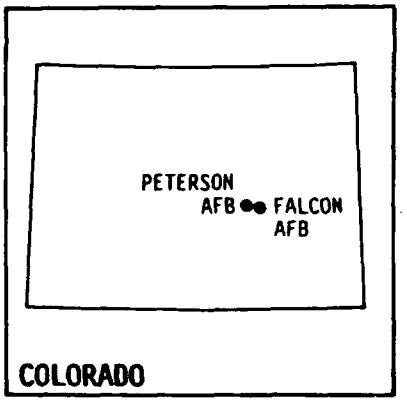
3.5 PETERSON AIR FORCE BASE/FALCON AIR FORCE BASE, COLORADO

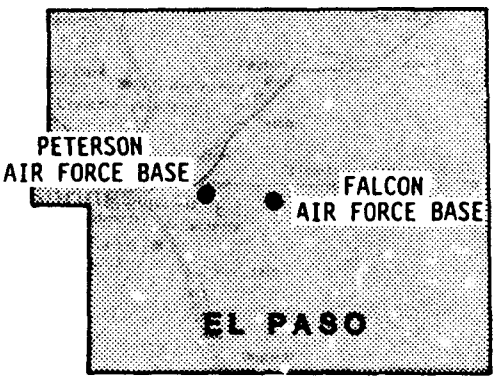
Peterson Air Force Base (AFB), with an area of approximately 1,286 acres (184 acres are fee-owned and 1,102 acres are leased from the City of Colorado Springs), is located 4 miles east of Colorado Springs in El Paso County, Colorado (Figures 3.5-1 and 3.5-2). The host organization at this Air Force Space Command base is the 3rd Space Support Wing. Peterson AFB is the headquarters for the North American Aerospace Defense Command (NORAD), U.S. Space Command, and Air Force Space Command. Other major units include the 1st Space Wing and the Air Force Reserve 302nd Tactical Airlift Wing (TAW). The base is part of the Peterson Complex which includes Peterson AFB, Falcon AFB, and Cheyenne Mountain AFB, as well as offices in the Federal Building and other leased space in downtown Colorado Springs.

Peterson AFB employed 5,675 permanent party military personnel, 1,374 Air Force Reserve personnel, 2,421 appropriated fund civilian personnel, 639 other civilian personnel, and 2,801 contractor personnel at the end of fiscal year (FY) 1989. Approximately 20 percent of the permanent party military personnel live on Peterson AFB, and 80 percent live in communities near the base. The City of Colorado Springs is the host community for the base, and most of the personnel living offbase reside in the city or in nearby smaller communities.

Falcon AFB, approximately 10 miles east of Colorado Springs and Peterson AFB, covers approximately 3,840 acres of fee-owned land (Figure 3.5-3). Presently, facilities at Falcon AFB are confined to a 640-acre portion of the base, east of Enoch Road. The host organization at this Air Force Space Command base is the 2nd Space Wing. The major tenant at Falcon AFB is the Strategic Defense Initiative Organization (SDIO) National Test Facility (NTF). The NTF, currently under construction, is expected to become fully operational in late 1990.

Falcon AFB employed 1,369 permanent party military personnel, 300 appropriated fund personnel, and 2,198 contract civilians at the end of FY 1989. When the NTF becomes fully operational, the total workforce is expected to be approximately 6,000. Falcon AFB has no base housing; most of the personnel who work at Falcon AFB live in the Colorado Springs metropolitan area.





SCALE IN MILES
0 22.8

BCP013

FIGURE 3.5-1 REGIONAL VICINITY MAP FOR PETERSON AFB AND FALCON AFB, COLORADO

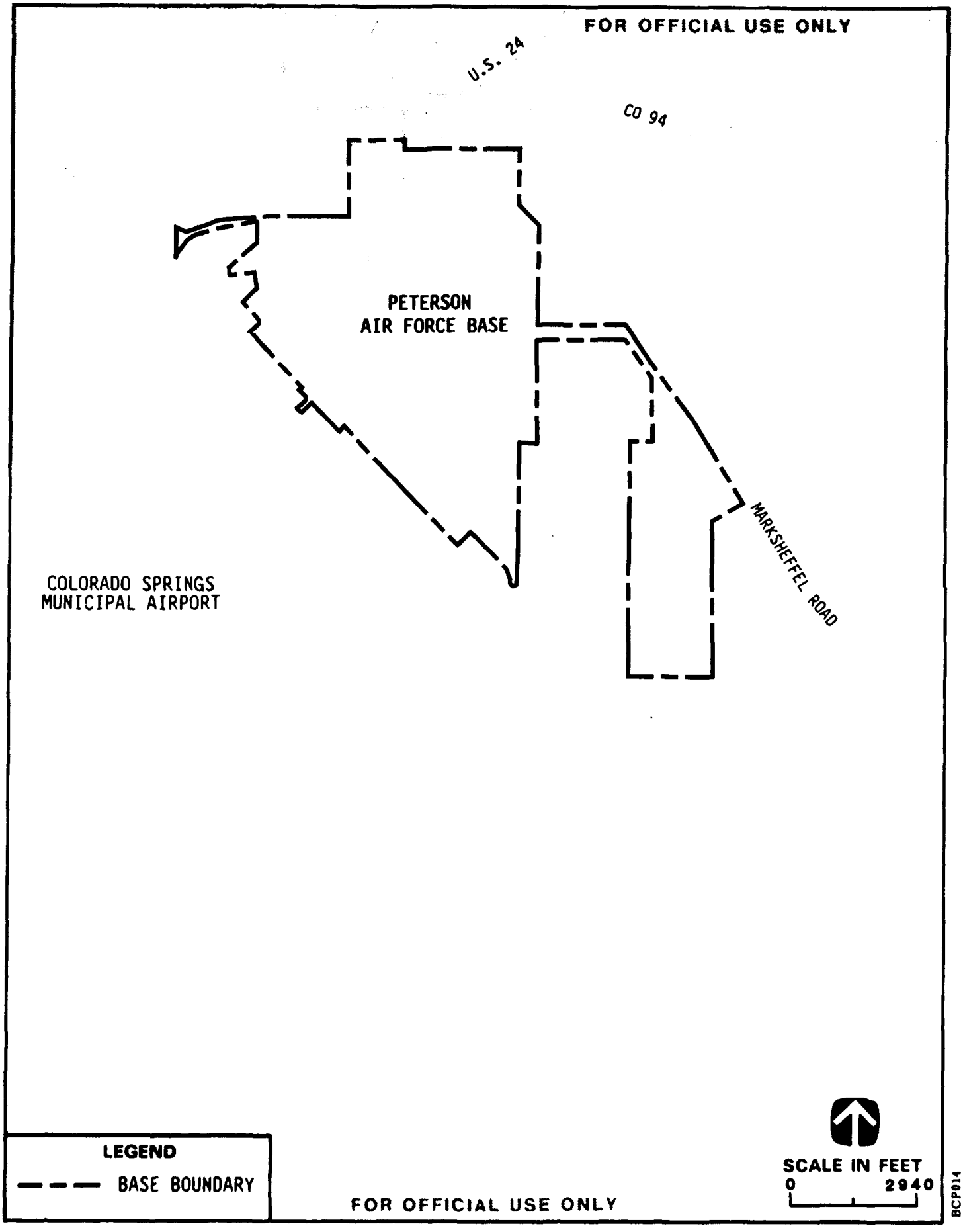
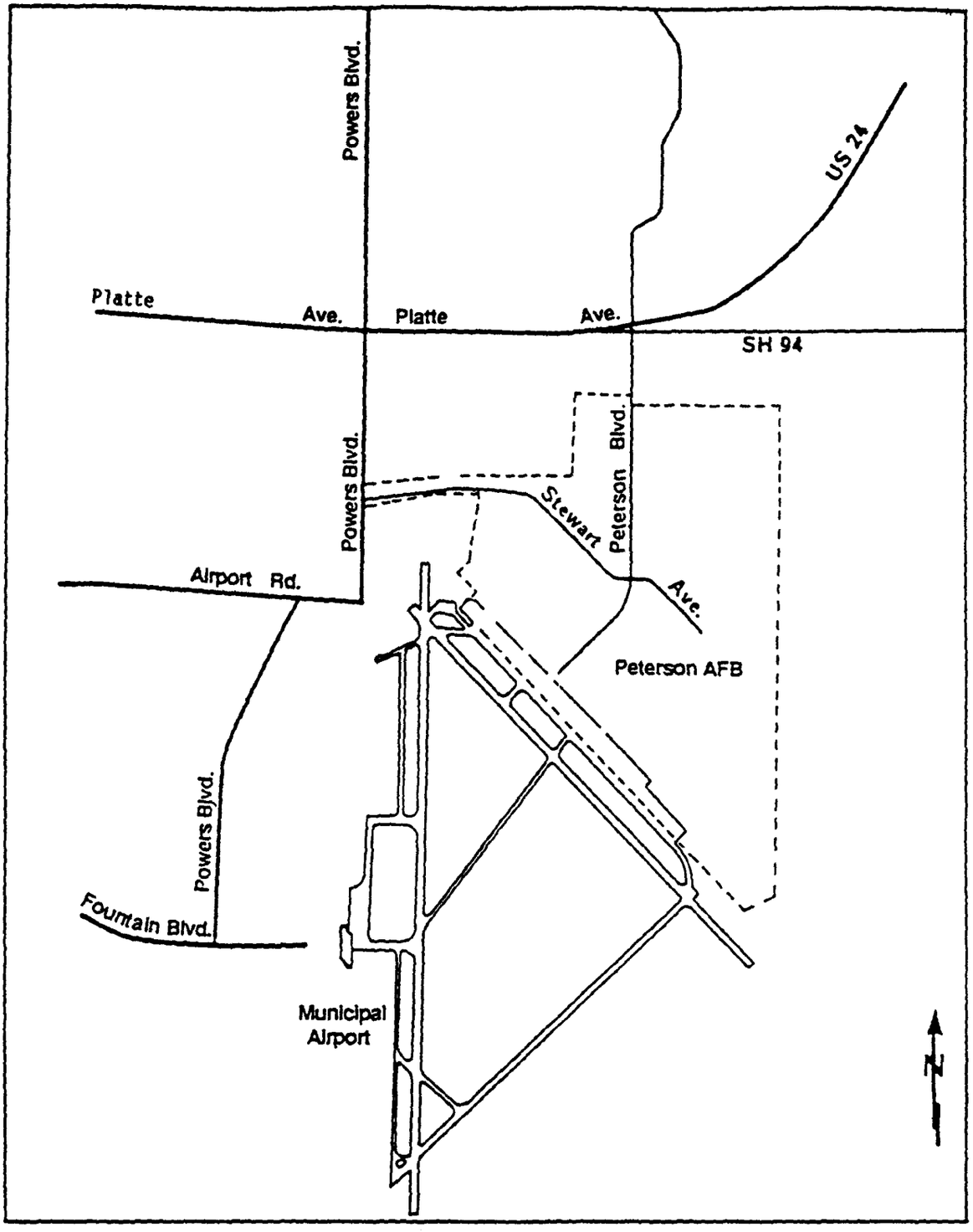


FIGURE 3.5-2 LOCAL VICINITY MAP FOR PETERSON AFB, EL PASO COUNTY, COLORADO



Source: U.S. Air Force, 1987.

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FIGURE 3.5.3-1 ROADWAY NETWORK NEAR PETERSON AFB, COLORADO

History. The installation, originally established as a civilian airport for Colorado Springs in 1925, came under federal control during World War II, and a large portion of the facility was used as a fighter training base. In 1945, the field was returned to the control of the City of Colorado Springs, and many of the military buildings were razed. The federal government and the City in 1948 reached an agreement that guaranteed a flying facility for the 15th Air Force, which was then headquartered at Ent AFB in Colorado Springs. A year later, 15th Air Force relocated to March AFB, California, and both Ent Air Force Base and the Air Force portion of Peterson Field were placed on inactive status until January 1951, when the Air Force established the Aerospace Defense Command at Peterson Field and Air Force personnel were reassigned to support the new command.

In 1976, Peterson Field was renamed Peterson AFB. In October 1979, control of the base was transferred to the Strategic Air Command. Air Force Space Command was activated at Peterson AFB in September 1982. The 1st Space Wing was constituted and activated in January 1983 and assumed control of the base in April of the same year. The 2nd Space Wing was activated at Falcon AFB, approximately ten miles east of Peterson AFB, in July 1985. The 3rd Space Support Wing was activated in October 1986 to provide base operating support for the Peterson Complex and all Air Force Space Command bases and sites worldwide.

Mission. The major commands and units at Peterson AFB and Falcon AFB are described below.

The North American Aerospace Defense (NORAD) Command is responsible to the U.S. Joint Chiefs of Staff and the Canadian Chief of Defense Staff for the warning and assessment of, and providing an appropriate response to, an air attack on North America, and providing surveillance and control of the airspace of Canada and the United States.

The United States Space Command (USSPACECOM) commands, plans, coordinates and employs forces to conduct those activities in space that support national objectives. USSPACECOM also prepares operational plans for the conduct of military space operations, assigns tasks and directs coordination among the subordinate component commands (i.e., Air Force Space Command, Naval Space Command and Army Space Command) to ensure unity of effort in accomplishment of command assigned missions.

Air Force Space Command operates forces to provide support from space to terrestrial forces; ground control support for Department of Defense (DOD) satellites in peacetime and through all required levels of conflict; warning of a space or missile attack; and the ability to negate enemy space systems during conflict.

The 1st Space Wing provides ongoing management, training, and evaluation for missile warning, space surveillance, intelligence, and communications sites that are assigned to the wing. The 1st Space Wing operationally commands and supports sensor units located in the United States and throughout the world.

The 2nd Space Wing, headquartered at Falcon AFB, provides command and control of operational DOD satellite systems, and operates and manages the Air Force Satellite Control Network (AFSCN).

The 3rd Support Wing is the host wing for both Peterson AFB and Cheyenne Mountain AFB and provides overall operating support. The Wing also provides certain support functions such as personnel, finance, supply, and transportation for the 2nd Space Wing at Falcon AFB.

As a part of the Space Command's mission, Falcon AFB was created in 1985 to be the National Test Facility for the Strategic Defense Initiative Organization (SDIO).

3.5.1 Community Setting

3.5.1.1 Population and Employment

Total employment in El Paso County increased from 155,470 in 1980 to 210,184 in 1988, an increase of 35.2 percent. Based on 1988 estimates of the Colorado Department of Labor and Employment, the labor force, inclusive of both those working and those seeking work, numbered 189,150 civilians and 35,049 active duty military personnel. The unemployment rate in 1988 was 7.4 percent. The average annual salary in El Paso County was $19,628; somewhat less than the statewide average of $21,469. Compared with the overall economic structure of the United States, the Colorado Springs Metropolitan Statistical Area (MSA) is characterized by a high proportion of service-related employment. Table 3.5.1-1 identifies employment by sector.

Table 3.5.1-1

Employment Trends by Industry
Colorado Springs, Colorado
1979 - 1989 (Annual Average)

	1980	1985	Sept 1989
Total Non-ag. Wage and Salary Employment	105,800	141,700	154,100
Mining	160	200	200
Construction	6,100	10,800	6,100
Manufacturing	17,000	24,500	25,900
Transportation, public utilities, communication	14,700	5,500	5,700
Trade	23,700	32,300	34,900
Finance, Insurance, and Real Estate	5,600	8,300	8,800
Services	25,200	34,100	43,500
Government	23,400	25,900	29,200

Note: Based on jobs by place of work. Subtotals may not add up to totals.

Source: U.S. Department of Housing and Urban Development 1990.

The Colorado Springs MSA has fared much better in terms of employment growth than the rest of Colorado. Reduction in the oil and gas, mining, and agricultural industries resulted in statewide employment losses in 1986 and 1987 and rebounded only slightly in 1988 and 1989. However, Colorado Springs benefitted from the expansion of the Peterson AFB facilities. Only the growth of the military complex kept the Colorado Springs area from experiencing employment declines felt throughout the rest of Colorado.

A recent Department of Housing and Urban Development (HUD) study assessed that prospects for continued growth over the next few years are at best uncertain. The potential for additional cuts in the defense budget and the threat of a national recession has dampened growth prospects. Growth at Peterson AFB is expected to continue but at a slower rate than previously forecast. Construction will continue to lose employment as the area tries to absorb existing vacant residential, commercial, and industrial space. Manufacturing employment should increase based on the strengths of existing companies. Trade and services should also grow but at a lesser rate than in the past several years. HUD forecasts total employment to grow at an average of 1 to 2 percent per year. This is slightly below the growth experienced in the Colorado Springs area during 1989 and far below the high growth rates experienced between 1980 and 1985.

Table 3.5.1-2 provides a summary of the impact of the military on the Colorado Springs area, including those stationed at the Peterson Complex, the Air Force Academy, and Fort Carson Military Reservation, an Army installation. The Peterson Complex is projected to increase its population over the next two years; specifically, a new AFSC unit at Peterson AFB will add an additional 1,100 military and civilian personnel by 1993. However, Fort Carson deactivated one of its three brigades in 1989, thereby eliminating 3,300 military positions. This reduction will be partially offset by 700 military and civilian personnel of the 6th Army Headquarters who will be relocated to Fort Carson in 1993 from the Presidio in San Francisco, California.

The military facilities account for 37,800 military and military-connected civilian personnel. This excludes all civilian non-appropriated funded (NAF) and contract personnel, which are estimated to number between 4,000 and 5,000 employees. Also excluded are over 21,000 military retirees living in the area. In terms of impact on the area, approximately 24,000 military and military-connected households (excluding NAF, contract, and retiree households) account for over 16 percent of all households. The 37,800 military and civilian personnel account for about 18 percent of total military

Table 3.5.1-2

Extent of Direct Military Impact on Colorado Springs January 1990

	Peterson Complex	U.S. Air Force Academy	Fort Carson Army Base	Total
A. Total Personnel				
Military[1]	6,150	7,170	18,000	31,320
Military-Connected Civilian[2]	2,450	1,630	2,450	6,530
TOTAL:	8,600	8,800	20,450	37,800
B. Military Households[3]				
Onbase	530	1,200	1,830	3,560
Offbase	4,960	1,390	9,230	15,580
TOTAL:	5,490	2,590	11,060	19,100
C. Military-Connected Civilian Households[4]	1,840	1,220	1,840	4,900
D. Total Military/ Military-Connected Civilian Households[5]	7,330	3,810	12,900	24,000
E. Total Households in HMA	145,800	145,800	145,800	145,800
F. Military/Military-Connected Households as a Percentage of Total Households	5.0	2.6	8.8	16.5

Notes: Subtotals may not add to totals because of rounding.

[1]Excludes military reservists and temporary duty personnel. Includes cadets at the U.S. Air Force Academy.
[2]Excludes nonappropriated fund and contract personnel.
[3]Excludes military in group quarters.
[4]Adjusted for dual wage-earner households.
[5]Sum of "B" and "C".

Source: U.S. Department of Housing and Urban Development 1990.

and civilian employment. The difference between the impact on households and employment indicates the large number of military in group quarters (over 11,000).

3.5.1.2 Housing

A summary of the housing inventory in the Colorado Springs area is presented in Table 3.5.1-3. The housing inventory in the city increased dramatically during the 1970s. Over 43,000 units, approximately 37 percent of the housing inventory in 1980, were constructed during this decade. Since 1980, the inventory has grown by over 47,000 units, approximately 30 percent of the estimated housing stock in 1990. Most of these units was constructed from 1983 to 1985. The two decades combined account for well over 50 percent of the current housing stock.

In 1986 and 1987, household growth was not sufficient to absorb the units built during the boom years of 1983 and 1984. Low interest rates in 1986 caused high levels of single-family construction which also contributed to an overbuilt market.

Very few multifamily rental units were constructed in the early 1980s as a result of overbuilding in the 1970s, a national recession, and high interest rates. Because of the prospects of large increases in military activity, permit activity accelerated in the mid-1980s; however, the number of unsubsidized multifamily units permitted declined from 4,574 in 1984 to 2 in 1989. Vacancies peaked in 1986 at an estimated 18 percent. The rate has remained high with an estimated 16 percent vacancy in 1989. No multifamily units are presently under construction.

The home sales market is soft because of overbuilding and a currently slow economy. The existing home supply exceeds the demand and, until the market balances, production of new units should be considerably slower than the average in the area during the 1980s. A surplus of single-family homes exists in and around Colorado Springs, a situation that has existed since the mid-1980s. This has brought the number of new units produced to its lowest level in 15 years. Because of the lack of financing and availability of new homes, prices for high end existing homes have increased. Low- and middle-priced homes have been depressed because of the large number of foreclosures.

The vacancy rate for rental units is currently estimated at 16 percent and has not been below 10 percent since 1983. The southeast area of Colorado Springs, adjacent to the base, has the highest concentration

Table 3.5.1-3

Housing Inventory and Vacancy Trends in Colorado Springs, Colorado January 1990

	April 1970	April 1980	January 1990
Total Housing Inventory	73,710	117,571	164,500
Total Occupied Units	67,581	107,791	145,800
Owner Occupied Units	39,745	65,440	97,450
Percent of Total	58.8	60.7	66.8
Renter Occupied Units	27,836	42,351	48,330
Percent of Total	41.2	39.3	33.1
Total Vacant	6,129	9,780	18,700
Available Vacant	3,714	6,439	13,260
For Sale	863	1,936	4,060
Sales Vacancy Rate Percent	2.1	2.9	4.0
For Rent	2,851	4,503	9,200
Rental Vacancy Rate Percent	9.3	9.6	16.0
Other Vacant Units	2,415	3,341	5,500

Notes: Subtotals may not add to totals because of rounding.

These vacancy rate estimates are designed to be compatible with the vacancy rates in the 1970 and 1980 Census.

Source: U.S. Department of Housing and Urban Development 1990.

of apartments and generally has the highest vacancy rates. It is estimated that military personnel represent between 50 and 70 percent of the tenants in apartment complexes near Peterson AFB.

Peterson AFB. Peterson AFB has 640 group quarters (exclusive of visiting and temporary quarters) and 491 family housing units. Demand for family housing onbase is considerable because of the financial advantage; waiting lists are currently lengthy. However, the soft housing market in Colorado Springs has not justified the construction of new onbase housing.

3.5.1.3 Education

The public school system in the Colorado Springs area consists of 147 elementary, 24 middle and junior high schools, and 16 high schools, and enrolled approximately 67,886 in 1990. Table 3.5.1-4 summarizes current and build-out enrollments for each of the nine school districts within the Colorado Springs area. In addition, the Colorado Springs area has one Catholic high school, four Catholic elementary schools, and two Lutheran elementary schools. The Colorado Springs Christian School is composed of one elementary, one junior high, and one senior high school. The Colorado School for the Deaf and Blind is also located in the area.

3.5.1.4 Community Services

The City of Colorado Springs and El Paso County provide a variety of community services including police and fire protection and recreation. Nine hospitals are located in El Paso County and specialize in general care, psychiatry, osteopathy, and cancer research and treatment. Primary medical facilities include Cedar Springs Psychiatric Hospital, Penrose Hospital, Penrose Community Hospital, Memorial Hospital, and St. Frances Hospital.

Table 3.5.1-4

Colorado Springs Area Public School Districts

District	Current Enrollment (April 1990)	Design Capacity At Build-Out
Harrison (#2) (12 elem; 3 middle; 2 high)	9,477	9,723
Widefield (#3) (9 elem; 3 middle; 1 high)	6,820	8,265
Fountain (#8) (5 elem; 2 middle; 1 high)	3,371	5,500
Colorado Springs Proper (#11) (38 elem; 9 junior; 5 high; 2 alt.)	29,420	36,216
Cheyenne Mountains (#12) (4 elem; 1 junior; 1 high)	2,437	N/A
Manitou (#14) (2 elem; 1 middle; 1 high)	1,091	1,475
Air Academy (#20) (11 elem; 3 middle; 3 high)	10,485	12,561
Lewis-Palmer (#38) (3 elem; 1 middle; 1 high)	2,332	3,125
Falcon (#49) (3 elem; 2 middle; 1 high)	2,499	2,645
TOTAL:	67,886	79,510

3.5.2 Land Use

3.5.2.1 Existing Land Use

Peterson AFB. Peterson AFB consists of two areas linked by a narrow strip of land (Figure 3.5-2). The main portion of the base is located adjacent to the Colorado Springs Municipal Airport. The Air Force and the City jointly use the airport runways and taxiways. Existing land use patterns in this portion of the base include major command headquarters and space mission-related facilities in the north and north-central areas of the base near the Main Gate; community (commercial) center, medical, and unaccompanied housing in the central area; family housing in the east-central area; recreational uses in the southeast area; industrial uses in the northwest area; and aircraft operations and maintenance facilities along the flightline in the southwest area. To the east of the main base is the lease amendment/option area. This 222-acre area was recently leased from the City of Colorado Springs. The area is currently undeveloped, but is planned for space mission-related, community (commercial), administrative, and open space land uses.

Existing land uses in the area surrounding Peterson AFB consist of the Colorado Springs Municipal Airport and commercial and industrial uses to the west, and residential developments and scattered residences and commercial land uses to the north along the U.S. 24/State Highway 94 corridors. Lands to the south and east of the base are largely undeveloped open space and/or rangeland. The City of Colorado Springs plans to expand the airport in the near future, including the construction of a new north-south runway east of the main portion of the base and a new passenger terminal south of the main base. A 24,312-acre area east and northeast of Peterson AFB and adjacent to the lease amendment/option area is master planned as the Banning-Lewis Ranch. The entire area was annexed by the City of Colorado Springs in 1987. The area remains largely undeveloped and predominately supports agricultural uses. The area is master planned for an integrated community with a variety of land uses including residential, light industrial, commercial/office, and open space.

Falcon AFB. Falcon AFB is located in a largely undeveloped area of El Paso County. The only developed areas within Falcon AFB are located in Section 26 on approximately 500 acres (Figure 3.5-3). Land uses within the developed portion of the base include administrative and space mission-related land uses in the central area; industrial uses (i.e., wastewater treatment facility, electrical

substation, central plant, and fuel storage areas) in the southeast and eastern areas; recreational facilities in the northeast area; and parking and contractor (construction) support in the northern area. The main entry road to Falcon AFB is located along the northern edge of Section 26. The entire base is surrounded by high security fencing.

Land surrounding the developed portion of the base is primarily used for agricultural-related uses including grazing. A small farm is located approximately one-third mile west of the developed portion of the base and Enoch Road. With the exception of this farm, the areas surrounding the base are open space including the proposed project area. Little urban-level development occurs along State Highway 94 between Peterson AFB and Falcon AFB.

3.5.2.2 Land Use Plans and Policies

Peterson AFB. Peterson AFB controls land use within the lease amendment/option through its Base Comprehensive Plan. The City of Colorado Springs exercises land use control for areas within its corporate limits, including a portion of the proposed project areas. Land to the north and west of the proposed project areas are designated Airport Planned Development and to the south Heavy Industrial. The land immediately east of the lease amendment/option area is within the Banning-Lewis Ranch planned development and designated Research and Development and Office/Low Density. Lands to the south of the proposed project areas within the Banning-Lewis Ranch are designated School, Park, and Residential/Medium Density; lands to the north are designated Industrial Park, Retail, and Research and Development. Further east within the Banning-Lewis Ranch, the land is designated Residential/Medium Density and Residential/High Density.

Falcon AFB. Both the city and county governments, under the umbrella organization of the Pikes Peak Area Council of Governments, participate in land use planning for the region. Land use jurisdiction for most of the area around Falcon AFB is, however, the ultimate responsibility of El Paso County. Offbase lands in the Falcon AFB area are designated for agricultural use by the County. This designation applies to the areas within a one-mile radius of Falcon AFB and requires a minimum lot size of five acres.

3.5.3 Transportation

3.5.3.1 Traffic

Existing Conditions. Regional access to Peterson AFB and Falcon AFB is provided by U.S. 24 and State Highway 94. Local access to Peterson AFB is provided by Peterson Boulevard and Powers Boulevard. Two entrance/exit gates provide access to the base (Figure 3.5.3-1). The North Gate is located approximately 700 feet south of State Highway 94 on Peterson Boulevard. The west gate is at the intersection of Powers Boulevard and Stewart Avenue. A third gate is proposed on the eastern side (lease amendment/option area) of the base along Marksheffel Road. Local access to Falcon AFB is provided by Enoch Road, which intersects State Highway 94 approximately two miles north of the base. Blue Road, to the west of Falcon AFB is proposed to be extended to link the two bases.

Roadway Characteristics. Peterson Boulevard is a four-lane divided roadway extending from inside Peterson AFB, north to Galley Road. U.S. 24 links Colorado Springs with Interstate 70 at Limon and, through the connection with Peterson Boulevard provides access to the base from the east and west. Powers Boulevard is currently a rural two-lane road extending south from U.S. 24 to Fountain Avenue. Improvement of Powers Boulevard to six lanes in the vicinity of Peterson AFB is planned to provide better access to the Colorado Springs Municipal Airport and the surrounding area. Improvement of Powers Boulevard to six lanes north of U.S. 24 has been completed.

State Highway 94 is a two-lane roadway with unrestricted access and at grade intersections. Long term plans call for the conversion of State Highway 94 to a six-lane freeway with grade-separated interchanges. Construction of Falcon AFB in the early 1980s resulted in improvements to State Highway 94 from its junction with U.S. Highway 24 east to Enoch Road, including the addition of 10-foot paved shoulders and the replacement of substandard bridges. Enoch Road is a two-lane roadway from its intersection with State Highway 94 to approximately one-half mile south of the base entry road.

Existing Traffic Volumes. Existing daily traffic volumes and estimated roadway capacities for roadways in the immediate vicinity of the base are presented in Table 3.5.3-1. Traffic along State Highway 94 is relatively low, with approximately 3,500 vehicles per day west of Enoch Road and approximately

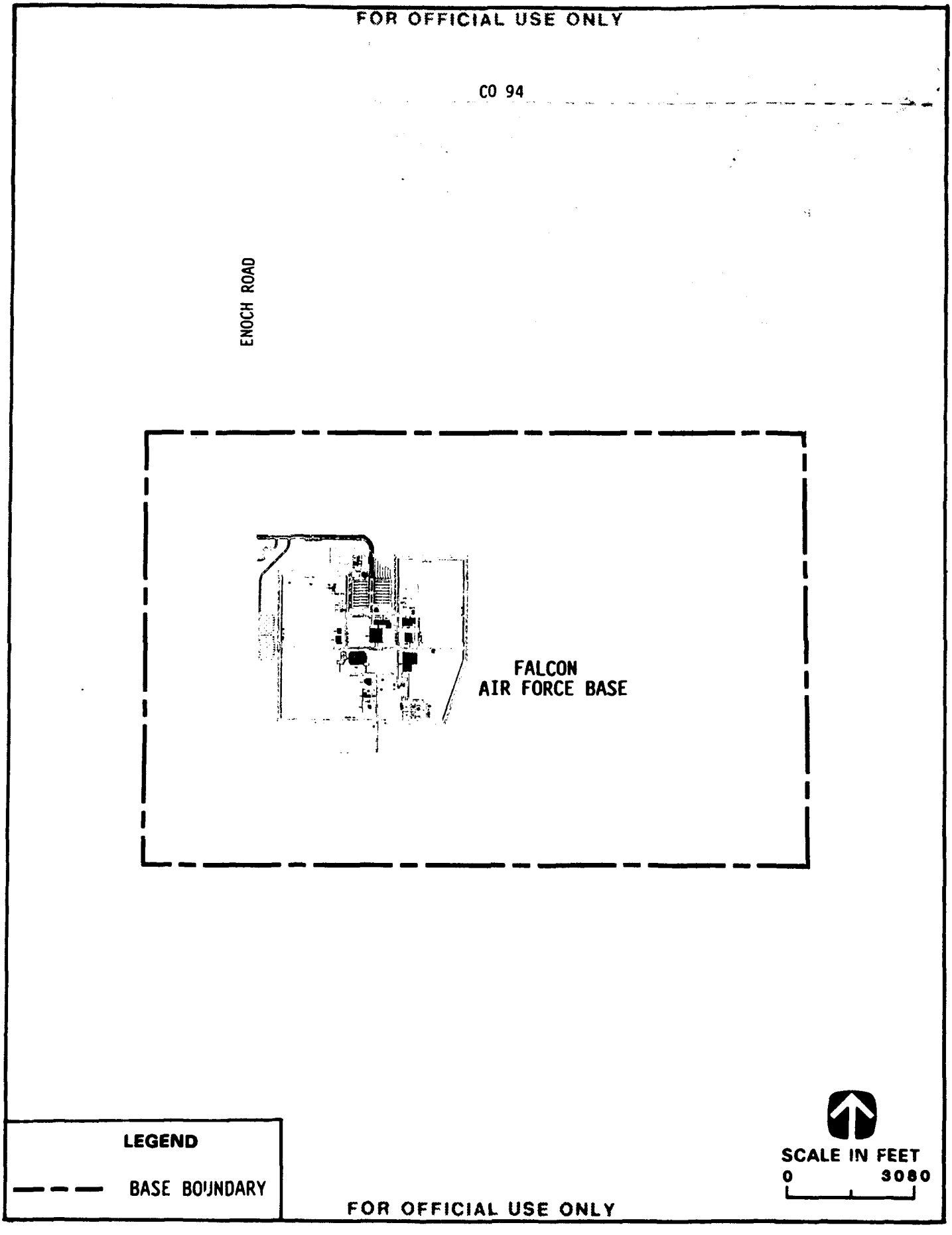

FIGURE 3.5-3 LOCAL VICINITY MAP FOR FALCON AFB, EL PASO COUNTY, COLORADO

Table 3.5.3-1

Comparison of Daily Traffic Volumes to Estimated Daily Roadway Capacities For Road Segments in the Vicinity of Peterson AFB and Falcon AFB, 1985

Road Segment	Average Daily Traffic	Roadway Capacity	V/C Ratio[1]	LOS[1]
Peterson Boulevard				
South of State Highway 94	8,700	14,000	0.62	B
North of State Highway 94	9,600	14,000	0.69	B
State Highway 94				
East of Peterson	5,750	16,200	0.35	A
West of Peterson	16,500	16,200	1.02	F
West of Enoch	3,500	16,200	0.22	A
East of Enoch	1,800	16,200	0.11	A
Powers Boulevard				
North of State Highway 94	13,300	57,000	0.23	A
South of State Highway 94	14,000	57,000	0.25	A
Enoch Road				
South of State Highway 94	1,500	28,900	0.05	A
Stewart Avenue	10,300	28,900	0.36	A

NOTES: [1]V/C represents the ratio of Average Daily Traffic Volumes to Capacity.
[2]LOS = Level of Service.

SOURCE: Pikes Peak Area Council of Governments 1988

1,800 east of Enoch Road. Rural truck traffic comprises approximately 10 percent of this traffic. Along Enoch Road, average daily traffic is approximately 1,500 vehicles and is primarily associated with the operations at Falcon AFB.

Operating Conditions on Roadways. The traffic volumes were compared to Level of Service (LOS) E daily roadway capacities to arrive at a volume-to-capacity ratio and corresponding level of service of operation. Table 3.5.3-1 presents a comparison of daily traffic volumes and volume-to-capacity ratios for selected roadway segments. All roadway segments analyzed are currently operating at LOS B or better with the exception of U.S. 24/State Highway 94 west of Peterson Boulevard which is currently operating at LOS F.

Future Traffic Conditions. Average daily traffic volumes for the year 2010 for the roadways in the immediate vicinity of the Peterson AFB and Falcon AFB are presented in Table 3.5.3-2. The year 2010 daily traffic volumes were compared to estimated year 2010 daily capacities to arrive at a volume-to-capacity ratio and corresponding level of service of operation. Table 3.5.3-2 presents a comparison of daily traffic volumes and volume-to-capacity ratios for selected roadway segments. All roadway segments analyzed are expected to operate at LOS D or better.

The existing roadway system is expected to change as a result of the continued urbanization of the Colorado Springs area, and planning for the future roadway network is ongoing. The Pikes Peak Area Council of Governments coordinates planning activities for growth to the year 2010 and has prepared a long-range plan for transportation improvements in the Colorado Springs urban area. This plan is expected to meet the transportation needs of the community and analyzes the highway and mass transit network alternatives over the next 20 years.

The 2.1 miles of State Highway 94 between Enoch Road and Ellicott were repaved in 1989. This was the only roadway improvement project near Falcon AFB that the Colorado Department of Highways identified in its 1985-1990 improvement plan. Improvements to the interchange between State Highway 94 and Peterson Boulevard are proposed, and if implemented, would improve both morning and afternoon peak traffic flow to LOS B. Long-term plans call for the conversion of State Highway 94 to a six-lane freeway with grade-separated interchanges (at one mile intervals for the 13-mile

Table 3.5.3-2

Comparison of Daily Traffic Volumes to Estimated Daily Roadway Capacities For Road Segments in the Vicinity of Peterson AFB and Falcon AFB Year 2010

Road Segment	Average Daily Traffic	Roadway Capacity	V/C Ratio[1]	LOS[1]
Peterson Boulevard				
South of State Highway 94	9,409	14,000	0.67	B
North of State Highway 94	8,400	14,000	0.60	A
State Highway 94				
East of Peterson	16,751	85,500	0.20	A
West of Peterson	41,321	85,500	0.48	A
West of Enoch	12,100	57,000	0.21	A
East of Enoch	23,500	57,000	0.41	A
Powers Boulevard				
North of State Highway 94	85,254	114,000	0.75	C
South of State Highway 94	55,126	114,000	0.48	A
Enoch Road				
South of State Highway 94	26,100	28,900	0.90	D

NOTES: [1]V/C represents the ratio of Average Daily Traffic Volumes to Capacity.
[2]LOS = Level of Service.

SOURCE: Pikes Peak Area Council of Governments 1988

segment from Peterson Boulevard to Peyton Highway) in order to accommodate a projected 60,000 vehicles per day with build-out of this area.

3.5.3.2 Airports

Colorado Springs Municipal Airport is served by seven major airlines and several smaller ones. The runways are maintained in joint use with Peterson AFB. Flight operations at Colorado Springs Municipal Airport for 1988 and 1993 projections are summarized in Table 3.5.3-3. Stapleton International Airport, approximately 80 miles north of Colorado Springs in northeastern Denver, is served by 15 major airlines and several secondary carriers.

Table 3.5.3-3
Aircraft Operations at Colorado Springs Municipal Airport

	1988		1993	
	Daily	Annual	Daily	Annual
Commercial & Air Taxi	81.2	19,642	126.4	46,136
Military	99.6	36,354	114.1	41,647
General Aviation (Jets)	18.0	6,570	26.0	9,490
Total	198.8	72,566	266.5	97,273

Source: Howard Needles Tammen and Bergendoff 1990.

3.5.4 Utilities

The City of Colorado Springs is the principal area where community and public utility services may be directly or indirectly affected by the proposed action. Most personnel living offbase are expected to reside in Colorado Springs or in areas adjacent to the city.

3.5.4.1 Water Supply

The City of Colorado Springs provides potable water to its residents and to Peterson AFB from surface water flows. In 1989, average daily demands equaled 65 million gallons per day (MGD) or approximately 43 percent of treatment plant capacity. The system presently is at a 100 percent capacity during summer peak demand. Construction of an upgraded facility to handle the increased demand is underway. Population growth estimates the demand of 200 gallons per capita per day (gpcd) will increase average daily demand to 66.16 MGD by 1996 and 67.47 MGD by 1997. Peterson AFB is supplied potable water through a 30-inch water main. The base consumed 1.07 MGD in fiscal year (FY) 1989. Onbase potable water use is expected to remain constant. Present per capita demand is 95.5 gpcd.

The City of Colorado Springs obtains 38 percent of its water from surface water sources within El Paso County and nine percent from groundwater. The remainder of the City's water supply is from Colorado River imports through transbasin diversions from the western slope of the Rocky Mountains. Developed and undeveloped water supplies for the City are presented in Table 3.5.4-1. At present, the annual water supply available to the City is 123,000 acre-feet. A portion of this supply, 40,800 acre-feet, is for nonpotable uses only. Current consumption is 70,000 acre-feet.

The Cherokee Water District provides service to Falcon AFB utilizing groundwater as the supply source. Cherokee Water District obtains its water supply from alluvial groundwater located in the upper Black Squirrel Creek Basin. This basin has a storage capacity of approximately 350,000 acre-feet. Existing groundwater consumption use ranges from 13,000 to 15,000 acre-feet/year, while the recharge rate is estimated at 8,000 to 10,000 acre-feet/year.

Cherokee Water District has the capacity to deliver 6.25 MGD. Total daily average demand in 1989 was 3.5 MGD. The district's contractual limits on delivery to Falcon AFB is 0.48 MGD. The average daily demand at the base was 0.24 MGD in FY 1989. Projected demands of 0.63 MGD, when the National Test Facility (NTF) is fully operational would increase the total daily water requirements to 1.11 MGD. Present plans include increased storage capacity and water reclamation and conservation practices.

Table 3.5.4-1

City of Colorado Springs Total Average Annual Water Supply (Developed and Undeveloped) in Acre-Feet

DEVELOPED SUPPLIES

	Potable	Nonpotable	Total
Pikes Peak	13,900		
Northfield	600		
South Suburban - Rosemont	2,500	400	
Pinello Ranch	1,400		
Blue River Project	12,100		
Homestake Project (Phase 1)	12,900		
Twin Lakes Project	27,000		
Fryingpan-Arkansas Project	14,400		
Hanna Ranch		5,800	
Monument Creek		800	
Imported Return Flow		33,800	
Total Present	84,800[1]	40,800[2]	123,200

UNDEVELOPED SUPPLIES

	Potable	Nonpotable	Total
Homestake Project (Phase III)	11,200		
Eagle-Arkansas Project	3,900		
Blue River Expansion/Exchange	5,800		
Additional Homestake Rights	4,800		
Imported Lawn Irrigation Return Flow		12,600	
Imported Return Flow		15,500	
Total Future	25,700	28,100	56,200
Total All Resources	110,500	68,900	179,400

Note: Volumes shown are net to the City's distribution system.

[1]Present annual average potable use is about 60,000 acre-feet.
[2]Present annual average reuse and nonpotable use is about 7,400 acre-feet.

Source: City of Colorado Springs 1987.

Water service to Falcon AFB is through a 10-inch water supply line and 4-inch water meter capable of delivering 500 gallons per minute (gpm) at 10 pounds per square inch. Water storage for peak demands, such as fire fighting requirements, is currently provided onsite by two 1.8 million gallon storage tanks.

3.5.4.2 Wastewater

Wastewater treatment for the City of Colorado Springs and Peterson AFB occurs at a recently updated municipal activated sludge treatment plant. The facility is presently processing 30 MGD and operating at 58 percent of its 52 MGD treatment capacity. Projected population growth will increase wastewater flows to 33.22 MGD by 1996 and 33.88 MGD by 1997, based on an estimated usage of 100 gpcd. Peterson AFB discharged 0.67 MGD to the facility in FY 1989. Future flows are expected to remain constant. Present per capita flows are 59.8 gpcd.

Falcon AFB has an onsite sewage treatment plant. Blowdown from the cooling tower system and boilers is combined with the treated domestic wastewater and discharged. The Falcon AFB wastewater treatment facility has, for a number of years, not met state or federal standards. The base has plans to remedy and upgrade the facility. The treatment plant has an extended aeration activated sludge treatment process capable of treating 0.075 MGD, with a present demand of 0.055 MGD. The wastewater flows onbase are expected to increase by 0.18 MGD because of the increased number of personnel associated with NTF when it is fully operational. The planned expansion of the existing facility will accommodate the increased flows.

Effluent disposal is provided by evaporation from two treatment ponds and overflow discharge to a tributary of Chico Creek, an ephemeral stream, which originates two miles north of the base. Both evaporative ponds are lined to prevent seepage to the groundwater. The facility conforms to the regulatory requirements for wastewater treatment and disposal set forth in its NPDES permit. The effluent is not presently of suitable quality for reuse in irrigation.

3.5.4.3 Solid Waste

The metropolitan area of Colorado Springs generates approximately 890.4 tons per day (T/day) of solid waste which is disposed of at two public landfill sites. The landfills have a lifespan of 10 to 12 years

each. Refuse collection is accomplished by contract at both Peterson and Falcon AFBs and disposed of in the public landfills. Peterson AFB generated approximately 17,760 tons of solid waste in 1989.

3.5.4.4 Energy

Electricity. The Western Area Power Administration (WAPA) markets and transmits federally-produced power to 15 central and western states, including Colorado. The Fryingpan-Arkansas Project, which supplies electrical power to Colorado, has the capacity of 600,000 kilowatts (kW) during the winter and 729,000 KW during the summer; the total energy available is 2 billion kilowatt hours (kWh) per year. The City of Colorado Springs purchases power from WAPA and also operates several coal-fired power plants with a generating capacity of 652 megawatts (MW). Approximately 383,000 customers consumed 525 MW in 1989.

Current forecasts indicate a need for increased supplies in 1994 and a major expansion project is currently being planned to handle increased needs. The city also supplies electricity to Peterson AFB. The transformer substation at Peterson AFB is capable of handling 10,000 kW per day, although it is designed to provide up to 15,000 kW if it was cooled by forced air. The 1989 peak daily demand for the base was 6,000 kW. Installation of an additional transformer substation is presently being negotiated with the City of Colorado Springs.

Falcon AFB is within the service area of the Mountain View Electrical Association. Presently, a 115-kW line ties into a substation on the base. The system is capable of providing 15,000 kW. With the addition of air-cooling equipment, the system is designed to provide up to 25,000 kW. Peak daily demand in 1989 was 6,301 kW. The NTF, when fully operational, will increase peak demand to 19,411 kW. An additional substation is planned to accommodate increased electrical demands.

Natural Gas. The City of Colorado Springs Department of Utilities supplies Peterson AFB and the area with natural gas purchased from the Colorado Interstate Gas Company. Natural gas supplies available to the area are extensive, and average demand is less than 60 percent of the existing system's capacity. In 1989, the city had 117,713 customers and projects 136,353 by 1997. The average residential consumption is 90 thousand cubic feet (Mcf) per year. Peterson AFB consumed 203,231 Mcf in FY 1989; demand is expected to stay constant.

Two government-owned 4000-gallon propane tanks are currently used at Falcon AFB. These tanks were installed for use by the Consolidated Space Operations Center, and propane is shipped to the base by a local supplier when needed. Propane is used to fire small boilers in individual buildings located outside the security fence. The gas is distributed through a natural gas network that will be hooked into an offbase gas transmission system.

A natural gas pipeline is scheduled to be installed by Peoples Natural Gas south along Enoch Road from a mainline along State Highway 94 by September 1990. The City of Colorado Springs will supply Peoples Natural Gas. The new gas line will be connected to the existing infrastructure at the base. The base also uses diesel fuel for backup electrical generators. In FY 1989, Falcon AFB consumed 3,185 million BTUs of propane.

Falcon AFB uses a diesel fuel unloading system for the Consolidated Space Operations Center. The system consists of one 500-gallon tank and two 39,000-gallon underground storage tanks. Diesel fuel is supplied from Peterson AFB via a local distributor. Diesel fuel is used to fire boilers in the central power plant. The boilers produce steam to heat the Consolidated Space Operations Center and humidify the computer areas year-round. These boilers are capable of using either diesel or natural gas; however, as mentioned previously, a natural gas hookup is currently not available. In FY 1989, Falcon AFB consumed 41,366 million BTUs of diesel fuel.

3.5.5 Hazardous Materials

At both Falcon AFB and Peterson AFB, hazardous wastes are managed by the Defense Reutilization and Marketing Office (DRMO) located at the Fort Carson Military Reservation, south of Colorado Springs. Typical hazardous wastes generated include oils, paint thinners, solvents, and other regulated materials. The hazardous wastes are stored in a conforming storage area on each base and then transported to the DRMO for shipment to licensed treatment and disposal facilities.

The Installation Restoration Program (IRP) at Peterson AFB resulted in the identification of five sites on the base where there may be a potential for environmental contamination resulting from past waste disposal practices. These sites consist of two landfill areas along Sand Creek, a leech field, and a

former fire training area near the golf course, and a third landfill in the southern extension of the base near the site of the proposed new Colorado Springs Municipal Airport terminal.

A follow-on Remedial Investigation in June 1989 analyzed these sites, as well as two additional areas (an abandoned drain line near the Aero Club hangar and the currently designated fire training area) for potential contamination. It concluded that none of the sites posed unacceptable long-term risks to human health or the environment, and that no further IRP action was warranted. Decision Documents to eliminate these sites from the IRP have been submitted to the Environmental Protection Agency (EPA). The EPA is expected to acknowledge compliance with the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and accept the findings of the Decision Documents.

3.5.6 Geology and Soils

3.5.6.1 Geology

Physiography and Topography. Both Peterson AFB and Falcon AFB are situated on the high plains of the Colorado Piedmont along the western margin of the Great Plains physiographic province. This is a region of rolling grasslands dotted with scattered buttes and mesas that terminate abruptly against the southern Rocky Mountains. The Front Range is the easternmost range that rises from the Great Plains.

The terrain of Colorado Springs, which is situated on a semiarid plateau of the eastern slope of the Rocky Mountains, is relatively flat. The mountains to the west rise abruptly above the plateau to average heights of 11,000 feet. Gently rolling prairie lies to the east of the city while, to the north, the land slopes upward toward the Palmer Lake Divide. The mean elevation is 6,145 feet. The greater metropolitan area extends north into Douglas County and west into Teller County.

Peterson AFB is located on the western edge of the Denver Basin at an elevation of 6200 feet above sea level. The area adjacent to the base is composed of low, sandy foothills and flat plains. Topography within the base slopes very gently to the south and east, and the east fork of Sand Creek passes through the western portion of the base. Falcon AFB is also at an elevation of 6200 feet and

located on the western edge of the Denver Basin. The area around the base is composed of sandy foothills and plains of low relief. Topography onsite is a broad, gentle slope to the south and east.

Regional Geology. The plains in the region around Colorado Springs are underlain by several large tectonic features, of which the Denver Basin is most prominent. The basin is asymmetric and filled with 11,000 feet of sediment. The eastern margin of the basin dips gently to the west, but the western margin is very steep where it borders the Front Range. All of the surface sediments that occur in this region are continental in origin.

Geologic Hazards. No known geologic hazards, such as geothermal hot springs, landslides, or potentially active faults, occur on either Falcon AFB or Peterson AFB. Colorado, in general, has a low seismic risk potential and is located in Seismic Zone 1, designated for areas where only minor damage could occur. Eastern Colorado, including the Colorado Springs area, has a particularly low seismic risk as no known potentially active faults have been identified in the region. Three recorded moderate intensity earthquakes (intensity VII, Modified Mercalli Index) have occurred in the region; all were located over 50 miles north of the two installations.

3.5.6.2 Soils

At Peterson AFB, Blackland Loamy Sand is the representative soil resource. The slope of this soil varies from 1 to 9 percent. This soil is located in the Truckton-Blakeland-Bresser Association and consists of deep and somewhat excessively drained sandy soil formation alluvial and eolian deposits. Permeability of the Blackland Loamy Sand is rapid, reducing the potential for erosion to a moderate level. As the texture is coarse, the potential for wind erosion is severe.

At Falcon AFB, the Bresser Sandy Loam and the Agealon Sandy Loam are the representative soil types. Soils in the Truckton-Blakeland-Bresser Association are deep and well drained and have been formed on terraces and upland areas. The permeability of the Agealon and Bresser Sandy Loams is moderate, and the hazard of water and wind erosion is also moderate. All three series are soil types conductive for the growth of range grasses. If well managed, these soils can be used for agricultural purposes. None of the soils are designated as prime farmland.

3.5.7 Water Resources

3.5.7.1 Groundwater

The principal aquifers in the Colorado Springs region are the Arkansas, the Dawson, and the Black Squirrel Creek. Alluvial aquifers, underlying Fountain Valley and the Black Squirrel Creek drainage, extend the alluvial basin toward Colorado Springs from the mainstream of the Arkansas River. Aquifers associated with the Arkansas River basin are generally shallow and consist of unconsolidated material with good water quality. The groundwater level varies from 25 to 100 feet, and yields vary from 100 to 1,200 gallons per minute. In general, the groundwater moves toward and discharges into the principal streams. Water withdrawal from wells has reduced the flow of groundwater to some streams and, in some areas, has induced flows from streams to the aquifer.

The Dawson aquifer underlies the majority of El Paso County at an average depth of 100 feet and is estimated to contain 38 million acre-feet of water in the upper 500 feet of its saturated thickness. Alluvial aquifers underlying major drainage areas, such as the Arkansas River, Fountain Creek, Jimmy Camp Creek, and Black Squirrel Creek Valleys, are important sources of water for municipal and agricultural purposes. Colorado's water regulations protect groundwater basins from withdrawal rates that would exceed the dependable supply. The Colorado Groundwater Commission has established a threshold withdrawal rate for the state of one percent annually of the estimated reserves from designated groundwater basins, including the Black Squirrel Creek aquifer. However, state regulations exempt wells that were in operation prior to the effective date of the legislation. Recently adopted groundwater regulations in El Paso County are more restrictive and limit withdrawals from an aquifer to 0.33 percent of the estimated reserves each year.

Falcon AFB. In the Falcon AFB area, the Dawson aquifer underlies to a depth of 100 to 150 feet, but has not been extensively developed as a source of water. The Black Squirrel Creek alluvial aquifer lies approximately three to six miles east of the base and is the primary water source for agricultural and municipal uses in unincorporated areas of El Paso County east of Colorado Springs. The quality of groundwater in the Dawson aquifer is good and is suitable for most uses. The quality of groundwater in the central portion of the Black Squirrel Creek aquifer is suitable for all uses.

Peterson AFB. At Peterson AFB, groundwater is not developed as a water supply source and would not constitute a potential resource.

3.5.7.2 Surface Water

Both installations are located in the Colorado Front Range of the Arkansas River basin. Precipitation in the area averages 13.5 inches annually which results primarily from thunderstorms occurring from March to September. Relatively dry conditions prevail during winter. El Paso County has an annual precipitation of approximately 15 inches.

Ephemeral or intermittent streams characterize most of the smaller drainages within the area. Only those streams with headwaters in the mountains flow continuously, including the Arkansas River with its headwaters near the Continental Divide, and Fountain Creek that originates near Pikes Peak. Smaller drainages in the area generally originate near the Monument Divide and Black Forest areas in northern El Paso County and flow southward to their confluence with the Arkansas River. Water quality in the Arkansas River basin is generally adequate to support most designated uses except in the central portion of Fountain Creek, below Colorado Springs, where high fecal coliform counts and metals impair the designated uses.

To minimize the potential for water quality damage caused by storm drainage and erosion, an Areawide Water Quality Management Plan (208 Plan) establishes various programs. Discharge of treated domestic wastewater often constitutes the entire streamflow in many of the tributary streams in the area. Surface water flows, or wastewater discharges to many of the tributary streams, often contribute to the recharge of shallow alluvial aquifers. Because of extremely low minimum streamflows, the lack of sustained aquatic life, and the use of surface water for stock watering and other agricultural uses, many of the water quality classifications for tributary streams are not set at a level to protect a full range of uses.

Peterson AFB. At Peterson AFB, the Last Fork of Sand Creek, an intermittent drainage channel, crosses the western portion of the base.

Falcon AFB. At Falcon AFB, two drainage channels originate approximately two miles north of the site. One of the stream channels has been rerouted around the perimeter of the base and the channel has been lined with rock.

3.5.8 Air Quality

3.5.8.1 Regulatory Setting

Federal and state ambient air quality standards are presented in Table 3.5.8-1. Primary standards are those that protect public health; secondary standards are designed to protect the public from other adverse air pollution effects, such as damage to vegetation and other materials and degradation of aesthetic qualities.

The Colorado Springs metropolitan area is currently a nonattainment area for carbon monoxide (CO) and total suspended particulates (TSP); the state is therefore required to adopt a State Implementation Plan (SIP) outlining a policy to reduce emissions, improve air quality, and regain attainment status. This responsibility has been delegated to the Pikes Peak Area Council of Governments (PPACG), a consortium of municipal and county governments responsible for planning decisions related to development projects in El Paso and neighboring counties. Any future development within the designated nonattainment areas must comply with the adopted SIP policies.

In order to demonstrate compliance with the SIP, a proposed project must obtain all necessary permits and show consistency with the traffic and population projections contained in the SIP. Additionally, pollutant increases must be within federal Prevention of Significant Deterioration (PSD) increments, must not contribute to violations of the National Ambient Air Quality Standards (NAAQS) or delay attainment, and must be consistent with the control measures adopted in the SIP. Air Quality Maintenance Plans outlining options to control CO and TSP are incorporated into the SIP.

Table 3.5.8-1

National and State of Colorado Ambient Air Quality Standards

Pollutant	Federal Primary Standard	Federal Secondary Standard	Colorado Adopted Standard
Total Suspended Particulates			
24 Hour Average	260 $\mu g/m^3$*	150 $\mu g/m^3$	260 $\mu g/m^3$
Annual Geometric Mean	75 $\mu g/m^3$	60 $\mu g/m^3$	75 $\mu g/m^3$
Sulfur Dioxide			
24 Hour Average	.14 ppm**	- - - -	- - - -
Annual Arithmetic Average	.07 ppm	- - - -	- - - -
3 Hour Average	- - - -	.5 ppm	700 $\mu g/m^3$
Carbon Monoxide			
8 Hour Average	9 ppm	9 ppm	9 ppm
1 Hour Average	35 ppm	35 ppm	35 ppm
Photochemical Oxidants			
1 Hour Average	.12 ppm	.12 ppm	.12 ppm
Nitrogen Dioxide			
24 Hour Average			
Annual Arithmetic Average	.05 ppm	.05 ppm	.05 ppm

NOTES: *$\mu g/m^3$ - micrograms per cubic meter
**ppm - parts per million

3.5.8.2 Regional Air Quality

Meteorology and Climate. In the Colorado Springs region, the climate is continental and influenced by the high elevation of Front Range, which protects the area from temperature extremes and results in cool, sunny summers and dry, low-humidity winters. The average annual temperature of 48.3° F ranges from a January mean of 29° F to a July mean of 70.8° F. Approximately 80 percent of the average annual 15 inches of rainfall occurs from April to September and primarily during thunderstorms. The average annual snowfall is 40 inches.

Existing Air Quality. El Paso County encompasses an area of approximately 2,160 square miles. Much of the county is in compliance with the national ambient air quality standards; the primary area of concern is the urbanized area in and around Colorado Springs. Outside the urban area, the most significant sources of air pollutants are from agricultural activities to the east, military training operations,at Fort Carson to the south, and naturally-occurring dust from the semiarid plains east of the Rocky Mountains. Fugitive dust from unpaved roads accounts for 46 percent of the total suspended particulates in the Air Quality Management Area (AQMA) and the county as well. Pollutant concentrations are predicted to substantially increase as a result of more intensive and widespread urban activities in the AQMA.

The ambient air quality within the Colorado Springs metropolitan area varies with local meteorological conditions. During the winter months, when inversion and limited dispersion conditions prevail, the air quality is often poor. These conditions are recognized as the primary factor contributing to higher CO concentrations in the Colorado Springs area. The potential is also high for TSP impacts in the winter months when soil moisture and ground cover are at a minimum and wind speeds are high. Air quality generally improves during the spring months because of fewer temperature inversions and an increase in rainfall.

Falcon AFB is located outside the Colorado Springs nonattainment areas for CO and TSP; however, Peterson AFB is within the EPA-designated nonattainment area, and all projects would be required to comply with the SIP.

3.5.9 Noise

3.5.9.1 Regulatory Setting

Peterson AFB. Because Peterson AFB operates as a tenant of, and under joint use with, the Colorado Springs Municipal Airport, an AICUZ (Air Installation Compatible Use Zone) study is not required, and the base operates under the jurisdiction of the Part 150 program, a Federal Aviation Administration (FAA) program designed to assist in noise control and planning around civilian airports. The FAR Part 150 guidelines require an Airport Noise Compatibility Planning Program to be established, including determining existing noise conditions around the airport; identifying noise problem areas; reviewing and selecting both land use and operational noise control alternatives; coordinating and interacting among operators, users, neighbors, local government, and the FAA; and developing an implementation plan for the program.

3.5.9.2 Existing Noise Sources

Peterson AFB. In the Peterson AFB area, flying operations associated with the base and the Colorado Springs Municipal Airport constitute the primary source of noise. An additional runway is presently under construction southeast of the site, and its use is expected to produce noise contours at the proposed site of at least 65 L_{dn} by the year 2000.

The FAR Part 150 Program for Colorado Springs Municipal Airport was updated in March 1990. The noise contours for the airport for 1988 and projected 1993 air traffic are shown in Figures 3.5.9-1 and 3.5.9-2. Table 3.5.9-1 presents a summary of land uses and the population within specific noise contours. While the new runway and operations will significantly reduce noise impacts in areas west of the base, some areas would still be adversely influenced by noise without implementation of further mitigation measures.

Falcon AFB. Falcon AFB is located in a rural, sparsely populated area in which there are few sensitive receptors located near the base. Open range borders the base on three sides, and several scattered residences are located approximately one-third mile to the west. The primary source of existing noise at and near Falcon AFB is vehicular traffic. Current ambient noise levels are estimated at 40 L_{dn}.

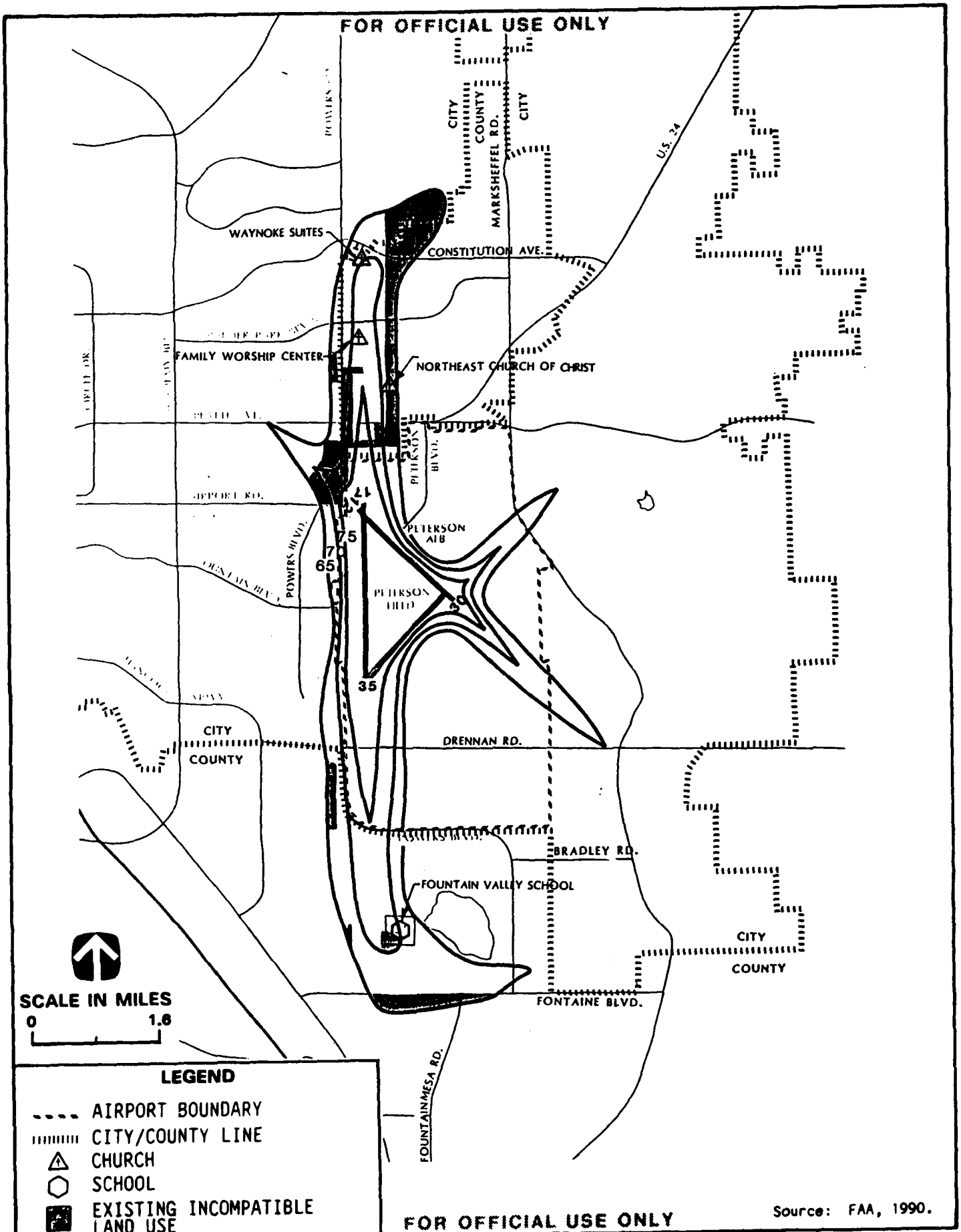

FIGURE 3.5.9-1 1988 Ldn NOISE EXPOSURE MAP, COLORADO SPRINGS MUNICIPAL AIRPORT

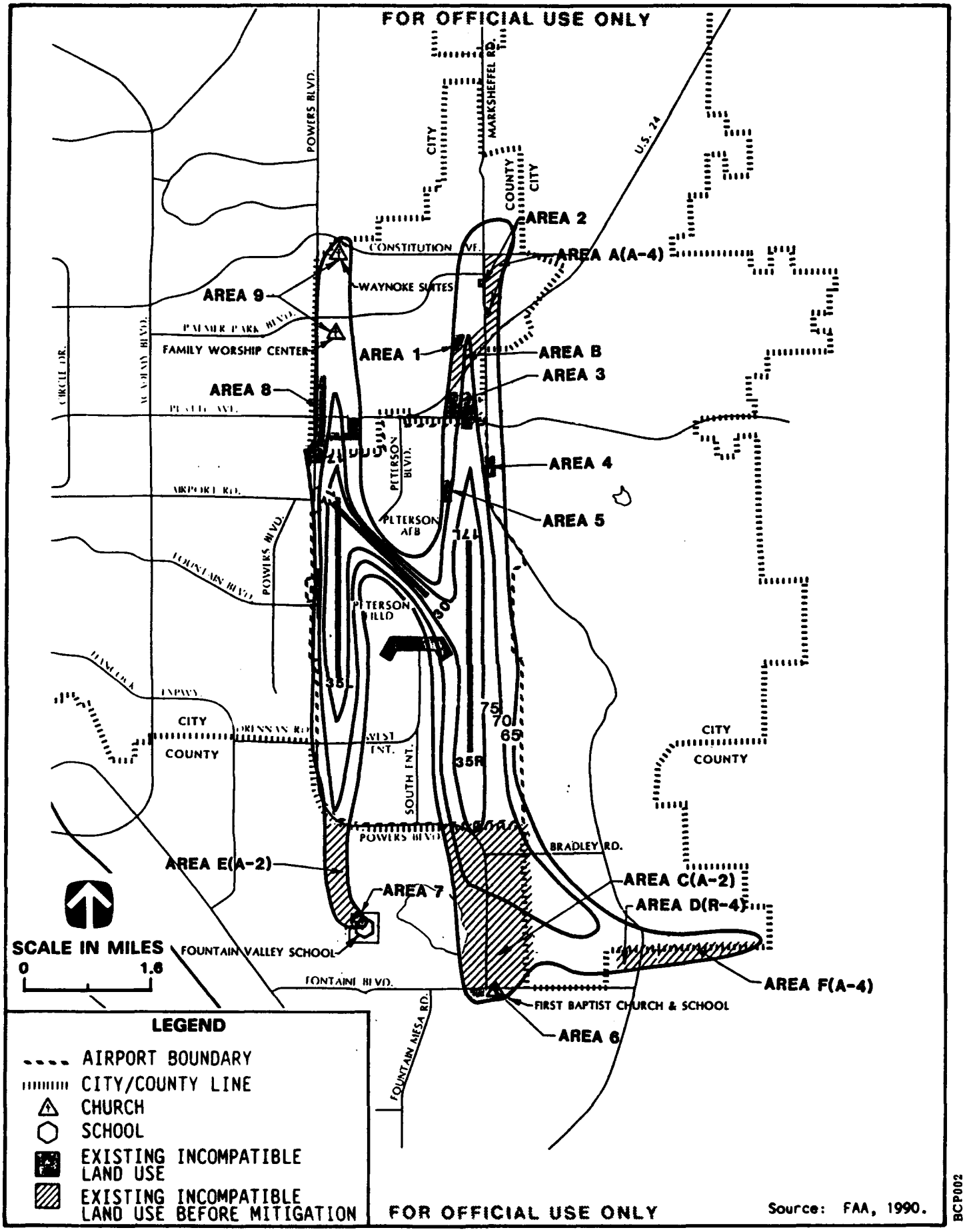

FIGURE 3.5.9-2 1993 Ldn NOISE EXPOSURE MAP WITH NEW RUNWAY AND OPERATIONAL CHANGES, COLORADO SPRINGS MUNICIPAL AIRPORT

Table 3.5.9-1

Population and Land Uses Within Existing 1988 And Projected 1993 Noise Contours[1]

Description	1988 Existing				1993 Projected			
	75+[2]	75-70	70-65	Total	75+	75-70	70-65	Total
ACRES:								
Acres within Contour	1,434	1,926	4,006	7,366	1,856	2,624	6,656	11,136
RESIDENTIAL UNITS:								
Single-Family	8	11	891	910	0	12	32	44
Trailers	0	56	5	61	0	1	175	176
Multi-Family - Total Number of Units	0	0	164	164	0	0	0	0
TOTAL RESIDENTIAL UNITS:	8	67	1,060	1,135	0	13	207	220
Estimated Current Residents[3]	30	181	2,682	3,073	0	35	559	594
NOISE SENSITIVE PUBLIC BUILDINGS:								
Family Worship Center		X		1			X	1
Waynoke Suites		X		1			X	1
Northeast Church of Christ			X	1				0
Mormon Church				0				0
First Baptist Church and School				0			X	1
Fountain Valley School		X		1			X	1
Martin Luther King Jr Elementary				0				0
Health Care Facilities				0				0
Historic Buildings				0				0

NOTES:
[1]The 1993 values assume completion of new runway and subsequent airport operational changes.
[2]L_{dn} Noise Contour
[3]Assumes 2.7 persons/household.

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3.5.10 Biological Resources

3.5.10.1 Vegetation

Both Peterson AFB and Falcon AFB are located within the shortgrass prairie of east-central Colorado. These grasslands are dominated by native grasses such as blue grama (Bouteloua gracilis), buffalograss (Buchloe sp.), western wheatgrass (Agropyron smithii), and needlegrass (Stipa sp.); forbs such as aster (Aster spp.), globe mallow (Sphaeralcea coccinea), butterfly weed (Gaura coccinea), and Russian thistle (Salsola kali var. tenuifolia); and scattered shrubs such as rabbit-brush (Chrysothamnus nauseosus), snakeweed (Gutierrezia sarothrae), saltbrush (Atriplex spp.), and yucca (Yucca glauca).

Livestock grazing and farming are the predominant land uses in this region. Because of the arid climate, vegetation is slow to recover from removal or disturbance, resulting in widespread soil erosion in the region.

3.5.10.2 Wildlife

Habitats in the vicinity of Peterson AFB and Falcon AFB support both small and large mammals, a variety of songbirds and raptors, and many reptiles and amphibians. The proposed project areas at both locations are comprised mainly of the short-grass prairie habitat. The species listed below are those that occur most commonly in the short-grass prairie habitat in this region.

Big game species found occasionally in the short-grass prairie habitats are pronghorn (Antilocapra americana), mule deer (Odocoileus hemionous), and white-tailed deer (O. virginianus). Common large predatory mammals include bobcat (Felis rufus), badger (Taxidea taxus), coyote (Canis latrans), and gray fox (Urocyon cinereoargenteus). Smaller predators include striped skunk (Mephitus mephitus), racoon (Procyon lotor), long-lailed weasel (Mustela frenata) and red fox (Vulpes vulpes).

Supporting the predatory species populations are many species of small mammals including small-footed myotis (Myotis leibii), western pocket mouse (Reithrodontomys megalotis), deer mouse (Peromyscus maniculatus), silky pocket mouse (Perognathus flavus), northern pocket gopher (Thomomys talpoides), black-tailed jackrabbit (Lepus californicus), desert cottontail (Sylvilagus audubonii), white-tailed jackrabbit (Lepus townsendii), thirteen-lined ground squirrel (Spermophilus tridecemlineatus) and perhaps the black-tailed prairie dog (Cynomys ludovicianus).

Avian species occurring in short-grass prairie habitats are mourning dove (Zenaidra macroura), eastern kingbird (Tyrannus tyrannus), western meadowlark (Sturnella neglecta), lark bunting (Calamospiza melanocorys), horned lark (Eremophila alpestris), common nighthawk (Chordeiles minor), and several species of sparrow. Several large raptor species forage in the prairie habitat including the American kestrel (Falco sparverius), red-tailed hawk (Buteo jamaicensis), great horned owl (Bubo virginianus), northern harrier (Circus cyaneus), and turkey vulture (Cathartes aura). Several game birds also occur in the area including scaled quail (Callipepla squamata) and ring-necked pheasant (Pasianus colchicus) and, less commonly, the wild turkey (Meleagris gallopavo).

Two toad species are expected to occur in short-grass prairie habitats in both of the project areas, the plains spadefoot (Scaphiopus bombifrons) and Woodhouse's toad (Bufo woodhousii woodhousii). Otherwise, amphibian species are mostly restricted to the aquatic habitats on Peterson AFB and Falcon AFB. Aquatic habitats consist mainly of artificial ponds for water storage and recreation purposes. No aquatic habitats occur on the proposed project areas at Peterson AFB, but several natural temporary pools occur in the proposed project area at Falcon AFB. Amphibian species expected to occur in these ponds include the tiger salamander (Ambystoma tigrinum) and plains leopard frog (Rana blairi).

Reptiles are fairly abundant in short-grass prairie habitats in the vicinity of the bases. Common snakes include the prairie rattlesnake (Crotalus viridis viridis), bullsnake (Pituophis melanoleucus savi), and western plains garter snake (Thamnonphis radix haydeni). The eastern red-lipped prairie lizard (Sceloporus undulatus erythrocheilus) and the prairie sixlined racerunner (Cnemidophorus sexlineatus viridis) are the most common lizard species.

3.5.10.3 Threatened and Endangered Species

Several sensitive plant species and communities occur in El Paso County, but none are expected to occur in the vicinity of the proposed project areas. The black-footed ferret (Mustela nigripes), a specialized predator of prairie dogs, has been nearly extirpated from the shortgrass prairie as a consequence of prairie dog control programs and is a federally-listed endangered species. Although no ferrets have been recently sighted in El Paso County, the predominant short-grass prairie habitat could support this species. The U.S. Fish and Wildlife Service (USFWS) indicates that actions detrimental to prairie dogs, or their habitat, could adversely affect black-footed ferrets. USFWS guidelines specify that if prairie dogs are likely to be affected and the combined area of prairie dog towns within a 4.5-mile radius of the affected area totals more than 250 acres, surveys for black-footed

ferrets should be conducted according to prescribed methods. If prairie dog towns are located within the project project areas, surveys for the black-footed ferret will be conducted.

The bald eagle, federally listed as endangered, is an infrequent visitor to the Peterson AFB and Falcon AFB region. The lack of feeding areas, night roosts, and diurnal perches in the areas limit the activities of this species to temporary stays during the winter period. The federal and state-listed endangered peregrine falcon (Falco peregrinus) is not expected to be a resident within the region. Cliff or escarpment nest sites and adequate hunting areas do not occur within the areas near the bases. As with the bald eagle, only occasional migrating individuals are expected to occur within the proposed project areas on Peterson AFB and Falcon AFB.

Because of the lack of perennial streams in the proposed project areas, the greenback cutthroat trout and the Arkansas darter (Etheostoma cragini) are not expected to occur. The greenback cutthroat trout is listed as endangered by both the federal government and the State of Colorado. The Arkansas darter is listed as endangered by the State. Critical habitats designated by federal agencies do not occur within 50 miles of the Peterson AFB.

3.5.10.4 Wetlands

Wetland habitats including riparian systems of arid and semiarid regions like east-central Colorado, are valuable wildlife habitats that have been designated by the USFWS for preservation, and where possible, rehabilitation. Wetland habitats in the region of Peterson AFB and Falcon AFB include intermittent and perennial streams, artificial pools and hydrological impoundments, and temporary surface pools in the prairie. Wildlife using these water sources includes large and small mammals, songbirds and waterfowl, as well as reptiles and amphibians.

Although wetland habitats occur on Peterson AFB, none are located near the proposed project areas. The wetlands occuring onbase are artificial recreational ponds located within the base golf course.

Several natural temporary pools occur in the proposed project area east of Falcon AFB in the short-grass prairie habitat. These pools are slight depressions in the grassland which catch and hold rainwater during the spring season. These shallow pools may support plant species adapted to temporarily flooded conditions such as water spike rushes (Eleocharis spp.), sedges (Carex spp.), and knotweed (Polygonum spp).

3.5.11 Cultural and Paleontological Resources

3.5.11.1 Prehistoric Resources

Prehistoric site types that occur in the area include habitation sites, camps, hunting stations, plant processing sites, buffalo kills and butchering sites ranging from the Paleoindian period (10,000-5,000 B.C.) to the Late Ceramic or Protohistoric period (A.D.1550-A.D.1750). Most of the sites in the region represent the Ceramic stage (A.D. 200-A.D.1750).

Approximately 84 percent of Peterson AFB has been inventoried for cultural resources. No prehistoric sites were identified and only two isolated finds have been recorded on the base. However, the recently acquired lease amendment/option areas in the eastern portion of the base have not yet been surveyed for cultural resources.

A proposed program option area occurs east of Peterson AFB in Sections 16, 21 and 28 (Township 14 South, Range 65 West) (Figure 3.5-2). Several cultural resources surveys have been conducted in this area. A literature search and reconnaissance study was completed for the Banning-Lewis Ranch planned development. Field reconnaissance was conducted on small selected parcels in the Banning-Lewis Ranch project area; however, none of the reconnaissance areas are located in the current proposed program areas. Only one prehistoric site, a small Early Ceramic period lithic scatter was recorded on a terrace of Jimmy Camp Creek near the proposed program areas. A cultural resources inventory may be conducted on selected offbase parcels adjacent to Peterson AFB.

One square mile or about 16 percent of Falcon AFB has been inventoried for cultural resources. A survey was conducted prior to establishment of the base. No prehistoric sites were identified; however, six isolated finds were recorded. A cultural resource survey may be conducted on selected parcels in section 25, east of the previously surveyed area.

Several Native American groups including Plains Apache, Shoshone, Comanche, Ute, Arapaho, Kiowa and Cheyenne, historically occupied or traversed the general area around Colorado Springs. Some archaeological sites or features such as burials or vision quest locations may be encountered during inventory and may be of concern to Native American groups.

3.5.11.2 Historic Resources and Structures

The earliest use of the area around Colorado Springs was by Spanish, French and American fur traders and explorers beginning in the early 1800s. Several historic trails used by the fur traders converge in the general area including the north-south trending Divide Trail along Jimmy Camp Creek.

Coal mines and small mining communities such as McFerran (1888-1896) were established in the region in the 1860s to exploit the coal seams in the Upper Cretaceous Laramie Formation. In the 1880s, several railroads and numerous rail spurs connecting the coal mines and mining communities to Colorado Springs were built in the area. Sheep and cattle ranches were established in the general area in the late 1880s. These ranches were later divided into homesteads but eventually became large ranch holdings after the 1930s.

Most of the historic resources in the area are archaeological sites or standing structures associated with the early transportation routes, coal mining, frontier settlement and the sheep or cattle industry. Sites include historic trails, gravesites, coal mines, mining communities, railroad grades, homesteads, schools, cattle camps, line shacks, lambing pens ranch complexes and windmills.

Five standing structures from the original Colorado Springs Municipal Airport (1926-1941) have been recorded at Peterson AFB. The buildings represent a combination Art Deco/Art Modern architectural style and have been recommended as eligible for listing on the National Register of Historic Places (NRHP). Military use at Peterson AFB began in 1942 and continued through World War II. In 1945, the air field was returned to the City and most of the World War II-era buildings were razed at that time. Peterson Air Field was used for military activities from 1948 to 1949 and 1951 to the present. Most of the buildings on the base were built within the last 50 years and are not considered historic resources.

A historic railroad grade was recorded during a small survey conducted in 1984 at Peterson AFB 1984. The railroad grade represents the remnants of connecting spur built by the Denver and New Orleans Railroad Company in 1882. The railroad spur was abandoned in 1917. The railroad grade lacks physical integrity and was recommended as not eligible for the NRHP.

Numerous historic resources have been identified in the Banning-Lewis Ranch project area east of Peterson AFB. These sites include portions of the Divide Trail, several coal mines, old railroad grades,

mining communities and camps, homesteads and ranches. Several historic sites have been identified through archival research in proposed program areas in Sections 16, 21 and 28. The Jimmy Camp coal mine in operation from 1929 to 1941, consisted of four adits located in Section 16. All four adits were backfilled and reclaimed before 1984 during the Colorado Inactive Mine Program. Portions of the Denver and New Orleans Railroad (1882-1917) also occur in Sections 16 and 21.

Only one historic site has been previously identified at Falcon AFB. The site is a livestock watering complex consisting of a windmill, pumphouse, modern well, and stock tanks. This complex may have been built as early as the 1920s; however, it is considered not eligible for the NRHP. Falcon AFB was established in 1982; none of the onbase structures are considered historic resources because they do not meet the 50-year requirement.

3.5.11.3 Paleontological Resources

A paleontology study was conducted for the Banning-Lewis Ranch project. Four formations from the Upper Cretaceous and Lower Tertiary have surface exposures along Jimmy Camp Creek and all are fossiliferous. Pierre Shale consists of silty shales, siltstones, and sandstones and contains plant remains, pelecypods, ammonites and baculites. The Fox Hills sandstone has mostly shale in the lower portions and sandstone in the upper portion. The Fox Hills contains pelecypods, dinosaur bone, fish and plant remains. The Laramie Formation consists of sandstones, shales and coal beds; paleontological materials include plant and marine animal remains and dinosaur bone.

The Denver Formation is a series sandstones, siltstones, shales and conglomerates and contains plant remains, early mammals, turtles, crocodiles, and dinosaur bone. The Denver Formation represents the contact between the Mesozoic and Cenozoic eras and is important because it provides a diverse floral and faunal assemblage including both dinosaurs and early mammals.

Four paleontological localities have been identified in the proposed program areas in Sections 16 and 21. The Fox Hills sandstone exposures in these localities have yielded trace fossils, burrows of near-shore crustaceans, molluscs, gastropods, a pleisosaur tooth, and fish vertebrae. The Laramie Formation exposures contain petrified wood, leaf fragments, an unidentified dinosaur bone fragment. The Denver Formation exposures in these localities contain unidentified dinosaur bone fragments.

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Geological formations with surface exposures near Falcon AFB includes the Denver Formation which represents the contact between the Mesozoic and Cenozoic eras and contains both dinosaur and early mammal remains.

3.6 KIRTLAND AIR FORCE BASE, NEW MEXICO

Kirtland Air Force Base (AFB) is located in Bernalillo County in north-central New Mexico, adjacent to the City of Albuquerque (Figures 3.6-1 and 3.6-2). The host organization at this Military Airlift Command (MAC) base is the 1606th Air Base Wing (ABW). Major tenants at Kirtland AFB include the 1550th Combat Crew Training Wing, the Department of Energy (DOE) Sandia National Laboratory, and the Air Force Systems Command (AFSC) Space Technology Center.

The base is located adjacent to the Albuquerque International Airport, and the runway facilities are jointly used by the base and the airport. Kirtland AFB covers an area of approximately 52,681 acres; the Air Force controls 44,017 acres (25,497 acres are fee-owned, 18,439 acres are public domain lands, and 82 acres are easement); the DOE controls 7,522 acres (2,927 acres are fee-owned, and 4,595 acres are public domain); and the City of Albuquerque owns 1,141, acres including 1,110 acres of runways/taxiways.

Kirtland AFB and the non-Department of Defense (DOD) tenant units employed 4,847 military personnel, 1,249 National Guard and Air Force Reserve personnel, 3,128 appropriated fund civilian personnel, 2,826 other civilian personnel, and 8,664 contractor personnel at the end of fiscal year (FY) 1989. Approximately 52 percent of the military personnel live on the base, and 48 percent live in communities near the base. The City of Albuquerque, located adjacent to the base on the north and west, is the host community for Kirtland AFB. Most of the personnel living offbase reside in Albuquerque, but some personnel live in other smaller communities in the area.

History. Kirtland AFB was named after Colonel Roy C. Kirtland, a military aviation pioneer who learned to fly with the Wright Brothers. Kirtland AFB began as a private airfield built in the 1920s. In the late 1930s and early 1940s, the municipal airport for Albuquerque was converted into two military complexes: Kirtland Air Field was established in 1939 and the Sandia facility in 1942. The Sandia Corporation (now the Sandia National Laboratories) was placed on the eastern side of Kirtland Air Field. Manazano Base was constructed in 1947 as an annex to Sandia Base. In 1948, Kirtland Field became Kirtland AFB and in 1971, Sandia Base, Manazano Base, and Kirtland AFB merged and became known as Kirtland AFB.

Mission. Kirtland AFB is the fifth largest Air Force Base and the largest base in MAC. The basic mission of Kirtland AFB is to support research and development and the training of pararescue

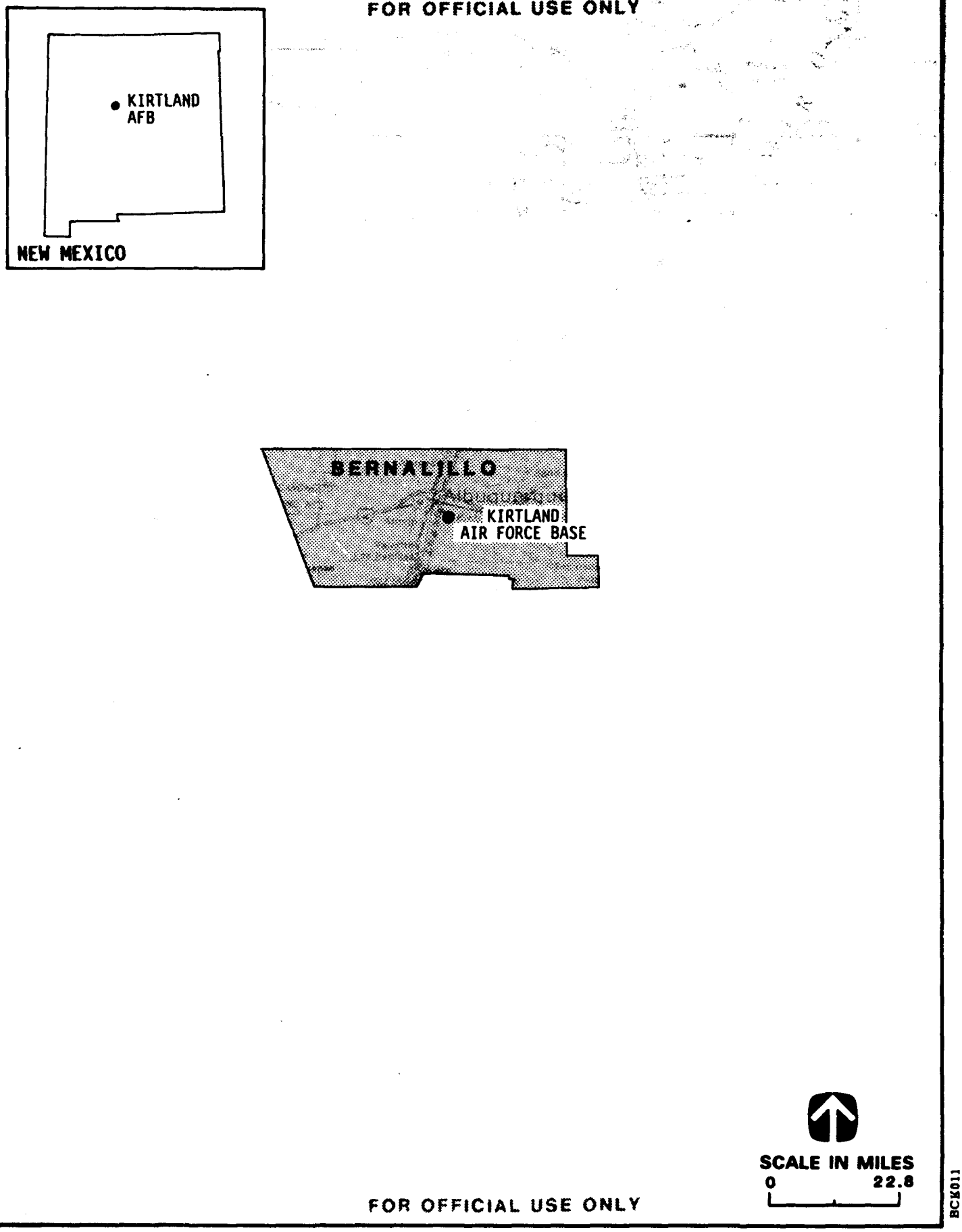


FIGURE 3.6-1 REGIONAL VICINITY MAP FOR KIRTLAND AFB, NEW MEXICO

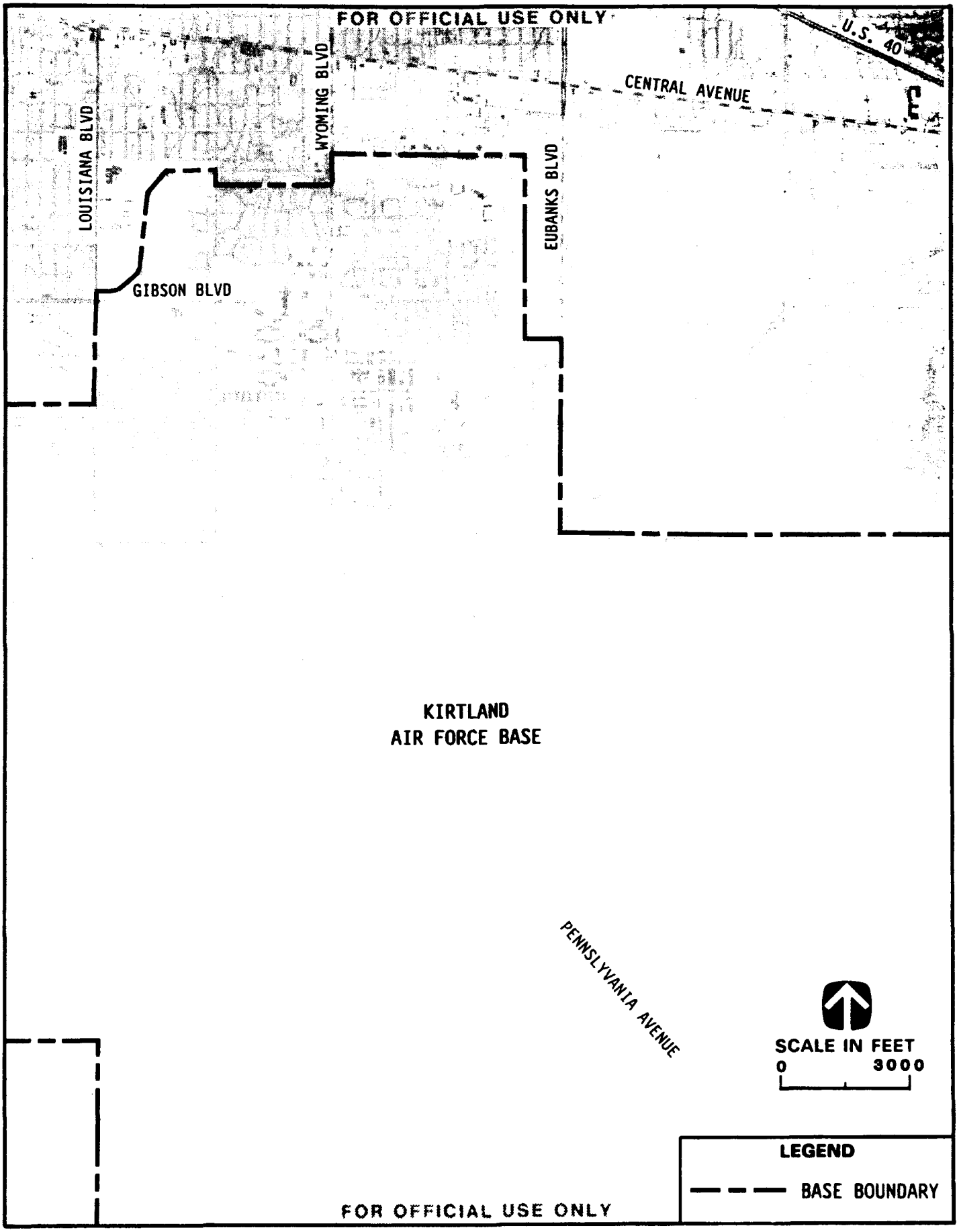


FIGURE 3.6-2 LOCAL VICINITY MAP FOR KIRTLAND AFB, BERNALILLO COUNTY, NEW MEXICO 3.6-3

medics. The support function for the base is performed by the 1606th ABW. The 1606th ABW mission is to supply medical care, housing, civil engineering, fire protection, administrative support, personnel services, legal assistance, transportation, security, law enforcement, pay, accounting, and funds management.

The 1550th Combat Crew Training Wing operates the consolidated Air Force helicopter training school for all Air Force helicopter crew members in conjunction with a specialized training school. The wing also provides basic and advanced pararescue qualification training.

Other organizations located at Kirtland AFB include the Contract Management Division, the Air Force's acquisition contract management agency, and the Space Technology Center under the command of Space Systems Division. The Space Technology Center directs three laboratories: the Weapons Laboratory at Kirtland AFB; the Rocket Laboratory at Edwards AFB, California; and the Geophysics Laboratory at Hanscom AFB, Massachusetts. The Weapons Laboratory is responsible for non-conventional weapons research, development of high energy laser technology and nuclear weapon technology.

The Department of Energy's Albuquerque Operations Office, including the Sandia National Laboratory, conducts research and development, testing, stockpile surveillance, and the transportation of nuclear materials.

3.6.1 Community Setting

3.6.1.1 Population and Employment

Population. The population of Bernalillo County accounts for 32 percent of the people living in New Mexico. In 1990, the population in the Albuquerque Metropolitan Statistical Area (MSA) was estimated at 538,970. The area's population has grown by 26.2 percent since 1980 when it totalled 427,100. During the past decade, the area has grown at an annual rate of 2.4 percent, after having grown at 3.1 percent a year during the 1970s.

Employment. In 1990, employment in the Albuquerque MSA was estimated at 253,920. With a labor force of 268,900, the unemployment rate is 5.9 percent. The largest employment sectors are services (27.9%), wholesale/retail (25.7%) and government (19.7%). The manufacturing sector accounts for

only 8.6 percent of the area's employment. The largest individual employers in Bernalillo County are the Albuquerque Public School System, the Sandia National Laboratory, and Kirtland AFB.

3.6.1.2 Housing

Kirtland AFB maintains 2,134 family quarters, 50 bachelor officer quarters, and 2,077 enlisted quarters. The base also has 580 transient quarters and 58 guesthouses. Housing construction onbase has been geared toward maintaining quality living quarters and not to increase the total number of units.

In the civilian housing market, the average home sells for $96,400 and rents for $428. The average price of a home has risen by 45 percent since 1980, and average rental costs have gone up by 18 percent over the same period. Housing costs in Albuquerque are very close to the national average. The average vacancy rate has risen from 4.2 percent in 1980 to 7.8 percent, largely because of the housing surplus which has resulted from the construction boom of the mid 1980s. During this time, 47,242 units were added to the housing stock. Single-family homes make up the majority of the city's housing units.

3.6.1.3 Education

The Albuquerque Public School District has a total enrollment of 84,700 students, attending 11 high schools, 23 junior high schools, 75 elementary schools, and 6 alternative schools. It is the twenty-seventh largest school district in the United States. Additional baseline information will be provided following receipt of information for school district.

3.6.1.4 Community Services

Fire and police department services are provided to area residents by both the City of Albuquerque and Bernalillo County. The city fire department handled over 30,000 emergency calls last year, and total expenditures on fire and police protection in 1989 represented over 33 percent of the City's operating budget. Within the Albuquerque MSA, the number of public service personnel per 1,000 residents is 42 local government employees per 1,000 residents; 24 state government employees per 1,000; 2.5 federal government employees per 1,000.

Medical facilities in the Albuquerque area consist of ten hospitals with 2,907 beds. In addition, there is a Veterans Administration Hospital at Kirtland AFB and a large medical center at the University of New Mexico.

3.6.2 Land Use and Aesthetics

The land use area at Kirtland AFB comprises the northwest area of the base including the eastern half of the main cantonment area. The main cantonment area will be referred in the land use analysis as the "Base Support Area." The Base Support Area contains both existing facilities and designated growth areas.

3.6.2.1 Existing Land Use

Land uses in the vicinity of the base include the Albuquerque International Airport which is owned and operated by the City of Albuquerque, including the four runways, and is located west of the base. The base uses the airport facilities, including taxiways to Air Force-owned facilities along the flightline (e.g., hangers and hot cargo pads).

Interstate 25 and Interstate 40 are located west and north of the base, respectively. The City of Albuquerque generally borders the base to the north and west. Access to base is primarily via the Gibson Gate, and Wyoming Gate on the north side of the base and the Eubank Gate on the east side.

The land use study considers nine classifications. The land use study area covers approximately 11,000 acres and is bounded by Zuni Road - U.S. Route 66 (Central Avenue) to the north; San Pablo Street (including logical extensions) to the west; the south boundaries of Sections 15, 16 and 17; and the logical extension of Bernalillo Place/Tramway Boulevard forms the boundary (Figure 3.6-2).

Residential. The east half of the Base Support Area has accompanied and unaccompanied residential base housing located in the northwest corner of the study area. The residential use continues offbase to the north boundary areas, west of Moon Street within the City of Albuquerque. The Base Comprehensive Plan has planned for the future realignment of Gibson Boulevard which would require the demolition of a portion of the base housing along the northern base boundary. The Base Comprehensive Plan also has planned a housing area for general officers' quarters on a site bounded by the existing Officer's Club and the current base boundary near Eubank Boulevard.

Other residential land uses within the study area are located in the northeast corner of the study area on private land located offbase. Two mobile home parks are located approximately 0.5 miles east of the Eubank Gate and residential use extend eastward to the Four Hills Community of the City of Albuquerque. A mixed residential/industrial/commercial use located in a developed strip parallel to U.S. Route 66 (Central Avenue) is the other residential neighborhood in the study area.

Public/Quasi Public. Public/quasi public use is limited to the Wherry and Sandia Elementary Schools, the National Atomic Museum, the Public Service Company of New Mexico switching station, water tanks, and a Albuquerque Public Schools school bus maintenance and storage yard located north and east of the base. The Base Comprehensive Plan has planned for the expansion of the base by approximately 86 acres of DOE-owned land. The planned uses of the site would include the relocation of the National Atomic Museum and Air Rescue Museum, the construction of a conference center, and the future siting of a commuter light rail station and right-of-way.

Cantonment. The existing base facilities designated administration, community (excluding public schools), and medical in the Base Comprehensive Plan have been combined for study purposes into the cantonment designation of the land use analysis. The majority of the cantonment area designation are concentrated within Base Support Area, generally consisting of Air Force uses; however, a portion of these uses are associated with the Sandia National Laboratories, within DOE Area I. Cantonment uses outside the Base Support Area consist of pump houses, water tanks, security police obstacle course, antenna fields, and a convey parking area.

The Base Comprehensive Plan designates sites for future uses including the new building headquarters for the Air Force Inspection and Safety Center (AFISC). AFISC is being relocated from Norton AFB in San Bernardino, California to a site north of the Eubank Gate and DOE Area I. AFISC would require a 30-acre site for a crash-site laboratory. One site under consideration is located between the base golf course and riding club. A contractors complex and a new Eubank Gate visitors center would be located on a base expansion area currently owned by DOE, north of the existing Eubank Gate. An expansion of the Air Force Test and Evaluation Center is currently under construction and a pharmacy, Class V store, and laundry pick-up and clothing store are planned to be constructed next to the existing BX.

Industrial. Offbase industrial uses are located in a district north of the base and south of Central Avenue (U.S. Route 66). A new industrial park is being developed east of the Eubank Gate, abutting the east side of Eubank Boulevard. Industrial type uses within the Base Support Area are located

within an industrial district shared by the Air Force and Sandia National Laboratories. The Sandia National Laboratories facilities are located within DOE Area I, and occupy most of the industrial district, with Air Force uses to the west and south.

The Sandia National Laboratories administers several DOE facilities designated industrial at the DOE Areas III, IV and V, located south of the Base Support Area. DOE Area V contains nuclear reactors and has an 3-kilometer Exclusion Area for safety. As a result, Sandia Laboratories has the authority to govern all land use activities including the removal or exclusion of personnel and property. The exclusion area can be crossed by roads or railroad with appropriate controls to address emergencies, but residences are prohibited. A six-kilometer low-population zone also extends beyond the Area V reactors, and does permit residences and other types of land use. The intent of this zone is to establish and maintain appropriate protective measures to be taken on the behalf of the residents in the event of an accident.

Air Force industrial uses vary greatly. The facilities in the Base Support Area generally are composed of developed building complexes and associated parking. Outside the Base Support Area, developed industrial facilities consist of the trestle facility, and its associated support facilities, training areas; burial sites; developed industrial buildings; and a sewer plant scheduled for future abandonment.

The Interservice Nuclear Weapons School (INWS), administered by the Air Force, consists of eight nuclear accident training sites (numbered from 1 to 8). The sites are located in a crescent-shaped band located 600 to 3,500 feet from the base golf course. The INWS has placed sites 5, 6, 7 and 8 (located south of Pennsylvania Avenue) on inactive status. The training sites are used for the training of personnel for alpha radiation monitoring and decontamination of simulated nuclear weapons accidents.

Burial sites are controlled by the Air Force, DOE, and Veterans Hospital. The Air Force manages the inactive radioactive waste burial (RB) site Neill, located within the defined area of the base riding club. RB-11 was formerly used for disposal of radioactive test animals and small amounts of acids, mercury, cyanides, and silver. The site is marked with radiation warning signs within an unfenced site. The DOE manages the inactive RB-1 site located in DOE Area 11.

The Air Force manages four nonradioactive sanitary landfills (Lf) within the study area. Lf-02 and Lf-03 are located on the western end of the study area, west of Pennsylvania Avenue. The sites contain general refuse and are closed. Lf-04 was formerly operated jointly by the City of

Albuquerque and the Air Force for disposal and burial of general refuse. The adjoining site, Lf-06, is an active site operated by the Air Force for disposal of general refuse. The Veterans Administration Hospital formerly operated a temporary landfill in order to dispose of hardfill from the demolition of old hospital facilities. The site is closed and the Air Force has posted the area prohibiting further dumping.

The Air Force also operates an igloo area south of Pennsylvania Avenue between training site 8 and a Sandia Laboratories facility. The igloo area is used to store hazardous wastes prior to disposal. A cobalt-60 laboratory with surrounding berms is located on the northern corner of the fenced quadrangle of the base riding club.

Ordnance Related. Ordnance-related facilities consist of the Manzano Area, DOE Area 11, the railroad facilities, and a future weapons storage area. The explosives safety zones for these facilities vary.

Flight Line. The flightline designation within the study area would include the clear zone and Approach Zone No.1 (APZ-1) as designated in the Base Comprehensive Plan. The flight line designation overlays across the southern part of the Base Support Area on the north and DOE Areas 1 and 11 in the south. Most of the land within the clear zone and APZ-1 is undeveloped open space.

Recreation. Most of the Kirtland AFB recreational facilities are scattered within the Base Support Area. Outside the Base Support Area, recreational facilities include of a sheet range, the base golf course, and the base riding club.

Open Space. Open space lands are generally located south and west of the Base Support Area (both within and outside the base). Within the Base Support Area, open space land is primarily located within the base housing areas.

Fault Zones. A fault zone of the Sandia Fault (as defined by Grant), is located between the golf course and riding club. This fault has been delineated for planning purposes.

3.6.2.2 Land Use Policies and Plans

The land occupied by Kirtland AFB is addressed under the Kirtland AFB Base Comprehensive Plan. The private land located north and east of the base is considered under the Albuquerque and

Bernalillo County Zoning Ordinances. The adjoining private land to the north and east of the base; located within the study area, are within the jurisdiction of the ordinances.

The land located north of the base from the San Pablo Street east of Wyoming Boulevard is generally zoned R-2 Residential or RT Residential Zone which permits houses, town houses, and low density apartments. The land located between Wyoming Boulevard and Eubank Boulevard is generally zoned C-2, Community Commercial Zone; C-3, Heavy Commercial Zone; and SU-1, Special Use Zone. The C-2 zone provides for suitable sites for commercial activities and certain types of outside storage. The C-3 zone provides for C-2 uses, wholesale commercial uses, and some light industrial uses. The SU-1 zone provides for uses which are special because of infrequent occurrence, effect on surrounding property, safety, hazard, or other reason.

The land east of Eubank Boulevard to Juan Taho Boulevard and north of Southern Avenue, is composed of a mixture of C-2, C-3, and O-1, office and institutional zone. The O-1 zone provides for office, service, institutional, and dwelling uses. The land south of Southern Avenue is essentially undeveloped with the exception of a developing industrial park near the Eubank Gate at Kirtland AFB. The Industrial Park is zoned SI-1 for industrial purposes. The Sandia Research Park is being developed at this location.

The surrounding land is zoned SU-1 for planned residential, public parks and recreational area, two elementary school sites, one junior high site, and one senior High site. The Albuquerque Public School system, the owner of 480 acres of this land, is currently preparing a specific plan upon which specific zoning will be designated. The remaining land in this area is zoned SU-1 for the mobile home park and R-D in Tijeras Canyon developed under the Four Hills West Specific Plan 81-5 which permits a mixture of dwelling unit types and incidental-related commercial activities. The R-P zone continues east from Juan Tabo Boulevard to the Four Hills Village consisting of existing single family homes and the Four Hills Country Club Golf Course (zoned SU for golf course). The Four Hills Village is located high on an alluvial fan and overlooks the base, including the Manzano Area.

3.6.2.3 Visual Resources

Albuquerque is surrounded by the high desert to the north and south, volcano escarpments to the west, and the Sandia Mountains to the east. The Manzano Mountains, Jemez Mountains, and Mount Taylor are visible in the distance. The city is located at an altitude of 5,300 feet above sea level.

Kirtland AFB and Albuquerque International Airport are surrounded by relatively flat terrain to the north, south, and west, and foothills to the east. The onbase facilities consist of low-level structures with well controlled and irrigated landscaping. The area surrounding the base consist of old residential housing and businesses in a well-preserved state.

3.6.3 Transportation

3.6.3.1 Traffic

Existing Conditions. Regional access to the base is provided by Interstates 25 and 40. Local access to the base is provided by Gibson Boulevard and five entrance/exit gates. The Eubank Boulevard gate provides access to the base from the east; the Wyoming Boulevard gate provides access from the north; and the Carlisle Boulevard gate, Truman gate (at San Mateo Boulevard), and Gibson Boulevard gate (at Louisiana Boulevard) provide access from the north along Gibson Boulevard.

The Albuquerque area is served by two major interstate highways, Interstate 40 and Interstate 25. These two highways intersect in the central area of the city and provide access to all major streets. Local transportation is primarily dependent on surface systems, with the automobile being the dominant mode. A public bus system provides service throughout the city. Local governmental agencies and commissions have studied two potential transportation corridors that would serve the southeastern part of Albuquerque. The Gibson Corridor route was jointly established by Kirtland AFB and local and state governments in 1980. This arterial will greatly improve onbase congestion and relieve city traffic volumes generated by the base.

Gibson Boulevard is a six-lane principal arterial with limited access extending from Broadway Boulevard (west of the base) to Louisiana Boulevard. Three of the five gates to the base are off of Gibson Boulevard. It is expected that Gibson Boulevard extension will be constructed to Juan Tabo Road east of the base by the Year 2010.

Carlisle Boulevard is a four-lane minor arterial extending from south of Gibson Boulevard north to Montgomery Boulevard. North of Gibson Boulevard, Carlisle Boulevard primarily serve residential areas. San Mateo Boulevard is a four-lane road just north of Gibson Boulevard, widening to a six-lane principal arterial with limited access from just south of Central Avenue north to Interstate 25.

Louisiana Boulevard is a six-lane principal arterial extending from south of Gibson Boulevard north to Spain Road. Wyoming Boulevard is a six-lane principal arterial extending from inside Kirtland AFB north to Paseo del Norte. Eubank Boulevard is a four-lane principal arterial south of Central Avenue, widening to six lanes north of Central Avenue. Eubank Boulevard extends from Pennsylvania Avenue inside the base north to Academy Road.

Pennsylvania Avenue connects the Manzano Area to the main part of the base where the traffic is dispersed during peak periods to various entry gates. Traffic on Pennsylvaina Avenue in the vicinity of the Manzano Area is minimal; however, Pennsylvania Avenue is a convoy route leading to the munitions storage area at Manzano and, as such, is subject to periodic traffic disruption. Offroad parking areas are provided for vehicles that are on Pennsylvaina Avenue during the convoy maneuver.

Existing Traffic Volumes. The 1988 average daily traffic for offbase roads in the vicinity of the base is presented in Table 3.6.3-1. Traffic counts conducted in March 1988 showed a total of 24,800 and 21,800 vehicles per day at the Wyoming and Gibson gates, respectively. Traffic problems on the base are generally confined to the peak hour situations where major streets, including Gibson Boulevard, Wyoming Boulevard and Pennsylvania Avenue north of "O" Street) become congested. The base has implemented staggered work schedules and one-way street systems in certain areas of the base to minimize congestion, particularly during the peak hour periods. Traffic rapidly diffuses throughout the major streets and highways in the Albuquerque area outside the base.

Operating Conditions on Roadways. Table 3.6.3-1 presents estimated roadway capacities and volume-to-capacity ratios for roadways in the vicinity of the base. Existing daily traffic volumes were compared to Level of Service (LOS) E roadway capacities to arrive at a volume-to-capacity ratio and corresponding level of service of operation. Table 3.6.3-1 is a comparison of daily traffic volumes and volume-to-capacity ratios for selected roadway segments. All roadway segments analyzed currently operate at LOS B or better.

Projected daily traffic volumes for the year 2010 for roadways in the immediate vicinity of the base are presented in Table 3.6.3-2. These projections do not assume any major increase in activity at Kirtland AFB. The year 2010 daily traffic volumes were compared to LOS E roadway capacities to arrive at a volume-to capacity ratio and corresponding level of service of operation. Table 3.6.3-2, presents a comparison of daily traffic volumes and volume-to capacity ratios for selected roadway segments. Several roadway segments are anticipated to operate at LOS E in the year 2010. including

Table 3.6.3-1

Comparison of Daily Traffic Volumes to Estimated Daily Roadway Capacities For Road Segments in the Vicinity of Kirtland AFB, 1988

Road Segment	Average Daily Traffic	Roadway Capacity	V/C Ratio[1]	LOS[1]
Gibson Boulevard				
West of Carlisle	37,400	54,000	0.69	B
Carlisle to San Mateo	36,200	54,000	0.67	B
San Mateo to Louisiana	32,800	54,000	0.61	B
Carlisle Boulevard				
North of Gibson	8,300	36,000	0.23	A
South of Central	9,600	36,000	0.27	A
San Mateo Boulevard				
North of Gibson	18,400	36,000	0.51	A
South of Central	29,700	54,000	0.55	A
Louisiana Boulevard				
North of Gibson	21,800	54,000	0.40	A
South of Central	23,700	54,000	0.44	A
Wyoming Boulevard				
South of Central	24,800	54,000	0.46	A
Eubank Boulevard				
South of Central	13,700	36,000	0.38	A

NOTES: [1]V/C represents the ratio of Average Daily Traffic Volumes to Capacity.
[2]LOS = Level of Service.

SOURCE: Mi..e Rio Grande Council of Governments 1990

Table 3.6.3-2

Comparison of Daily Traffic Volumes to Estimated Daily Roadway Capacities For Road Segments in the Vicinity of Kirtland AFB Year 2010

Road Segment	Average Daily Traffic	Roadway Capacity	V/C Ratio[1]	LOS[1]
Gibson Boulevard				
West of Carlisle	49,500	54,000	0.92	E
Carlisle to San Mateo	47,100	54,000	0.87	D
San Mateo to Louisiana	47,200	54,000	0.87	D
Louisiana to Wyoming	42,500	54,000	0.79	C
Wyoming to Eubank	36,800	54,000	0.68	B
East of Eubank	36,500	54,000	0.68	B
Carlisle Boulevard				
South of Gibson	5,800	36,000	0.16	A
Gibson to Central	12,100	36,000	0.34	A
San Mateo Boulevard				
South of Gibson	33,800	36,000	0.94	E
Gibson to Central	23,900	54,000	0.44	A
Louisiana Boulevard				
South of Gibson	30,400	54,000	0.56	A
Gibson to Central	17,200	54,000	0.32	A
Wyoming Boulevard				
South of Gibson	33,800	54,000	0.63	B
Gibson to Central	40,300	54,000	0.75	C
Eubank Boulevard				
South of Gibson	33,600	36,000	0.93	E
Gibson to Central	30,900	36,000	0.86	D

NOTES: [1]V/C represents the ratio of Average Daily Traffic Volumes to Capacity.
[2]LOS = Level of Service.

SOURCE: Middle Rio Grande Council of Governments 1990

Gibson Boulevard west of Carlisle Boulevard, San Mateo Boulevard south of Gibson Boulevard, and Eubank Boulevard south of Gibson Boulevard.

3.6.4 Utilities

The City of Albuquerque is identified as the area where municipal and public utility services may be directly or indirectly affected by the proposed action.

3.6.4.1 Water Supply

The City of Albuquerque provides potable water to its residents and Kirtland AFB from groundwater sources. The City's water supply is pumped from the aquifer contained within the Rio Grande Basin. This aquifer is estimated to contain 2.8 billion acre-feet of water. Once the water is pumped out, it is stored in enclosed reservoirs, is chlorinated, fluoridated, and distributed. The City's system presently has a capacity of 267 million gallons per day (MGD). In 1989, peak demand was 210 MGD, or 79 percent of the system operating capacity. Projected population growth will increase demands to 236.7 MGD by 1996 and 138.3 MGD by 1997 based on a per capita demand of 247 gallons per day per capita (gpcd).

The City supplied 0.8 MGD to Kirtland AFB in 1989. Approximately 3.98 MGD was pumped by Kirtland AFB from wells located on the eastern portion of the base. Kirtland AFB is limited by a court order to a pumped water allocation of 2,085 million gallons annually. Per capita demand is approximately 160 gpcd. The demand is expected to be remain about the same.

The Manzano Area water system capacity is 700 gallons per minute and is obtained from the Kirtland East high pressure distribution system, which has capacity of delivering 6,450 gallons per minute at a system pressure of 25,100 pounds per square inch. There are four reservoirs at the Manzano Area with a storage capacity of 314,000 gallons.

3.6.4.2 Wastewater

Wastewater generated by the City of Albuquerque and Kirtland AFB is processed by the City at a combined trickling filter and activated-sledge treatment plant with a capacity of 60 MGD. Wastewater water flows are 55 MGD, and the average daily flows are projected to increase to 62.77 MGD by 1996 and 63.5 MGD by 1997. Per capita flow is estimated to be 110 gpcd. Future expansion

of the treatment plant will provide approximately a 72 MGD capacity. Kirtland AFB presently contributes an average daily wastewater flow of 2.27 MGD to the City's treatment facility; this is expected to remain constant. Per capita flow is estimated to be 90 gpcd.

3.6.4.3 Solid Waste

The Albuquerque Solid Waste Management Department is responsible for solid waste collection and disposal. The city currently generates 1,100 tons per day (T/day) of solid waste and disposes of it at two sanitary landfills. The landfills have a projected life span of 10 to 12 years. Per capita residential generation is estimated 3.5 pounds per day. Kirtland AFB produces 40 T/day of solid waste and disposes of it at a sanitary landfill onbase with a projected lifespan of ten years. Solid waste generation for the City is projected to increase by 1.5 to 2 percent per year; solid waste generation is expected to remain constant for Kirtland AFB.

3.6.4.4 Energy

Electricity. Electrical energy is supplied to the City and Kirtland AFB by the Public Service Company (PSC) of New Mexico. The electricity is transmitted from the Four Corners area (in northwest New Mexico) and generaged by coal-fired plants. The company has 287,000 retail customers. The net generation capacity in 1989 was 1,591 megawatts (MW), with a peak demand of 1,006 MW. Because sales have been less than expected, PSC has a surplus generating capacity capable of accommodating expected growth in the service area.

Electrical service is delivered at 125 megavolt-amperes (MVA) to Kirtland AFB. Peak usage was 59.3 MW and total consumption was 323,449 megawatt hours (MWh) for the base in FY 1989. Service to the base is through one substation, which has three transformers with a capacity of 125 MVA.

Natural Gas. Natural gas is also provided to the City of Albuquerque and Kirtland AFB by PSC of New Mexico. PSC served 339,000 customers with total sales of 4.69 billion cubic feet in 1989. Long term contracts assure extensive supplies for future peak demands. The City of Albuquerque consumed 2,038,710 thousand cubic feet (Mcf) and expects a 2 percent average annual increase in gas consumption. Average residential consumption is 82 Mcf. A 14-inch high pressure main (at 45 pounds per square inch (psi) supplies natural gas to Kirtland AFB. It is then metered, reduced, and distributed for heating purposes. The base consumed 1,585,589 Mcf in FY 1989. Demand is expected

to remain constant. There is no natural gas supply to the Manzano Area; diesel fuel oil and propane are used for heating.

3.6.5 Hazardous Waste

Hazardous waste generated on Kirtland AFB are managed by the Defense Reutilization and Marketing Office (DRMO). Typical wastes include oils, paints, thinners, solvents, and other regulated materials. The hazardous wastes are stored in a conforming storage area on the base and then transported to licensed treatment and disposal facilities.

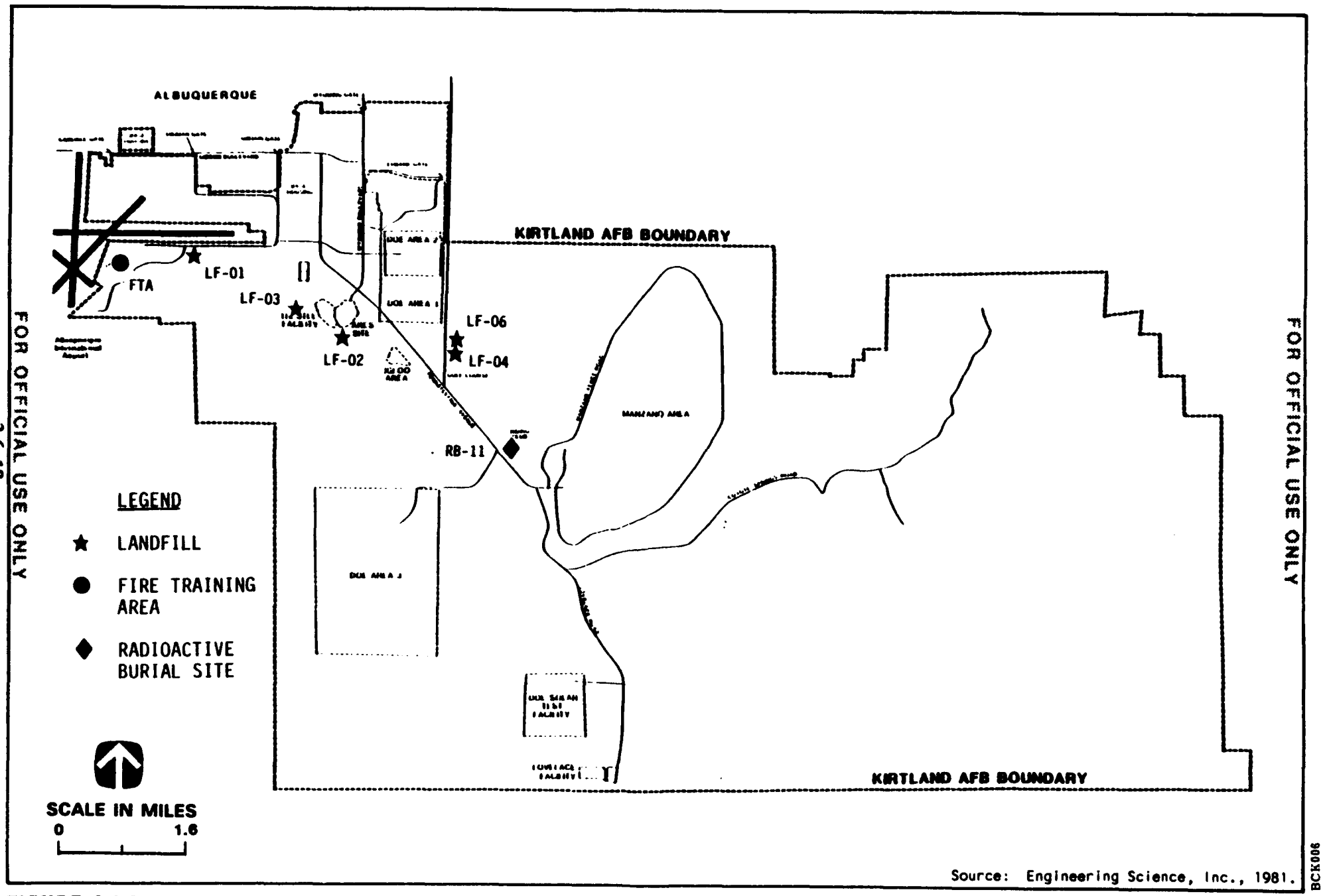
The Phase I Installation Restoration Program (IRP) identified 21 disposal sites on Kirtland AFB as potential contamination sources. Seven were prioritized and identified for possible remedial action. These include: Landfill Nos. 1, No. 2, No. 3, and No. 4; Radioactive Burial Site No. 11; the Fire Control Training Area; and Landfill No. 6 (Figure 3.6.5-1). The Phase II preliminary sampling suggested that additional geochemical data sampling for a majority of the sites be conducted, including implementation of a long-term groundwater quality monitoring program. Remedial actions were considered necessary even if additional data acquisitions efforts were not implemented at all seven sites.

3.6.6 Geology and Soils

3.6.6.1 Geology

Physiology and Topography. The topography of the Albuquerque area is a flat, semiarid valley. Desert grasslands are to the west where a mesa rises abruptly to the base of a lava escarpment from a row of five small, extinct volcanoes. The Sandia Mountains to the east of Albuquerque have a maximum elevation of 6,300 feet. The elevation of the city is 5,314 feet. Kirtland AFB and the City of Albuquerque are located in the Rio Grande Valley of the Mexican Highland Subdivision of the Basin and Range Physiographic Province.

Kirtland AFB is located on the East Mesa of the Rio Grande Valley, west of the Sandia and Manzano mountains. East Mesa has an elevation of approximately 5,400 feet, while the Sandia and Manzano mountains have a maximum elevation of 10,682 feet at Sandia Peak. The Rio Grande River is a perennial stream that drains Kirtland AFB runoff drains via overland flow from arroyos and canals.



Source: Engineering Science, Inc., 1981.

FIGURE 3.6.5-1 LOCATION OF LANDFILLS FOR POSSIBLE REMEDIAL ACTIVITY, KIRTLAND AFB, NEW MEXICO

Regional Geology. Geologic units associated with Kirtland AFB range in age from pre-Cambrian to Quaternary. The lithologies of these units include unconsolidated materials, sedimentary, metamorphic and igneous materials. The geology of the north and western portions of Kirtland AFB is composed of unconsolidated units while the eastern portion of the base is underlaid by consolidated units. The north and western portions of the base are located with the Albuquerque basin while the eastern section of the base is located within an area dominated by block faulted mountains. The Albuquerque Basin to the west is a part of the Rio Grande rift which is a connected series of structural basins and grabens. The eastern boundary of the basin is defined by a complex fault system plus the Manzano-Sandia mountains. The highland and mountainous areas were formed by the accumulation of sediments. The sediment thickness varies from a few feet up to 21,000 feet in depth.

Geologic Hazards. Four major fault systems exist within the boundaries of Kirtland AFB. The Tijeras Fault and the Hubbell Springs Fault intersect on the base and are currently active. The Hubbell Springs Fault appears to control groundwater movement. The other two faults are the Sandia and Manzano faults. The Manzano Fault is believed to be responsible for raising the Manzanita and Manzano Mountains to their present height. The Sandia Fault may be a northward portion of the Hubbell Springs Fault and may represent the point where the Sandia Mountains separated from rocks underlying the Rio Grande Rift.

3.6.6.2 Soils

Within the Kirtland AFB area, there are eight different soils, complex or associations. The soils located on flood plains and or dissected terraces include the Wink-Embudo Complex, the Wink Fine Sandy Loam and the Bluepoint-Kokan Association. The Wink-Embudo Complex has a 0 to 5 percent slope as does the Wink Fine Sandy Loam while the Bluepoint-Kokan Association is listed as hilly. These soils can be located in the landscape that is steep in aspect, somewhat excessively drained sandy and gravelly soils within dissected terraces and alluvial fans. The soils within this association are a potential source of sand and gravel for construction activities. The hazard for water erosion is moderate or severe.

The remaining five soil types are deep soils that can be located on alluvial fans, mesas or piedmonts. They are the Latene Sandy Loam, the Embudo Gravelly Fine Sandy Loam, Madurez-Wink Association, Tijeras Gravelly Fine Sandy Loam, and Embudo-Tijeras Complex. The Latene Sandy Loam has a 1 to 5 percent slope, the Embudo Gravelly Fine Sandy Loam has a 0 to 5 percent slope, the Madurez-Wink Association has been identified as gently sloping, the Tijeras Gravelly Fine Sandy

Loam has a 1 to 5 percent slope and the Embudo-Tijeras Complex has a 0 to 9 percent slope. The soils located on alluvial fans, mesas, or piedmonts tend to have well-drained loamy textures and may be used for range, watershed, and wildlife habitats and community development. Erosion potentials for these soils tend to range from slight to moderate.

There are no prime or unique farmland soils located on Kirtland AFB. All of the soils located within the base have a dryland capability that indicates unsuitability for cultivation or severe limitations because of the risk of erosion.

3.6.7 Water Resources

3.6.7.1 Groundwater

Kirtland AFB lies within the limits of the Rio Grande underground water basin. The principal aquifer of the Rio Grande Basin supporting the city of Albuquerque and Kirtland AFB is contained within the Santa Fe formation. This formation is valley fill and is composed of unconsolidated and semi-consolidated sands, gravels, silts and clays of the Pliocene Santa Fe formation plus alluvial fan deposits resulting from upland erosion. The Rio Grande basin is 27 miles wide and 90 miles long (Albuquerque economic development 1988). The valley fill varies from a few feet thick nearer to the Sandia and Manzano Mountains to over 21,000 feet thick at a point five miles southwest of the airfield on Kirtland AFB.

Ground water exists in the valley fill under water table (unconfined) conditions (Engineering-Science 1981). The water table of the Albuquerque area is known to be an irregular surface probably due to changes in local permeability, variations in saturated thickness and local withdrawal and recharge of ground water. Water level fluctuations may be brief, seasonal or long term. This will depend whether the recharge to the system occurs from precipitation, underflow of groundwater from adjacent areas and seepage from streams, canals drains, surface reservoirs and applied crop irrigation water. Recharge is most likely to occur at the base of mountains where permeability is enhanced due to the coarse-grained soils.

The impact of local faulting on Kirtland AFB ground water flow in not known, but well data suggests that the area east of the Hubbell Springs Fault may have significantly shallower ground water level than that portion of the base west of the fault. The regional water table slopes at a shallow gradient

diagonally down valley from the upland areas in the south westward direction moving to the Rio Grande area.

The City of Albuquerque obtains its water from approximately 89 wells that have been drilled throughout the metropolitan area. The water is pumped from the wells to local enclosed reservoirs and then the water is gravity-fed to the consumers through a waterline distribution system. Annual production of water in 1988 was 36,864 million gallons with a daily peak of 203 million gallons.

Regional groundwater monitoring is a component of the comprehensive plan to identify sources of nitrate, volatile organics, and gasoline contamination as all three have been found as contaminates in the groundwater. Septic tanks, agricultural activities, solid waste disposal sites, petroleum handling facilities, solid waste disposal sites, and illegal discharges are other sources of contamination which threaten groundwater quality.

3.6.7.2 Surface Water

There are 3,500 miles of perennial rivers and streams in New Mexico. New Mexico's surface waters include headwater portions to three principal drainage systems. These include the drainage from the San Juan River Basin and Lower Colorado Basin which contributes to the Colorado River, drainage from the Arkansas-White-Red River Basin which contributes to the Mississippi River, and the three Rio Grande basins and the Pecos River Basin which discharged into the Gulf of Mexico. The total annual stream flow for the State of New Mexico is approximately 5.7 million acre-feet. Of this amount, precipitation contributes 3.3 million acre-feet. The rest is a result of contributions from other states such as Colorado via the Rio Grande and the San Juan River. Down stream states receive 3.4 million acre-feet from New Mexico.

In 1980, surface water withdrawals totaled 2.5 million acre-feet and ground water withdrawals totalled 2.0 million acre-feet. The portion of water withdrawn permanently from the water supply was 1.3 million acre-feet of surface water and 1.2 million acre-feet from the groundwater. Eighty-six to eight-seven percent of the total withdrawals and depletions resulted from agricultural use and reservoir evaporation. From 1975 to 1980, the percent of total withdrawal and depletion resulted from community and individual water use increased from five to six percent to fifteen percent while agricultural withdrawal and depletion decreased to seven percent.

The quality of surface water in New Mexico has been rated as good. Of the 3,500 miles of perennial streams, violations of water quality standards were reported in 61 miles in 1984. Of those 61 miles, 56 miles were partially impaired perennial streams and 8 miles were domestic water sources.

Kirtland AFB is drained primarily by the Rio Grande River, located about 4 miles west of the base boundary. Runoff from the base either drains into the river via overland flow to arroyos (Tijeras Arroyo and Arroyo del Coyote occur on the base), canals, and man-made drainages, or infiltrates into surface soils. The only permanent surface waters in the portions of the base that would be affected by the proposed project areas are five ponds at the golf course. Man-made drainages occur mostly in the northern, developed portion of the base. Natural drainages include the two arroyos mentioned above and an unnamed drainage between them. Localized flooding on the base occurs only for brief periods when surface drainage flow is restricted within the arroyos.

3.6.8 Air Quality

3.6.8.1 Regulatory Setting

Kirtland AFB and the City of Albuquerque are within Air Quality Control Region No. 2, one of eight AQCRs in the state. Region 2 is located in the northwestern portion of New Mexico and is entirely contained within the state. Air quality control functions for all of Bernalillo County have been delegated to the Albuquerque-Bernalillo County Air Quality Control Board. The National and State of New Mexico Ambient Air Quality Standards are presented in Table 3.6.8-1. The Albuquerque Air Quality Control Region has been designated a Priority I nonattainment area for carbon monoxide (CO), photochemical oxidants (O_3), and total suspended particulates (TSP). Of the three, CO is the most significant air quality problem and is directly related to the increase in vehicular traffic.

The City of Albuquerque administers an aggressive local air pollution control program under the jurisdiction of the Air Pollution Control Division. Regulations were adopted by the joint city/county Air Quality Control Board and are implemented and enforced by the Air Pollution Control Division. Organization of this division is in three basic sections: engineering, monitoring and enforcement. The engineering section reviews new resources and development regulation; included in this review are all building construction plans which must demonstrate dust control measures during the construction phase of projects. Inspection/Maintenance control strategies are also part of the engineering function. Monitoring of the ambient air is a major portion of the total program.

Table 3.6.8-1

State and Federal Ambient Air Quality Standards
New Mexico

Pollutant	Federal Primary Standard	Federal Secondary Standard	New Mexico Standard	Albuquerque and Bernalillo County Adopted Standard
Total Suspended Particulates				
24-Hour Average	260 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
Annual Geometric Mean	75 $\mu g/m^3$	60 $\mu g/m^3$	60 $\mu g/m^3$	60 $\mu g/m^3$
Sulfur Dioxide				
24-Hour Average	.14 ppm	--	.10 ppm	.032 ppm
Annual Arithmetic Average	.07 ppm	--	.02 ppm	.004 ppm
3-Hour Average	--	.50 ppm	--	--
Carbon Monoxide				
8-Hour Average	9 ppm	9 ppm	8.7 ppm	--
1-Hour Average	35 ppm	35 ppm	13.1 ppm	13 ppm
Photochemical Oxidants (Ozones)				
1-Hour Average	.12 ppm	.12 ppm	.06 ppm	.01 ppm
Nitrogen Dioxide				
24-Hour Average	--	--	.10 ppm	--
Annual Arithmetic Average	.05 ppm	.05 ppm	.05 ppm	--

Source: U.S. Air Force, 1980.

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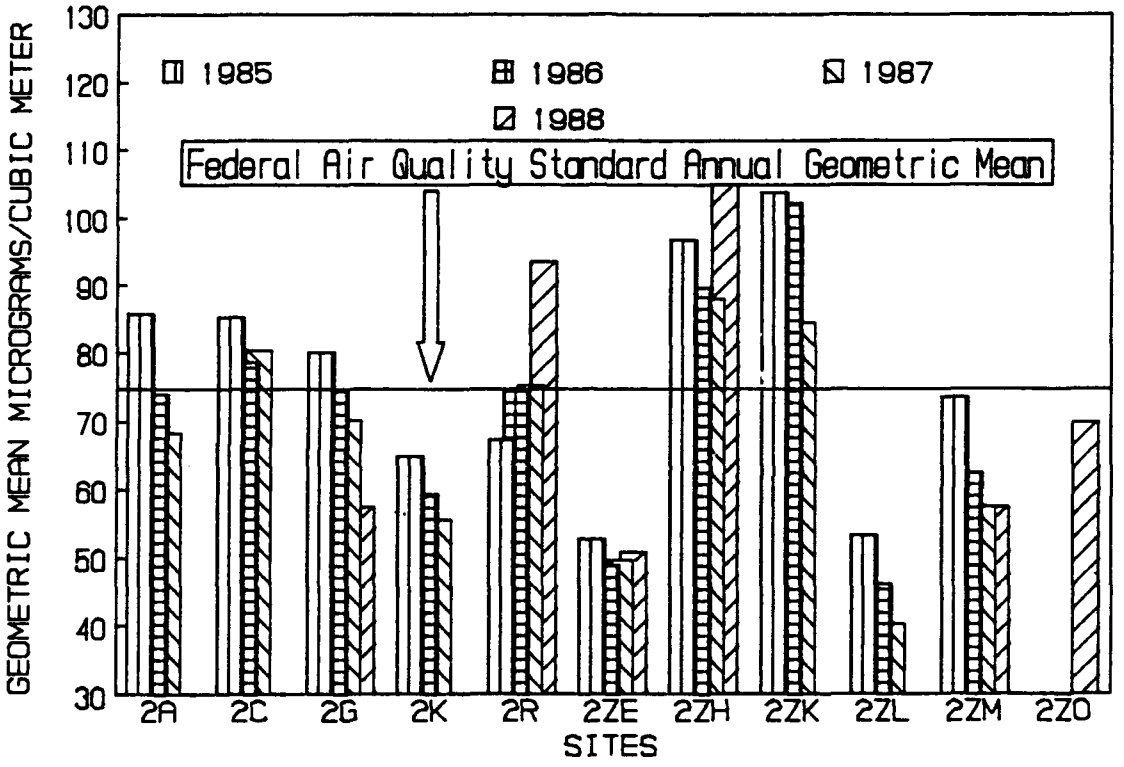
3.6.8.2 Regional Air Quality

Meteorology and Climate. The climate of the Albuquerque and Kirtland AFB region is dry and continental. Monthly mean temperature ranges from 32.7° F in January to 78.7° F in July with an annual average of 56.8° F. Annual precipitation averages 8.3 inches and primarily occurs between June and September as brief and sometimes heavy thunderstorms. Snowfall occurs between December and March and averages approximately 10.3 inches annually. During the winter, the Sandia Mountains shelter the Albuquerque area from frigid winds that sweep down the plains from the East. The relative humidity ranges from 16 to 69 percent.

There are 14 ambient air monitoring stations located within the city. There are 13 sites monitoring TSP, 8 sites monitor particulate material less than ten microns in size (PM_{10}), 5 sites to monitor O_3, 6 sites monitor CO, 1 site monitors NO_x, and 7 sites record wind speed and direction. Of 11 ambient air monitoring stations measuring TSP, 5 stations in 1985, 3 stations in 1986, 4 stations in 1987, and 2 stations in 1988 reported concentrations that exceeded the federal air quality standards (Figure 3.6.8-1). No stations reported ozone concentrations exceeding the federal air quality standards between 1985 and 1988 (Figure 3.6.8-2). The three stations recording CO concentrations, all reported concentrations that exceeded the federal air quality for the years 1985 through 1988 except for one station in 1988 (Figure 3.6.8-3)

Existing Air Quality. The worst air quality problems occur in areas of high traffic density, such as major shopping centers, and in downtown Albuquerque. The natural level of ozone in the Albuquerque area is generally about 0.05 ppm. Violations of the federal standard for O_3 are common, particularly in summer when abundant sunlight is available to produce elevated O_3 concentrations resulting from photochemical reactions between NO_x and hydrocarbon (HC) pollutants. These O_3 precursor pollutants are directly related to motor vehicle traffic. Control strategies have been implemented to reduce NO_x, HC, and CO emissions. These include improvement of vehicle exhaust controls, less reliance on cars for travel, and improved traffic flows; vehicle inspections and retrofit of pollution control devices are being considered.

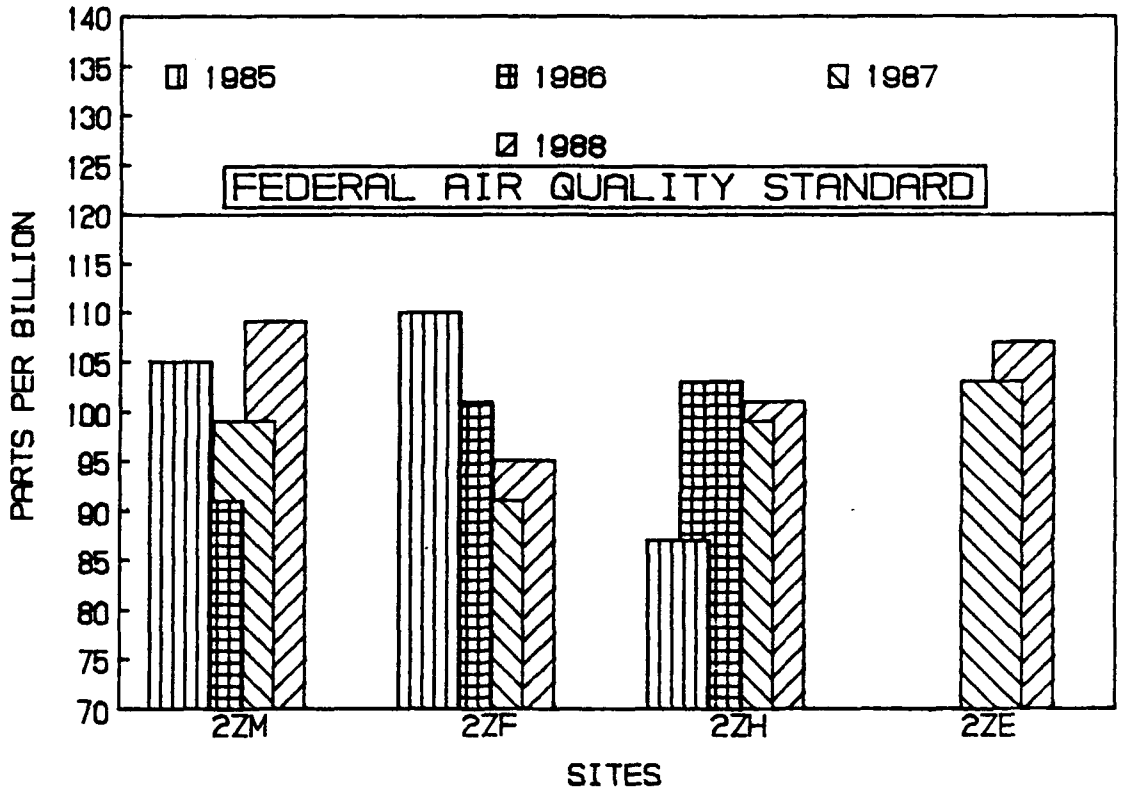
TSP violations are most frequent during the spring months and are primarily associated with natural dust storms and airborne dust from unpaved roads. Control strategies for particulates involve paving dirt roads and restrictions on open burning and grading operations.



Source: City of Albuquerque, 1989.

BCK002

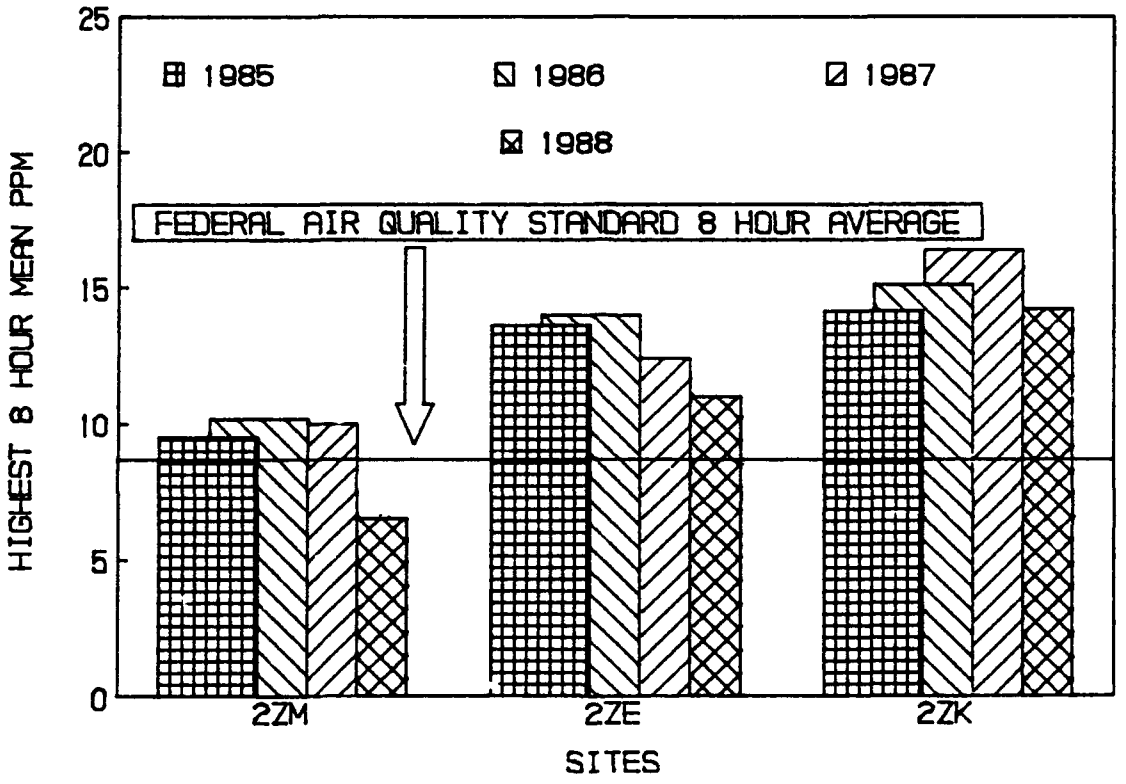
FIGURE 3.6.8-1 TOTAL SUSPENDED PARTICULATES, ALBUQUERQUE, NEW MEXICO



Source: City of Albuquerque, 1989.

BCK003

FIGURE 3.6.8-2 OZONE CONCENTRATIONS (HOURLY), ALBUQUERQUE, NEW MEXICO



BCK004

Source: City of Albuquerque, 1989.

FIGURE 3.6.8-3 CARBON MONOXIDE CONCENTRATIONS, ALBUQUERQUE, NEW MEXICO

3.6.8.3 Emission Sources

Primary sources of air pollutants in the City of Albuquerque include vehicular emissions, residential wood burning, dust from unpaved roads and construction sites, and to a lesser degree some industrial operations. The geographic location of Albuquerque at a mile high altitude plus the Sandia Mountains to the east, tend to aggravate any air pollution problems, especially in the winter months when residential wood burning is increased. Wood burning constitutes an estimated 52 percent while automobiles only contributes 45 percent of the air pollutants associated with Albuquerque air pollution problem. New construction, excavation, and travel on unpaved roads also adds to the pollutant concentrations in the ambient air.

Emission from activities at Albuquerque International Airport and Kirtland AFB are not considered by the Albuquerque-Bernalillo County Air Quality Control Board to be significant contributors to the exceedance of applicable air quality standards. HC, CO, and volatile organic compound (VOC) emissions are not major contributors. Recently, Kirtland AFB was cited with a notice of violation for excessive VOC emissions. Albuquerque is a nonattainment area for CO, but the CO emissions from Kirtland AFB are not major contributors to this problem. The City has a monitoring station near the base that is representative of the general vicinity. Data from that monitoring station indicate no violation of CO standards, even though the entire county is considered nonattainment with respect to CO. Carbon monoxide violations are generally found in the downtown area of Albuquerque because of the large volume of automobile emissions there. Additional information on Kirtland AFB to be provided following receipt of Air Emission Inventory report.

3.6.9 Noise

3.6.9.1 Regulatory Setting

As a result of Kirtland AFB operating as a tenant of, and under joint use with, Albuquerque International Airport, an Air Installation Compatible Use Zone (AICUZ) study is not required. Kirtland AFB operates under the jurisdiction of the Federal Aviation Administration (FAA) program for airport noise control planning called the Federal Aviation Regulation (FAR) Part 150. This program includes provisions for the development and submission of noise exposure maps and noise compatibility programs to the FAA by airport proprietors. The basic objectives of the program are to determine the existing noise condition around the airport; identify the noise problem areas; review and select both land use and operational noise control alternatives; and coordinate and interact with

operators, users, neighbors, local governments, and the FAA. The most recent FAR 150 study for the Albuquerque International Airport was prepared in 1989. This study incorporates baseline data from Kirtland AFB aircraft as a portion of the flight operations at Albuquerque International Airport.

3.6.9.2 Existing Noise Sources

Aircraft take-offs and landings constitute the primary source of noise at Kirtland AFB. The runway at Albuquerque International Airport is used jointly by the City of Albuquerque and the Air Force, and is less than three miles southwest of the proposed project areas. All three proposed project areas lie for the most part outside the 60 L_{dn} contour for projected noise exposure in 1993 (Figure 3.6.9-1). Based on the daily operations in 1988, the majority of the noise that is generated results from civilian aircraft arrivals and departures (Table 3.6.9-1). Air carriers and commuter aircraft comprised the majority of the types of air planes generating noise.

3.6.10 Biological Resources

3.6.10.1 Vegetation

Two vegetation types have been noted on Kirtland AFB. They are a Pinyon-juniper woodland and Grassland Association. The Pinyon-juniper woodland has an elevational limit of 5,800 feet. The Colorado pinyon pine (Pinus edulis) and one-seed juniper (Juniperus monosperma) are co-dominates within this association. The one-seed juniper can be found at the lowest elevational limit of this association and in association with scrub live oak (Quercus turbinella), skunkbush (Rhus trilobata var. trilobata), and Gambel oak (Q. gambelii). With the increase in elevation, the one-seed juniper is replaced by Rocky Mountain juniper (J. scopulorum) and Colorado pinyon pine plus ponderosa pine (Pinus ponderosa).

The understory of the Pinyon-juniper woodland tends to be dominated by grasses and shrubs. In the lower elevations, blue grama (Bouteloua gracilis), and side-oats grama (B. curtipendula) are dominant understory species. Where canopy cover tends to be more contiguous, forbs and small shrubs can be found as principle understory species. The more common forbs are bitterweed (Ambrosia artemisiifolia) and bricklebush (Brickellia sp.) while the shrubs include creeping mahonia (Berberis repens), Fendlerbush (Fendlera rupicola), and mock orange (Philadelphus microphyllus). On steep, rocky south facing slopes, Reverchon three-awn (Aristida glauca), Scribner needlegrass (Stipa

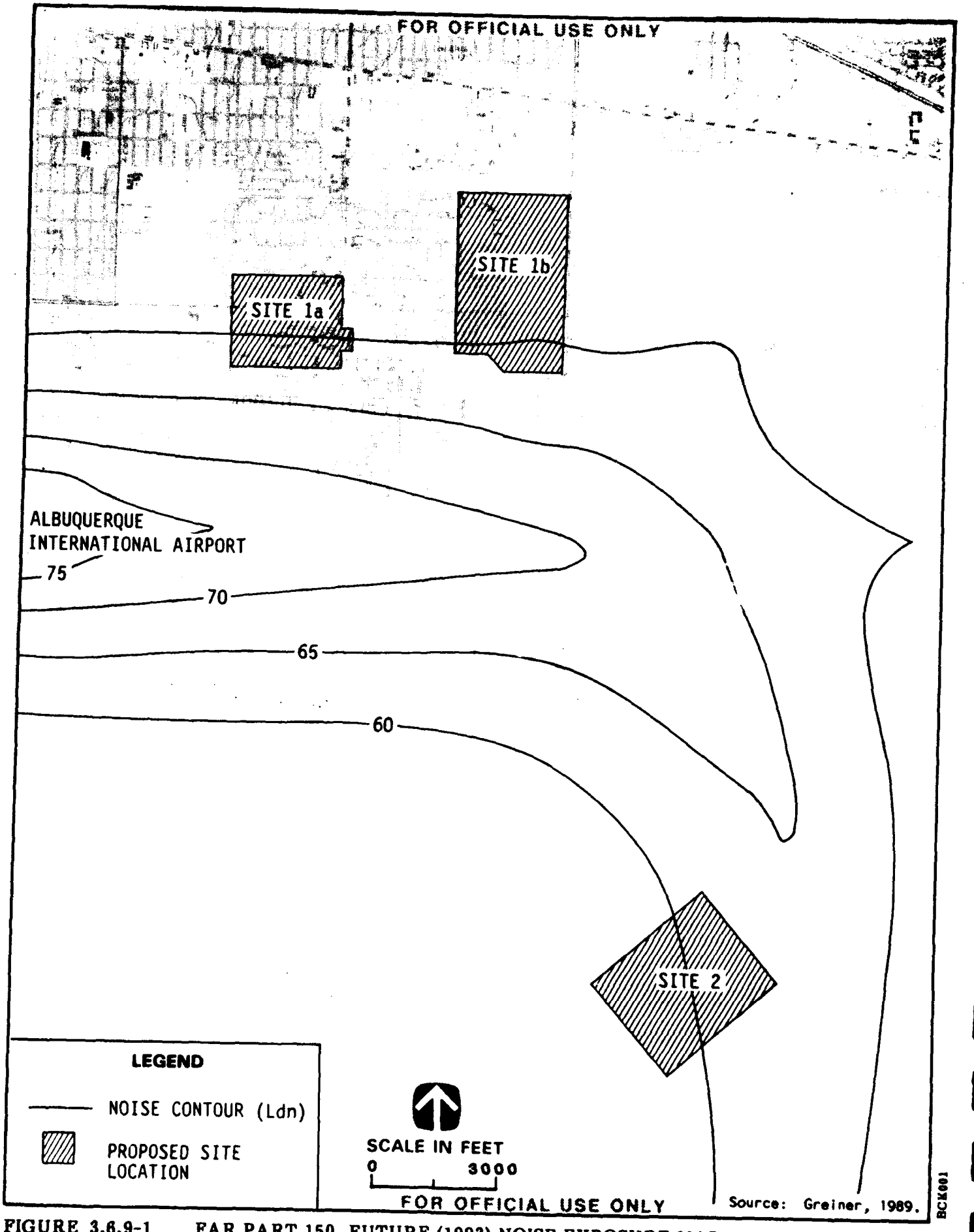


FIGURE 3.6.9-1 FAR PART 150 FUTURE (1993) NOISE EXPOSURE MAP, ALBUQUERQUE INTERNATIONAL AIRPORT

Table 3.6.9-1

Summary of Daily Flight Operations at Albuquerque International Airport 1988

Aircraft	Arrivals		Departures by Stage Length			
			0-500 NM[1]		501-1,000 NM[1]	
	Day	Night	Day	Night	Day	Night
Air Carrier	88.35	6.65	60.43	4.56	27.92	2.09
Commuter	50.22	3.78	50.22	3.78	0.00	0.00
Military	50.30	1.40	44.30	0.00	5.80	0.00
General Aviation	104.19	8.81	104.19	8.81	0.00	0.00
TOTAL:	293.06	20.64	259.14	17.15	33.72	2.09

Notes: [1]NM = Noise Model
Source: Greiner, Inc. 1989

scribneri), noseburn (Tragia sp.), beargrass (Nolina sp.), banana yucca (Yucca baccata), and paintbrush (Castilleja sp.) are common understory plants.

In areas where water from springs can be found at all times of the year, aquatic or semi-aquatic plants can be found. Cattail (Typha sp.), Torrey rush (Juncus torreyi), and smooth monkey flower (Mimulus glabratus var. fremontii) are common plants in these zones. Within arroyos, pioneering and seasonally wet trees such as narrow-leaf hop tree (Ptelea trifoliata), tree-of-heaven (Ailanthus altissima), and shrubs such as rabbit bush (Chrysothamnus sp.), fourwing saltbush (Atriplex canescens), and California bricklebush (Brickellia californica) may be found.

Within the grassland Association, over 50 different species of grasses may be found. Abundant species include black grama (Bouteloua eriopoda), sand muhly (Muhlenbergia arenicola), three-awn (Aristida sp.), indian ricegrass (Oryzopsis hymenoides), six-weeks grama (B. barbata), fluff grass (Tridens pulchellus), and spike dropseed (Sporobolus contractus) (U.S. Air Force 1980). Shrubs commonly found in the grasslands are sand sage brush (Artemisia filifolia), winterfat (Eurotia lanata), and fourwing saltbush. Forbs such as globe mallow (Sphaeralcea sp.), skeleton weed (Lygodesmia sp.), thistles (Cirsium sp.), Rocky mountain zinnia (Zinnia grandiflora), and snakeweed (Gutierrezia sp.) can also be located within the grassland type.

Cactus is common within the grassland. Many cacti that are threatened with local extinction appear to be protected here. They include dagger cholla (Opuntia clavata), cane cholla (O. spinosior), and Engelmann prickly pear (O. phaeacentha var discata).

In arroyos, the vegetation differs from typical grassland vegetation. Fourwing saltbush, Apache plume (Fallugia paradoxa), and rabbit brush are dominants found in these arroyos. Other plants, both introduced and native, commonly found in the arroyos of the grasslands include feather fingergrass (Chloris virgata), tansy mustard (Descurainia sp.), yellow cross, purple and golden aster (Chrysopsis sp.), goldenweed (Haplopappus sp.), Russian thistle (Salsola kali var. tenuifolia), summer cypress (Kochia scoparia), foxtail barley (Hordeum jubatum var. jubatum), prickly lettuce (Lactuca serriola var. serriola), and horse-nettle (Solanum elaeagnifolium).

In Coyote Canyon, a sulfur spring has resulted in an area of permanent moisture with vegetation typical of swampy areas along the Rio Grande Valley in Albuquerque. Some of these plants include cattails, rushes, sedges, saltbush, foxtail barley scratchgrass (Muhlenbergia asperifolia), watercress (Rorippa nasturtium-aquaticum), and rabbitfoot grass (Polypogon monspeliensis).

The vegetation within Kirtland AFB shows less evidence of disturbance than the surrounding area. However, an abundance of snakeweed and burro grass (Scleropogon brevifolius) is the result of heavy grazing at one time. Although grazing ended over 30 years ago, the recovery time for arid and semiarid environments is a relatively long period.

3.6.7.2 Wildlife

There are no fishing streams or lakes on Kirtland AFB and no hunting is allowed onbase. Because of a lack of competition from livestock, animals that feed on grasses are abundant. Rodents and muledeer (Odocoileus hemionus) are commonly sited in winter months. The rodent population includes mostly the Rock squirrel (Spermophilus variegatus), and several species of rats, mice, and ground squirrels (Spermophilus sp.). Toads, lizards, and snakes are also common.

Avian species expected in the grassland include horned larks (Eremophila alpestris), meadow larks (sturnella sp.), thrashers (Toxastoma sp.), predatory birds, sparrows, scaled quail (Callipepla squanate), and mourning doves (Zenaida macroura). Scrubjays (Aphelocoma coerulescent), plain titmouse (Parus inornatus), bushtits (Psaltriparus mimimus), woodpeckers, and warblers occur in the Pinyon-juniper woodland.

3.6.10.3 Threatened and Endangered Species

Gramma grass cactus (Pediocactus papyracanthus) is a federally- and state- listed endangered species. Wright's pincushion cactus (Mammillaria wrightii) is listed by the State of New Mexico as a sensitive species. It is an endemic and is not abundant where it occurs. The presence of these two species on Kirtland AFB base is probable.

The American peregrine falcon (Falco peregrinus anatum) is currently listed by the federal government as an endangered species. New Mexico also lists this bird as endangered. Although it has not been seen, occurrence within the boundaries of Kirtland AFB is probable. The bald eagle (Haliaeetus leucocephalus) and whooping crane (Grus americana) are also listed by the federal government and the state of New Mexico as endangered. The bald eagle has seasonal occurrence within the boundaries of Kirtland AFB and the whooping crane has a range that extends onto the base area, but occurrence of the crane has not been confirmed.

3.6.11 Cultural and Paleontological Resources

3.6.11.1 Prehistoric Resources

Prehistoric site types identified on Kirtland AFB include pueblos, pithouse villages, rockshelters, hunting blinds, agricultural terraces, quarries, lithic and ceramic scatters, and lithic scatters. Approximately 71 percent of the base has been inventoried for cultural resources; however, survey techniques and procedures vary greatly between projects. Sixty prehistoric sites have been recorded onbase and most represent the Anasazi period (A.D. 1 to 1540). According to previous cultural resource surveys, no prehistoric sites are located in the proposed project area between the golf course and the riding stable. Cultural resources survey may be conducted on selected offbase parcels.

Native Americans with concerns in this area include Sandia Pueblo, located north of Albuquerque, and Isleta Pueblo, south of the base. Archaeological sites may contain ceremonial features such as kivas, village shrines, petroglyphs, or burials; all of these site types or features would be of concern to local groups.

3.6.11.2 Historic Resources

Forty-two historic sites have been identified during previous cultural resource surveys onbase. These sites represent early mining, ranching, sheepherding, commercial ventures, and transportation routes. Historic sites associated with mining activities include shafts, prospects, tunnels, tailing dumps, claim cairns, trash scatters, and habitation sites. Ranching and sheepherding sites consist of corrals, ditches, stone foundations, camps, and trash scatters. The remnants of a bottling plant in operation from 1900 to 1930 also occurs onbase.

Kirtland AFB was established in 1942 at the location of the original Albuquerque Airport. Only four standing structures onbase are older than 50 years. Three buildings are aviation-related facilities (i.e., hangars and a depot) and the fourth is the Kirtland AFB West Officer's Club. The three aviation facilities have been recommended as not eligible for the National Register of Historic Places (NRHP), the Officers Club was built in 1936 in the Spanish Colonial style and is considered NRHP-eligible.

According to previous cultural resource surveys, only one historic site is located in the proposed project area between the golf course and riding stable. This site consists of a sparse scatter of historic

debris mixed with modern trash and debris from the golf course. This historic site does not appear to be NRHP-eligible because it lacks integrity.

3.6.11.3 Paleontological Resources

Five major geologic formations have surface exposures on Kirtland AFB: Pleistocene pediments and gravels, Miocene Santa Fe Group (undivided), Pennsylvanian-Mississippian Madera limestone and Sandia Formation (undivided), Permian Abo Sandstone, and PreCambrian rock. The majority of the base consists of Pleistocene pediments, terrace deposits, gravel, sand, and caliche. The Miocene Santa Fe Group occurs along Tijeras Canyon in the center of the base. The Madera limestone and Sandia formation occurs along with the PreCambrian rock along the mountain front on the east edge of the base. The Permian Abo Sandstone, a red sandstone, is located along the Manzano Mountains in the southern portion of the base.

Only three formations may contain paleontological materials: the Pleistocene deposits, the Santa Fe Group, and the Madera limestone/ Sandia formation. Pleistocene sediments contain mastodon, mammoth, horse, camel, antelope, musk ox, caribou, ground sloths, bison, cave bear, dire wolf, lion, saber-toothed cat, and other types of extinct and modern fauna, including birds and freshwater pelecypods and gastropods. Pleistocene fauna have been found in cave locations and river gravels around Albuquerque.

The Santa Fe Group represents a diverse deposit of early mammal forms, reptiles, birds, and plants from the middle Miocene to the early Pliocene. Extinct and modern mammals, and precursors of modern forms found in this deposit include deer, antelope, gazelle, horse, pig, camel, elephant, rhinoceros, hippopotamus, rabbit, beaver, mole, shrew, ground sloth, hedgehog, peccary, dog, fox, cat, raccoon, badger, skunk, and weasel. Other fossil forms found in association are a vulture-like bird, tortoise, lizard, frog, petrified wood, and palm frond. Because of the diversity of the Santa Fe Group deposits, environmental reconstruction of the Miocene/Pliocene is possible. However, fossiliferous deposits of the Santa Fe Group to the extent mentioned above, are discretely clustered north of Santa Fe. The Santa Fe Group outcrops around Albuquerque may contain a few small skeletal fragments of mammal forms, but are not as diverse or well-preserved.

Insects, crustaceans, eurypterids, amphibians, and fish have been preserved in swamp sediments in the Madera limestone/Sandia formation in the Manzanita Mountains east of Albuquerque. According to Kues (1982), Pennsylvanian paleontological fossils are abundant, diverse, and widely distributed.

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4.0 ENVIRONMENTAL CONSEQUENCES

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This section presents the environmental consequences for the proposed action, alternative action, and no action alternative for Headquarters Space Systems Division (HQ SSD) and Los Angeles Air Force Base (AFB), California, support units that have been proposed for closure. This section also includes the environmental consequences for Vandenberg AFB, California, + other bases which has been selected as a possible relocation site for HQ SSD and appropriate supporting units. The environmental consequences are also presented for Kirtland AFB, New Mexico; March AFB, California; Peterson AFB, Colorado; and Falcon AFB, Colorado, which are being considered as alternative locations for the beddown of HQ SSD plus appropriate supporting units.

Impacts were determined by evaluating context and intensity as required under the Council on Environmental Quality (CEQ) regulations (Code of Federal Regulations 1987, 40 CFR 1508.27b). Both short-term and long-term effects are considered. Short-term impacts are transitory effects of the proposed closure that are of limited duration and generally caused by initial drawdown activities. Long-term impacts occur or continue over an extended period of time whether they begin during drawdown or at closure.

According to the CEQ regulations, ~~intensity "refers to the severity of the impacts"~~ the evaluation of intensity involves:

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that on balance the effect will be beneficial.

2. The degree to which the proposed action affects public health or safety.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) or may cause loss or destruction of significant scientific, cultural, or historical resources.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

10. Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

These factors were included in the evaluation of the impacts of the proposed closure of Los Angeles AFB and the consideration of their significance.

4.1 LOS ANGELES AIR FORCE BASE, CALIFORNIA

This section presents the environmental impacts associated with the proposed closure of Los Angeles AFB. In this context, the base is considered to be inclusive of Areas A and B at Aviation and El Segundo boulevards within the City of Los Angeles; the Aerospace Corporation in the City of El Segundo; Lawndale Annex No. 3 in the City of Hawthorne; and the Fort MacArthur, Pacific Crest, and Pacific Heights base housing areas within the San Pedro community of Los Angeles. The no action alternative is also discussed.

4.1.1 Community Setting

check numbers!

4.1.1.1 Proposed Action

The proposed action to close Los Angeles AFB and relocate HQ SSD to a different base would result in the initial loss to the South Bay area of approximately 4,000 jobs beginning in 1993, and ultimately resulting in the loss of 15,800 jobs by 1997. Of these, 8,509 would constitute direct military and civilian positions at Los Angeles AFB, while 7,249 would be secondary in nature.

The proposed action would cause the loss of $115 million in personal income to the Region of Influence (ROI) in 1993 and a loss of $460 million in 1997 and each year thereafter. Los Angeles County would experience the greatest majority of this loss in income.

Population and Demographics. The proposed action would result in the loss of 14,000 people who would move to the new site of HQ SSD. Of this total, 26 percent would be military personnel and dependents, 24 percent would be civilian government workers, and 50 percent would be support contractor personnel. ~~The loss of 14,000 population in Los Angeles County would have no discernible effect on the nature of its population base.~~

Housing. The proposed action to close Los Angeles AFB would result in the vacancy of 2,271 housing units in 1993. By 1996, a total of 9,030 units would be vacated. Of these, 500 would be military housing units and the remainder would be private dwellings. Vacancy of this number of units within Los Angeles County would have a negligible effect on area rental costs and home prices.

Education. As a result of the proposed action, enrollment in Los Angeles County schools would decrease by about 1,359 students. This represents a very small percentage of total school enrollment for the county.

Community Services. Health care would be affected by the proposed action through closure of Los Angeles AFB medical facilities. The 2,771 active-duty personnel and their 6,670 dependents would receive medical care at the Air Force base to which they are assigned. The 37,500 military retirees who currently obtain care at Los Angeles AFB would have to find an alternative medical facility. There is an abundance of private medical facilities in Southern California that would be able to provide service to retirees through the government's Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) program. In addition, there are a number of Air Force base and Veteran's hospitals in the area that are available to serve retirees.

Under the proposed action, military retirees who reside in Southern California would lose access to medical care they currently receive at Los Angeles AFB. These retirees would also lose the services provided by the base's exchange and commissary. Similar goods and services would still be available at the remaining Air Force bases in Southern California and at area Veteran's hospitals.

Closure of Los Angeles AFB under the proposed action would lead to the relocation of approximately 7,500 people to the new site of HQ SSD. This would help ease demand on the overburdened recreational facilities in the vicinity of the base, which have been termed inadequate by the National Recreation and Parks Association.

Police protection in the area would not be affected by the closure of Los Angeles AFB as the base provides its own security force and draws on local police departments only on an emergency basis. Local fire departments that service the base would likely experience a lessening of demands placed on them with closure of the base.

4.1.1.2 Alternative Action

Realignment scenarios other than the original proposal for the sole and complete closure of Los Angeles AFB have been envisioned by the Air Force. Among these are the concurrent relocation of the Ballistic Missile Organization (BMO) to the base which will receive HQ SSD, resulting in the reassignment of 10,000 personnel. Partial closure of Los Angeles AFB and the reassignment of either

5,000, 2,500, or 1,000 personnel to a new base has also been proposed. The socioeconomic impacts of these options should Los Angeles AFB be chosen have been summarized in Table 4.1.1-1 (TBS).

4.1.1.3 No Action Alternative

Under the No Action Alternative, socioeconomic activity in the region surrounding Los Angeles AFB will be characterized by the baseline descriptions found in Chapter 3.0.

4.1.2 Land Use and Aesthetics

4.1.2.1 Proposed Action

The proposed action concerns the disposition of current facilities at Los Angeles AFB and the Aerospace Corporation presented in Table 2.3-2.

Areas A and B of Los Angeles AFB and Facilities of the Aerospace Corporation. Areas A and B of Los Angeles AFB and facilities of the Aerospace Corporation are within a 2-square-mile industrial district of east El Segundo, which is part of the greater industrial district of the South Bay area of metropolitan Los Angeles. The City of El Segundo, through its adopted general plan, presents development policies that encourage the placement of industrial and manufacturing uses, and the general plan is supported by the zoning ordinance whose development requirements allow commercial manufacturing and light and heavy manufacturing.

The area is served by an extensive multiuse transportation infrastructure consisting of a freeway system of Interstate 405 and a city system of arterial streets. Los Angeles International Airport, 1 mile to the north, provides access to commercial airline and air freight service. The rail lines of the Southern Pacific Railroad Company and Atchison and Topeka Railroad Company provide convenient freight service. The Los Angeles County Transportation Commission is in the process of establishing commuter rail service to the area.

It is anticipated that the facilities excessed to other public agencies or sold to the private sector would be used by other entities whose needs require commercial and industrial zoning and can benefit from the extensive transportation infrastructure. There are no known amendments planned for the commercial/manufacturing/industrial zoned property. The land use and aesthetic impacts related to the proposed action would be negligible.

The Lawndale Annex No. 3 is planned to be excessed to other public agencies or sold to the private sector. The property is within the South Bay industrial area within the City of Hawthorne. The facility is adjacent to the new six-story Federal Building, the regional office of the Federal Aviation Administration, and across the street from a large industrial complex owned by TRW. This site also is served by a multiuse transportation system within the Cities of Hawthorne, Manhattan Beach, and Redondo Beach. The impacts would be similar to those of Los Angeles AFB and the Aerospace Corporation, which would be negligible.

Fort MacArthur Housing Area. The Fort MacArthur Housing Area and administration facilities would be retained (Table 2.3-2); therefore, the proposed action would have no impact on the Fort MacArthur Housing Area and administrative facilities.

Pacific Crest Housing Area. The Pacific Crest Housing Area consists of 91 single-family dwellings on the site of the former Bogdanovich Park conveyed to the Air Force by the City of Los Angeles. The land, prior to the development of the park, was the site of the U.S. Navy Portsmouth Housing Area. The property is zoned R1-1 and is not located within the Coastal Zone administrated by the California State Coastal Commission. The property is designated "Publicly Owned 1 (recreation, environmental protection, or school site)" in the San Pedro Community Plan of the City of Los Angeles. This plan specifies that in the event federal property is declared surplus by the federal government, future (nonfederal) use should be used for recreation, education, open space, or other public purposes. Therefore, in the event that the property is sold, an amendment to the community plan would have to be processed to be consistent with the R-1 zoning; otherwise, the existing zoning would be inconsistent with the community plan, a condition not permitted by state planning law.

No unforeseen problems are anticipated with the amendment since the City of Los Angeles adopted the R1-1 zone and conveyed the land back to the federal government for the purpose of building military housing for the Air Force. The proposed action would not involve any further building. Therefore, the anticipated land use and aesthetic impacts related to the proposed action would be negligible.

Pacific Heights Housing Area. The Pacific Heights Housing Area was developed at the same time as Pacific Crest. The background is similar to Pacific Crest with the following exceptions:

- The property was formerly a U.S. Army installation of Fort MacArthur; and
- The property is within the Coastal Zone administered by the State Coastal Commission.

The property at Pacific Heights is zoned R1-1 by the City of Los Angeles and designated "Publicly Owned 1 (recreation, environmental protection, school site)" in the San Pedro Community Plan. This plan requires that the policies of the community plan take effect in the event federal property is declared surplus and is acquired by an entity other than a federal agency. The existing use, while consistent with the R1-1 zoning district of the City of Los Angeles zoning ordinance, would not be consistent with the community plan if the land is acquired by a nonfederal entity. Therefore, an amendment of the community plan to a designation consistent with the R1-1 zoning district would have to be processed. For the Pacific Heights site, the *Final Environmental Impact Statement (FEIS) of the Air Force Space Division Housing Project, San Pedro, California*, (July 1986), documents a disagreement between the Air Force and the State Coastal Commission. The Air Force made a determination of consistency with the State Coastal Plan. The State Coastal Commission, in its Consistency Determination No. CD-17-86 on May 29, 1986, objected to the consistency determination made by the Air Force. The FEIS does not document any resolution of the matter between the two parties. The inconsistency between the Air Force and State Coastal Commission has the potential to be commented on by the commission, as a responsible agency, when the City of Los Angeles processes an amendment to change the Publicly Owned 1 designation on the property to a designation consistent with R1-1 zoning.

The anticipated land use and aesthetic impacts related to the proposed action would be negligible if the property is excessed to a federal agency; if the property is excessed to other than a federal agency or sold to the general public, the anticipated impacts could range from negligible to significant depending on the public response expressed during the amendment process of the Community Plan held by the City of Los Angeles, the Lead Agency.

4.1.2.2 Alternative Action

Changes resulting from the alternative action at Los Angeles AFB and the Aerospace Corporation would be the same as for the proposed action. More facilities would be retained, and the impacts would be proportionally reduced.

4.1.2.3 No Action Alternative

"will not include upgrades"

Los Angeles AFB and the Aerospace Corporation would continue their present mission, Area A facilities would be refurbished, Area B facilities would be demolished, and new facilities would be constructed. The present military housing would continue. The impacts resulting from the no action

alternative are anticipated to range from negligible to not significant. The no action alternative is presented in Table 2.4-1.

The Lawndale Annex No. 3 facility would be sold. The impacts related to the no action alternative concerning the sale of the Lawndale Annex No. 3 facility would be the same as the proposed action.

4.1.3 Transportation

4.1.3.1 Proposed Action

Closure of Los Angeles AFB and its ancillary facilities would require the transport of material, supplies, and personnel to another military facility (to be determined). Several transport methods, including truck, freight train, and airplane, could be used to transport personnel and equipment to the receiving base.

Transportation Systems. Los Angeles AFB is adjacent to two major railroads. The Southern Pacific Railroad line parallels the southern portion of Area A, perpendicular to Aviation Boulevard. The Atchison Topeka and Santa Fe Railroad line runs parallel to Aviation Boulevard, along the western and eastern portion of Area A and Area B, respectively. However, Los Angeles AFB has not, to date, utilized these facilities and it is not anticipated that the base would do so during drawdown.

Ground Traffic. Traffic volume would increase on Aviation, El Segundo, and Compton boulevards during closure activities; however, the proposed phased drawdown would mean that not all relocations and equipment transport would occur simultaneously. Even though the traffic volume would increase, in general, this effect would be offset by the decrease in traffic after the base is closed. Approximately _____ vehicles enter or exit the base daily. After closure, the number of vehicles would be reduced, resulting in a _____ percent decrease in daily traffic on Aviation Boulevard, a _____ percent decrease on El Segundo Boulevard, and a _____ percent decrease on Compton Boulevard.

Air Traffic. Closure of Los Angeles AFB would have a slight beneficial impact on air traffic at nearby Los Angeles International Airport in that the approximately 80,000 commercial flights per year taken by military and civilian personnel would be eliminated. It is reasonable to assume, however, that commercial carriers would be adversely affected by this reduction. No military aircraft are assigned to Los Angeles AFB.

4.1.3.2 Alternative Action

Under the alternative action, use of the existing transportation system, traffic volumes, and air travel would be proportionately less than the existing levels of impact.

4.1.3.3 No Action Alternative

Auto traffic volume and flow would be the same as present conditions. Air traffic would also continue as presently defined.

4.1.4 Utilities

4.1.4.1 Proposed Action

Water Supply. Base closure would result in a usage decrease of approximately 20,840,765 cubic feet per year inclusive of Area A, Area B, Lawndale, Fort MacArthur, and the military housing areas. Closure of the Aerospace Corporation would result in a further usage decrease of 6,818,182 cubic feet per year. This represents a revenue loss to Southern California Water Company, the City of El Segundo, and to the Los Angeles Department of Water and Power of $169,100 per year. This should not represent a significant revenue loss to the purveyors.

Wastewater Treatment. Base closure would decrease wastewater volumes to the sanitation districts of Los Angeles treatment facilities, ~~which could necessitate higher sewer rates to compensate lost revenues~~. However, the loss in wastewater volumes would give the Los Angeles wastewater system additional expansion capacity.

Solid Waste. The closure of Los Angeles AFB would result in a beneficial impact to both the Calabasas and Puente Hills landfills. The reduction in the tonnage of waste from the base may give the landfill a longer use life. The waste generated by the closure would increase in the short term but would be offset by the total base reduction after closure.

Energy. Base closure would result in a usage decrease of approximately 38,275,700 kilowatt-hours (kWh) per year inclusive of Area A, Area B, Lawndale, Fort MacArthur, and the military housing areas. Closure of the Aerospace Corporation would result in a further usage decrease of 45,012,800 kWh per year. This represents a revenue loss to Southern California Edison Company and the Los

Angeles Department of Water & Power. This should not represent a significant revenue loss to the purveyors.

Base closure would result in a usage decrease of approximately 900,850 million cubic feet per year inclusive of Area A, Area B, Lawndale, Fort MacArthur, and the military housing areas. Closure of the Aerospace Corporation would result in a further usage decrease of 94,344 cubic feet per year. This represents a revenue loss to Southern California Gas Company. It should not represent a significant revenue loss to the purveyor.

4.1.4.2 Alternative Action

Utility demands would be proportionately greater with each of the options of the alternative action.

4.1.4.3 No Action Alternative

Present demands on the various utility systems would continue if the no action alternative were selected.

4.1.4.4 Mitigations

No mitigations are associated with the proposed, alternative, or no action alternative.

4.1.5 Hazardous Materials

4.1.5.1 Proposed Action

All waste stored at Los Angeles AFB facilities would be properly disposed of and all residual contamination would be remediated in accordance with an Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) approved closure plan. Sampling would occur at the hazardous waste accumulation points (storage tanks and facilities) as well as an assessment of spills that have occurred at any of these accumulation points.

Storage Tanks. All under- and aboveground storage tanks were tested for leaks in the fall of 1989 and remedial action is being taken to remove existing tanks. Plans include replacement of these tanks with

double-wall tanks in the near future. This action would have positive effects on the environment in that the potential of accidental spills will be reduced.

Installation Restoration Program Sites. ~~The closure of Los Angeles AFB would prevent new hazardous~~ wastes from being generated by the military. The elimination of hazardous substances would have a positive impact on the biological and physical environment of the base. The Installation Restoration Program (IRP) sites under investigation will be restricted from future development until any necessary remedial actions were completed. The IRP will not be affected by implementation of closure. The IRP is independent of the base closure process and will continue, as needed, after the military mission has been terminated.

Asbestos. An asbestos survey was completed for Los Angeles AFB Area A, Area B, the Lawndale Annex, and the Fort MacArthur facilities. No asbestos-containing materials were located in the Pacific Heights and Pacific Crest housing units. A survey of asbestos-containing materials at the Aerospace Corporation would be completed prior to disposition of the facilities. Under present conditions, asbestos contamination is reduced as the result of adequate air conditioning and heating at all facilities. Environmental control in base facilities would be maintained during caretaker status to prevent additional deterioration of asbestos materials that could become friable and produce hazardous conditions. Eliminate AFB statement

4.1.5.2 Alternative Action

Waste production would be proportionately greater with each of the options of the alternative action than experienced with the full closure of the base.

4.1.5.3 No Action Alternative

The waste stream's present composition and volume would continue. Hazardous waste disposal for Los Angeles AFB Area A and Area B would continue to be handled by a civilian contractor. The contractor is a California-licensed waste hauler who disposes of the materials in accordance with California and federal regulations.

The Aerospace Corporation would maintain its Extremely Hazardous Waste Disposal Permit, as required by the California Department of Health Services - Toxic Substances Control Division. The

wastes would continue to be collected onsite and are transported by a California-licensed waste hauler to a licensed hazardous waste facility.

The present program associated with storage tank removal, the IRP program, and the removal of asbestos-containing materials will continue.

4.1.5.4 Mitigations

No mitigations are associated with the proposed, alternative, or no action alternative.

4.1.6 Geology and Soils

4.1.6.1 Proposed Action

Geology. Closure of Los Angeles AFB would have no effect on the geology or the availability of mineral resources because the federal government would retain ownership and mineral rights.

Soils. Positive effects would occur for local topography as new construction and other activities for military missions would no longer be a concern. The elimination of new construction would prevent grading or excavating for base needs, thereby reducing the amount of soil erosion. Risks associated with new soil contamination by spills or inadvertent releases of hazardous materials caused by military operations would be eliminated.

4.1.6.2 Alternative Action

Under the alternative action, the impacts on geology and soils would be proportionately less than the full closure of the base facilities.

4.1.6.3 No Action Alternative

General base activities and new construction would contribute to some soil erosion. The potential for soil contamination through accidental releases of hazardous materials would remain. However, the base has implemented mitigation programs to manage hazardous wastes and to prevent or minimize additional contamination.

4.1.7 Water Resources

4.1.7.1 Proposed Action

Groundwater. Base closure would have a positive impact on the water quality in the area by diminishing potential and ongoing impacts to groundwater quality. Fuel and other hazardous chemical storage tanks would be emptied, and spills from corroded tanks would be avoided. Currently, no groundwater is drawn from underlying aquifers for use onbase. Base closure would not reduce permeable surfaces, thereby increasing the recharge rate of the aquifer. However, it would preclude continued development that would reduce the recharge rate.

Surface Water. Base closure would have a positive impact on the water quality in the area by diminishing potential and ongoing impacts to surface water quality. The cessation of operations would also significantly reduce the introduction of contaminants to stormwater runoff. Plans for removing existing fuel and chemical storage tanks and replacing them with double-walled tanks are under development, thereby reducing the potential for spills from corroded tanks.

The overall demand for water for drinking, sanitation, irrigation, and industrial uses would be significantly reduced. In addition, the demand on the area's water facilities, which supply all of the base's water, would be significantly reduced. However, because the Los Angeles area's water supply is adequate, the reduced demand would have little actual impact. Stormwater would still be routed to the streams that drain the base so that the current hydrology of these streams would be maintained.

4.1.7.2 Alternative Action

Under the alternative action, the impacts on ground and surface water would be proportionately less than those experienced from full closure of the base.

4.1.7.3 No Action Alternative

No additional effect on existing groundwater conditions is anticipated. The potential for groundwater contamination through accidental release of hazardous materials would remain; however, the base has implemented mitigation programs to manage hazardous wastes and to prevent or minimize additional contamination.

No additional effect on existing surface water conditions is anticipated. The potential for surface water contamination through accidental release of hazardous materials would remain; however, the base has implemented mitigation programs to manage hazardous wastes and prevent or minimize additional contamination.

4.1.8 Air Quality

The closure of Los Angeles AFB and Aerospace Corporation would result in the reduction of air pollutant emissions in the area. Because the emissions from these facilities contribute only a very small fraction of the pollutant burden in the area, the improvement in air quality would not be measurable.

4.1.8.1 Proposed Action

When the base is fully demobilized and closure is complete, air emissions from base operations would be eliminated. Base closure would reduce the number of motor vehicles in the affected Los Angeles communities, which would thereby result in lower automobile emissions. In addition, the base incinerator would be deactivated. However, the reductions of air pollutant emissions are not expected to result in significant changes in local air quality. As shown in Section 3.1.8.3, the estimated emissions from the base are only a small portion of the total emissions for the Los Angeles County and the South Coast Air Basin. Therefore, the air quality impact would be insignificant. However, even though the emission reduction is relatively small, it would still have some beneficial effect on the local air quality.

4.1.8.2 Alternative Action

The alternative action would cause proportionately more air pollution than that experienced from the full closure of the base.

4.1.8.3 No Action Alternative

~~Present air emissions from Los Angeles AFB represent a small portion of the total emissions for the county.~~ With the no action alternative, air emissions would remain at present levels.

4.1.9 Noise

The closure of Los Angeles AFB and Aerospace Corporation would reduce traffic and the associated noise in the local area. Day-night (L_{dn}) noise levels would be reduced approximately 1 decibel on the A-weighted scale (dBA) to 2 dBA. ~~This reduction would hardly be detectable in the high background noise levels that currently exist in the area.~~

4.1.9.1 Proposed Action

~~No military flights are associated with current activities at Los Angeles AFB.~~ Noise generated from ground transportation associated with the base would be reduced significantly because of the reduction in military, supplier, contractor, and dependent traffic. During ~~drawdown and closure~~, the movement of equipment, supplies, and personnel could cause traffic noise to increase slightly; however, this short-term effect would be offset by the overall reduction of noise after base closure. Therefore, the proposed action would have insignificant impacts on the noise levels in the area.

4.1.9.2 Alternative Action

Noise generated from ground transportation would be proportionately greater than that experienced by the full closure of the base.

4.1.9.3 No Action Alternative

Current noise levels would continue under this alternative.

4.1.10 Biological Resources

4.1.10.1 Impacts of the Proposed Action

Vegetation. Under the proposed action, all existing facilities (e.g., buildings, parking lots, roads, landscaping) would be maintained in their present condition. Therefore, based on existing data, the proposed action would not have a significant impact on the plant resources of the area. Subsequent field studies may indicate the potential for increases in species diversity or population sizes following implementation of the proposed action based on the decrease in human activity.

Wildlife. The most important effects of the proposed action on the wildlife of the area would result from an overall decrease in human activity. Based on preliminary studies, this decreased activity would not have a significant impact on the wildlife of the area because of the lack of suitable habitats. Subsequent field studies may indicate a potential for increased habitat and therefore a potential for increases in wildlife species diversity and/or population sizes.

Threatened and Endangered Species. The only threatened or endangered species that may occur within the area affected by of the proposed action is the Palos Verdes blue butterfly, which is federally listed as endangered. Two specimens of Astragalus trichopodus leucopsis, the plant on which the larval form of the butterfly feeds, were found in 1986 at White Point City Park. There have been no reports of recent sightings of the Palos Verdes blue in the park. Since the park is open to the public, the proposed action would lead to only a slight decrease in human activity in the park. Therefore, based on preliminary studies, the proposed action is not expected to have a significant impact on the range or abundance of the Palos Verdes blue butterfly.

4.1.10.2 Alternative Action

Vegetation. Based on preliminary studies, the alternative action would not have a significant impact on the plant resources of the area.

Wildlife Resources. Based on preliminary studies, the alternative actions would not have a significant impact on the wildlife resources of the area.

Threatened and Endangered Species. The Palos Verdes blue butterfly is the only endangered species that may occur within the area affected by the alternative actions. Preliminary studies indicate that the alternative action would not have a significant impact on the range or abundance of the Palos Verdes blue butterfly.

4.1.10.3 No Action Alternative

Vegetation. Existing evidence indicates that the no action alternative would have no significant impact on the plant resources of the area. ~~However, if there is future development on or around the sites, it may result in impacts to the area's plant resources. These impacts would be discussed in a separate environmental assessment EA.~~

Wildlife. Existing evidence indicates that the no action alternative would have no significant impact on the wildlife resources of the area. However, if there is future development on or around the sites, it may result in impacts to the area's wildlife resources. These impacts would be discussed in a separate (EA).

Threatened and Endangered Species. Preliminary studies indicate that the no action alternative would have no significant impact on any threatened or endangered species. However, future development on or around the sites may have impacts on threatened and/or endangered species. These impacts would be addressed in a separate EA.

4.1.11 Cultural and Paleontological Resources

4.1.11.1 Proposed Action

Fort MacArthur contains an NRHP Historic District and an NRHP eligible site, the Trona Plant. The district and the Trona Plant would not be affected by base closure because they would be maintained in their present condition during caretaker status.

No prehistoric or historic resources presently exist in the Pacific Crest and Pacific Heights housing areas. Paleontological materials do occur in the area; however, these deposits would not be affected by closure.

No prehistoric or historic resources have been identified at the Lawndale Annex. Subsurface paleontological materials may occur in this area. However, base closure would not affect buried paleontological materials.

4.1.11.2 Alternative Action

Impacts under the alternative action would be similar to those of the no action alternative.

4.1.11.3 No Action Alternative

Present levels of security would be maintained, and vandalism to the existing and eligible NRHP sites would remain at a minimum.

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4.2 NORTON AIR FORCE BASE, CALIFORNIA - TBS

4.3 VANDENBERG AIR FORCE BASE, CALIFORNIA

4.3.1 Community Setting

4.3.1.1 Proposed Action

Population and Employment. The proposed action would cause the Region of Influence (ROI), which includes Vandenberg Air Force Base (AFB), to experience a 4.6 percent increase in population over and above its baseline growth between 1993 and 1996. The inmigration resulting from the project would be 5,565 in 1993, 3,015 in the peak construction year of 1996, and then fall by 526 in 1997. The net addition to area population, as a result of the proposed action, would be 17,098.

Of the 17,098 people who would inmigrate during the operations phase of the project, 2,135 would live onbase while 14,963 would live offbase. This would constitute 3.6 percent of the area's population. As a result, the effects of the proposed action on the surrounding community would be fairly significant.

The proposed action would generate 5,706 new jobs beginning in 1993, grow to a peak of 15,470 jobs in 1996, and stabilize at 14,594 in 1997. During the peak year for construction (1996), 8,010 of the 15,470 jobs would constitute direct jobs while 7,460 would be secondary in nature. Of this total, 1,162 would be filled by local employees.

The proposed action would represent 7 percent of the total employment in the ROI during the peak year of the project. This would result in an unemployment rate for the ROI of 0.6 percentage points lower in 1996 than if the project had not been undertaken.

The proposed action would produce $148,709,000 of personal income in 1993, $403,471,000 in the peak construction year of 1996, then fall to $380,316,000 in 1997 and every year thereafter in the ROI.

Housing. The proposed action would create demand for 2,155 housing units in the first year of construction, 5,868 units in the project's peak year, and 5,523 units in 1997 and each year thereafter.

Most of the unaccompanied military personnel reassigned to Vandenberg AFB, as a result of the proposed action, would be assigned quarters onbase. The Air Force would most likely house approximately 50 percent of its new personnel onbase. Given the 3 percent vacancy rate among the 140,526 units currently existing in Santa Barbara County and the surrounding area, the proposed action would exert strong pressure on rental costs and home prices.

Education. As a result of the proposed action, enrollment would increase by 2,394 within the ROI. This represents a 6 percent increase in the ROI over baseline projections. Existing school facilities would be able to accommodate these additional students and, as a result, no construction would be needed. The project would increase the pupil-to-teacher ratio from 21.3 to 22.42 and necessitate the hiring of 110 more teachers to maintain the baseline ratio. Without the employment of 110 additional teachers, the schools would still be within the weighted average maximum state standard of 28.

Community Services. Medical care in the communities surrounding Vandenberg AFB would be affected by the proposed action through demand for medical services by civilian employees of the project and by military personnel who participate in the CHAMPUS program.

The addition of new workers would raise the resident-to-hospital bed ratio from the current rate of 526 to 537 in 1993 and 573 in 1997 and each year thereafter. This would place a moderate strain on the ability of the existing medical facilities to provide adequate care. Vandenberg AFB would not be able to serve the 1,750 additional military personnel and 2,520 military dependents without increasing its medical staff and facilities.

The 4,270 military personnel and dependents brought to Vandenberg AFB by the proposed action would add to the number of people drawing on such services as the base exchange, commissary, and recreational facilities. Without an expansion of facilities and staff, services to military retirees who draw on base resources would be degraded.

The introduction of 17,098 people to the communities in the vicinity of Vandenberg AFB by the proposed action would not place a significantly greater demand on recreational facilities in the area than now exists, given the relative abundance of public recreational resources at present.

Current staffing for fire and police departments in Santa Barbara County would not be adequate given the population increase created by the proposed action. For public services in general, Santa Barbara County now employs 21.37 personnel per 1,000 residents. To maintain current service levels, 363 additional public employees would be needed for the proposed action. If public employment is not increased, the number of government employees per 1,000 residents would fall to 19.82. This would not have a significant impact on the quality of service provided to the county's citizens.

4.3.1.2 Alternative Actions

Realignment scenarios other than the original proposal for the sole and complete closure of Los Angeles AFB have been envisioned by the Air Force. Among these are the concurrent relocation of BMO to the base which will receive HQ SSD, resulting in the reassignment of 10,000 personnel. Partial closure of Los Angeles AFB and the reassignment of either 5,000, 2,500, or 1,000 personnel to a new base has also been proposed. The socioeconomic impacts of these options should Vandenberg AFB be chosen have been summarized in Table 4.3.1-1 (TBS).

4.3.1.3 No Action Alternative

Under the no action alternative, socioeconomic activity in the region surrounding Vandenberg AFB would be characterized by the baseline descriptions found in Chapter 3.0.

4.3.2 Land Use and Aesthetics

4.3.2.1 Proposed Action

In studying land use and aesthetic changes that could be associated with the proposed action and alternatives, several siting alternatives were analyzed:

- The installation facilities consist of two sites: Site 1 and Site 2. Site 2 consists of subarea Sites 2A and 2B.

- The proposed action military housing area consists of two sites.

Site 1. Site 1 would be bounded by Nebraska Avenue on the north, Ocean View Avenue on the west, the irregular boundaries of Alaska Bay Road and California Boulevard on the east, and 13th Street on the south. The site is within the base support area of the Vandenberg AFB Comprehensive Plan.

The proposed action would displace existing and planned unaccompanied housing and recreation facilities north of Washington Avenue. An industrial use planned for relocation would also occur. The proposed action would also require TBS acres of vacant land, currently planned Administrative, adjacent to an existing industrial area at the intersection of Airfield Road (extension of Ocean View Avenue) and Washington Avenue, and the Space and Missile Administrative offices.

Site 1 would result in the expansion of the industrial uses at Vandenberg AFB within the designated base support area. This new, industrial area is an expansion of an existing smaller, industrial area, which would be extended east to abut the western side of the Morale, Welfare, and Recreation (MWR) and Administrative corridor (sited along California Boulevard/Arizona Avenue). The main industrial area of Vandenberg AFB currently abuts the eastern side of the corridor. Site 1, while not consistent with the future land use map of the comprehensive plan, is consistent with the goals and policies of the plan in Option I, reflects the general industrial pattern of the existing area, sited in a manner that would not adversely affect sensitive areas of the base support area.

Site 2. Site 2 consists of Sites 2A and 2B. Site 2A is bounded by Washington Avenue on the north, Arizona Avenue on the west, 13th Street on the south, and the existing industrial area on the east. Site 2B is bounded by an existing sanitary landfill to the north, Iceland Avenue and an existing industrial area to the west, vacant planned industrial land to the south, and the future alignment of Loop Road and Burton Mesa Reserve to the east. This alternative would displace some existing low-density administrative industrial, unaccompanied housing, and planned administrative land, and a small scattering of MWR in Site 2A. Site 2B would use an existing industrial building and develop vacant land designated Industrial. This alternative would expand the existing industrial area through infill of existing industrial facilities and land and through the acquisition of land abutting the existing industrial area. Site 2B is consistent with the comprehensive plan; Site 2A, while not consistent with the future land use map of the plan, is consistent with the goals and policies of the plan because it

is an expansion of the industrial area through the use of adjoining land. Sites 2A and 2B would be sited in a manner that would not adversely affect sensitive areas of the base support area.

Military Housing. The southeastern boundary of military family housing Site 1 would be adjacent to Site 1, its southwestern boundary would be Washington Avenue, the eastern boundary would be Ocean View Avenue, the northern boundary would be a riparian area of an unnamed ephemeral stream course, and the western boundary would be an existing windbreak of eucalyptus trees parallel to Ocean View Avenue. The land west of Ocean View Avenue is outside of the base support area of the comprehensive plan on land designated Burton Mesa Reserve. A parcel of land would extend east of Ocean View Avenue, which is adjacent to an existing Capehart housing area. The land is currently designated for MWR uses, including an existing recreation area. A smaller area is also east of Ocean View Avenue on land designated Recreation and Unaccompanied Housing now vacant. This area is also adjacent to land designated Airfield, which is a clear zone for a helicopter landing pad. Military family housing Site 2 is located in an area on the base currently designated for future housing expansion in the comprehensive plan. This 270-acre area is bounded by California Boulevard, Lompoc-Casmalia Road (CR-1), Utah Avenue, and future Loop Road.

Offbase Host Communities.

Lompoc and Unincorporated Communities in the Vicinity. The City of Lompoc and the surrounding unincorporated communities of Mission Hills (including Mesa Oaks) and Vandenberg Village have historically been host to approximately 55 percent of Vandenberg AFB employees choosing to reside offbase (i.e., military, civil service, and civilian contractors). The lack of developable residential land and the policies of the adopted city and county general plans have essentially frozen the designated urban areas to existing boundaries and have protected prime farmland and environmentally sensitive areas from future conversion to urbanized uses. Furthermore, the Vandenberg AFB comprehensive plan warns that the westward expansion of Lompoc across these prime farmlands could create a conflicting situation in which the land would lie close to or under the Vandenberg AFB flight paths.

It is anticipated that the proposed action would probably create extreme development pressures on the City of Lompoc and County of Santa Barbara to convert prime agricultural land and/or

environmentally sensitive land to urban uses. The proposed action may also increase the rate of growth to achieve total buildout sooner.

Santa Maria and Unincorporated Communities in the Vicinity. Santa Maria and the unincorporated communities, consisting of Orcutt and Tanglewood, have historically been host to approximately 40 percent of Vandenberg AFB employees who reside offbase (i.e., military, civil service, and civilian contractors).

Santa Maria, through its proposed land use element of the general plan (currently not adopted), would recommend the expansion of potential residential use to increase the city's housing by 5,927 dwelling units and adjust the county line and city boundary, which would add 375 more dwelling units. The adopted land use element mentions that there is adequate vacant land designated Residential for moderate population growth. In instances of extended periods of growth, the city may find it necessary to develop an active annexation policy, redevelop older residential neighborhoods, and expand selectively into prime agricultural lands. The new general plan emphasizes phasing growth to keep it manageable. The unincorporated area around Santa Maria could accommodate development at a faster rate by annexation as opposed to new development away from the city on lands managed by the County of Santa Barbara, as general plan policies direct growth to existing urban areas and prevent leap-frog development and protection of environmental and prime agricultural resources.

Other Areas. Communities located elsewhere have historically provided residences for 5 percent of Vandenberg AFB personnel living offbase. It is anticipated these levels would essentially remain the same, with the exception of those communities that have reached total buildout or have moratoria on new development based on water hook-ups or growth control measures.

The facilities of the proposed action would not be seen from the present alignment of the Lompoc-Casmalia Road (CR-1), the key observation point, because the administrative and industrial facilities of the proposed action would be located 7,000 feet or more away and the military housing 2,000 feet or more from that highway. In addition, the intervening terrain and vegetation, including windbreaks, chaparral, and woodlots, and existing development of the base support area, would further block the view of the facilities from the key observation point.

4.3.2.2 Alternative Actions

Changes resulting from the alternative action including Options II, III, IV, and V at Vandenberg AFB would be about the same as in the proposed action (not significant), except there would be proportionally fewer acres of Vandenberg AFB land within and adjacent to the base support area that would be developed. The effects to the host communities of Lompoc, Santa Maria, and surrounding unincorporated communities would essentially be the same as in the proposed action. The effects of Options IV and V to the host communities of Lompoc and Santa Maria probably would be minor.

4.3.2.3 No Action Alternative

Vandenberg AFB would continue with its existing missions and future missions as described in the base comprehensive plan, plus accommodate new growth.

The City of Lompoc and the unincorporated communities of Mission Hills and Vandenberg Village have few vacant parcels for residential development. Total buildout is anticipated to occur within 5 years even if no new missions were added to Vandenberg AFB.

The City of Santa Maria has planned for future growth and has expressed its willingness to accommodate the future offbase needs of Vandenberg AFB.

The no action alternative would not affect other communities in the vicinity of the base.

4.3.3 Transportation -- TBS

4.3.4 Utilities

Because of construction personnel still onsite, the 1996 projected figures for program-related requirements are peak figures. The 1997 figures represent the proposed action in full operation.

4.3.4.1 Proposed Action

Water Supply. Average daily requirements, for the city of Santa Maria would increase from a projected baseline of 13.19 million gallons per day (MGD) in 1996 and 13.62 MGD in 1997 to 15.79 MGD in 1996 and 16.13 MGD in 1997 (Table 4.3.4-1). Program-related requirements would increase average daily demand by 20 percent from the projected baseline level. The system, with an 18 MGD capacity, would be operating at 90 percent of its capacity and would be affected by the program-related increased demand.

Program-related requirements of 0.58 MGD in 1996 and 0.56 MGD in 1997 would increase average daily demand, computed by using 180 gallons per capita per day (gpcd), to 6.96 MGD and 7.05 MGD in 1996 and 1997 to the City of Lompoc's facility. The facility's scheduled upgrade to 10 MGD would be able to handle the increased demands from the proposed action.

Potable water demand at Vandenberg AFB would increase from 4.1 MGD to 5.08 MGD in 1996 and 5.05 MGD in 1997 due to a combination of onbase housing and facilities demands. With an estimated 11 MGD capacity, the base has capacity to pump and treat the supply needed to meet program-related demand. Estimates were computed by using Air Force Manual 88-10:150 gpcd for residents and 50 gpcd for nonresidents.

Wastewater Treatment. Average daily flows for the City of Santa Maria would increase from a projected baseline level of 5.6 MGD to a peak of 8.47 MGD in 1997 because of a 1.25 MGD program-related increase. The presently planned upgraded facility of 8.7 MGD would not meet the increased demands of the proposed action; therefore, the system would be affected. Estimates were based on 100 gpcd.

Average daily flows for the City of Lompoc would increase from a projected baseline level of 3.56 MGD to 5.79 in 1997, this includes 0.76 MGD from Vandenberg AFB. The contractual amount of effluent treatment would be in the allowable limits of 1.53 MGD for the base. The planned upgraded system with a capacity of 10 MGD would meet the increased demands of the proposed action. Projected increased flows were based on 100 gpcd for the City of Lompoc, and, as suggested by Air Force Manual 88-11, 80 percent of the potable water use for Vandenberg AFB.

Table 4.3.4-1

Water Supply Relocation Requirements
Santa Maria

1986

Options	Personnel	Increased Demand[1] (MGD)	Baseline (MGD)	Total (MGD)	% Increase
I	12,987	2.6	13.19	15.79	20
II	10,953	2.19	13.19	15.38	17
III	8,636	1.73	13.19	14.92	13
IV	3,636	0.73	13.19	13.92	6
V	1,235	0.29	13.19	13.48	2
		1997			
I	12,530	2.50	13.62	16.13	18
II	10,616	2.12	13.62	15.74	16
III	8,461	1.69	13.62	15.31	12
IV	3,526	0.71	13.62	14.33	5
V	1,390	0.28	13.62	13.90	2

NOTE: [1]Estimated utilizing 200 pcd

Solid Waste. Solid waste generation would increase by 15.89 tons per day T/day in 1996 and 15.0 T/day in 1997, or approximately 3 percent of the city of Santa Maria's solid waste generation. With the city of Santa Maria already adequately disposing of 585 T/day, the program-related increase would not require additional equipment or personnel. The city of Lompoc is presently disposing of 170 T/day, projected to increase to 200 T/day in 1997. Program-related increases of 5.68 T/day in 1996 and 5.48 T/day in 1997 would not require additional equipment or personnel. Per capita generation of 3.5 lb/day was used for residential generation estimates.

Present solid waste generation of 35 T/day would increase to 54 T/day generation on Vandenberg AFB in 1996, then would stabilize to 51 T/day to in 1997. The base would be able to handle the increased generation from the proposed action. The existing landfill has a projected lifespan of 35 years and would be able to handle the increased flow. Per capital generation estimates were based on 3.5 lb/day per person for residential generation, 0.6 per capita for construction solid waste estimates, and 2 lb/day per person was used for facility generation.

Energy. Increased electrical energy generation for the city of Santa Maria and the base would be met by Pacific Gas and Electric Company (PG&E). Estimated program-related demands would peak in 1996 to 22 megawatts (MW). PG&E would have adequate power supplies to meet this increase. Estimated peak demand of 17 MW for the facilities would be met with the 92 megavolt-ampere system presently on Vandenberg AFB. Estimated increased program-related electrical generation for the city of Lompoc would be 5,040,000 kW in 1996 and 4,863,000 kW in 1997. The Northern California Power Agency has adequate supplies to meet the increased demand.

Southern California Gas Company has the infrastructure and reserves to meet the increased project-related natural gas demands.

4.3.4.2 Alternative Action

Water Supply. Average daily demand on the potable water system of the city of Santa Maria is decreased with each option as shown on Table 4.3.4-1. The system is operating above 90 percent in all the options but Option V. The system is affected by Options II, III, and IV of the alternative action.

Program-related average daily demand decreases correspondingly with each option. The capacity of each of the system's at the city of Lompoc and Vandenberg AFB would meet the program-related requirements of Options II through V of the alternative action.

Wastewater. Average daily flows would decrease with each option. The treatment facilities of the cities of Santa Maria and Lompoc would be able to treat the flows associated with Options II through V.

Solid Waste. The generation of solid waste would decrease incrementally with each option. Santa Maria, Lompoc, and the base would be able to handle the increased generation of solid wastes associated with program-related demands in Options II through V.

Energy. Estimated increased program-related electrical demands of Options II through V are less than that of Option I. PG&E would be able to meet the required energy demands of Options II through V.

Total natural gas consumption decreases correspondingly with each option. Southern California Gas Company has the infrastructure and reserves to meet the additional natural gas requirements of Options II through V of the alternative action.

4.3.4.3 No Action Alternative

There would be no adverse effect on the existing potable water systems, wastewater treatment facilities, solid waste disposal infrastructure, or increased energy requirements for Vandenberg AFB or the surrounding area in the no action alternative were selected.

4.3.5 Hazardous Materials

4.3.5.1 Proposed Action

The volume and composition of hazardous waste generation would increase on Vandenberg AFB due to the proposed action. The present volume at Los Angeles AFB of 142,801 lb, 4,894 gallons, and 55.27 yards would be expected and incorporated into the existing management system, stored onbase,

and then transported to treatment and disposal facilities. Any needed California and federal permits would be obtained.

4.3.5.2 Alternative Actions

Hazardous waste generated by the options of the alternative action would be incorporated into the existing management system, stored onbase, and transported to treatment and disposal facilities. Any permits required by state and federal regulations would be obtained.

4.3.5.3 No Action Alternative

Program-related hazardous waste production would not occur if the no action alternative were selected.

4.3.6 Geology and Soils

4.3.6.1 Proposed Action

Geologic Hazards. Vandenberg AFB is in the western portion of the Transverse Ranges Physiographic Province and is within the Hosgri Fault System (Figure 3.3.6-1). Three faults traverse Vandenberg AFB: the Hosgri Fault, the Honda Fault, and the Lion's Head/Lompoc-Solvang (Santa Ynez River) Fault. Epicenters of several seismic events have occurred within the Vandenberg AFB area and seismicities have ranged from 3.0 to 7.3 in magnitude on the Richter Scale (Figure 3.3.6-1).

As a result of an earthquake, liquefaction of the underlying geologic structures, or tsunami or seiche wave action may be generated. The proposed location for the Headquarters Space Systems Division (HQ SSD) mission is over 2 miles from and 300 feet higher than sea level. This might preclude any damage from tsunami or seiche wave action. Damage to structures may occur as a result of liquefaction if the structures are in areas with high water tables. As the sites for the realigned mission are located far enough from the Santa Ynez River and the San Antonio Creek, liquefaction might not pose as hazard.

Soils.

Construction Phase. Some impacts may occur to soil resources in the proposed alternative areas as a result of construction activities. Construction of the necessary facilities has the potential to increase the potential for erosion unless proper mitigation measures are taken.

Erosion is the wearing away of land surfaces by geological processes such as water and wind. To help quantify the potential amount of soil lost as a result of construction operations, there are two equations that may be employed to estimate the amount of soil that may be lost from the erosive effects of water or wind.

The Universal Soil Loss Equation (USLE) has been developed to quantify the amount of soil lost as a result of water forces. The predicted soil loss in tons/acre/year is defined by the following equation:

$$A = RKLSP \qquad [1]$$

Where: A = Predicted soil loss (tons/acre/year)
R = Rainfall and runoff
K = Soil erodibility
L = Slope length
S = Slope gradient or steepness
C = Cover and management
P = Erosion control practice

The rainfall and runoff factor, R, measures the erosive forces of rainfall and runoff. This factor provides the intensity plus duration of rainfall to the area being studied. The soil erodibility factor, K, indicates the inherent erodibility of a soil based on the infiltration capacity and structural ability of that soil. The topographic features, LS, of the soil reflect the influence of the length and steepness of the slope associated with the soil analyzed. The cover and management factor, C, indicates the influence of cropping systems and management variables on soil loss. The final factor, the support practice factor, P, describes the benefits of contouring, strip cropping, or other management practices being used.

Soil types encountered in the Vandenberg AFB area include the Tangair Sand and the Narlon Loamy Sand, which predominate within the base support area. Both soils have sandy textures, but vary through the sites by slope and particle size classification. For simplicity, the potential amount of soil loss due to water erosion was calculated for the Tangair Sand series. The following assumptions/calculations were made for the various parameters required to determine the potential soil loss from water erosion.

The rainfall and runoff factor value was derived from isopleth maps indicating the average rainfall in a 6-hour rainfall event. This information was then used to interpolate the erosive force of rainfall and runoff for the Vandenberg AFB area from a graph demonstrating an annual average erosion index and rainfall occurring within 6 hours. The erodibility of the Tangair series was obtained from the Soil Conservation Service (SCS) Soil Survey of the Vandenberg AFB area (1972). The topographic factors were based on an average slope length of 200 feet and an average percent slope of 4 percent for the Tangair series (SCS Handbook 537, 1978). The cover and management factor assumed no canopy cover and the vegetation on the soil surface was composed of litter. The final factor, the support practice factor, was judged to be of no consequence as there is no farming practices employed within sites identified for Option I sites. The predicted amount of soil lost as a result of water erosion was determined to be 7.0 tons/acre/year for the Vandenberg AFB area. As this rate exceeds the average amount of soil formed of 5 tons/acre/year, (USDA Handbook 587, 1978), the loss from water erosion is expected to be only slightly significant.

Wind erosion commonly occurs in arid and semiarid regions and has similar parameters to define the potential amount of soil loss as the water erosion formula. The following equation has been used to define soil loss due to wind erosion:

$$E = f(ICKLV) \qquad [2]$$

Where:
- E = The quantity of erosion per unit area (tons/acre/year)
- I = The soil erodibility
- C = A local wind erosion climate factor
- K = The soil surface roughness
- L = The width of the area examined
- V = The quantity of vegetative cover

The potential quantity of erosion per unit area (tons/acre/year) is a function of the soil erodibility, a local wind erosion climate factor, the soil surface roughness, the width of the area examined, and the quantity of vegetative cover. Soil erodibility was determined from a standard chart based on texture of the soil series (SCS unpublished data, 1990). The local wind erosion climate factor was based on prevailing wind velocity and wind direction across the area being analyzed. The surface roughness was determined as inconsequential. As a result of construction activities, it was assumed that the surface of the various zones would be leveled; therefore, all microtopographic structures would be essentially uniform. The field width was considered to be the distance across the construction site and the quantity of vegetative cover was rated as zero as any present would be scraped off to facilitate construction activity. Based on this equation, the predicted average annual soil loss due to wind would be 33 tons/acre/year. This is considered significant as it exceeds by greater than six times the average soil formation rate of 5 tons/acre/year (USDA Handbook 537, 1978).

Operational Phase (Option I). As buildings and landscapes would be installed, and pavement established for parking lots and roads, no impact to soil resources due to erosion is anticipated.

4.3.6.2 Alternative Actions

If one of the remaining options (II through V) were to be realigned at Vandenberg AFB, impacts to soil resources would decrease corresponding to how much construction would be required. The areas designated for the various components of the realigned mission would still be set aside, but as only a portion of the facilities would be required, only a relational fraction of the land might be exposed to the erosional forces of wind and water.

4.3.6.3 No Action Alternative

There would be no adverse impact to the existing geology and soil resources of Vandenberg AFB if the no action alternative was selected.

4.3.6.4 Mitigation Measures

Geologic Hazards. No significant faults are known to cross within the base support area proposed for the areas designated at Vandenberg AFB for Options I through V. The Hosgri Fault System is to the south of the Base Support Area. Movement along the Hosgri Fault System would occur with unpredictable frequency and would expose any option of the relocated mission to the same risk as the surrounding community.

Soil. During the construction phase, soil loss due to wind would be a significant impact. This can be mitigated in various ways. Through the months of October to March, the Santa Ana-like winds can be a dominate influence in increasing erosional activities. Awareness of these windy months and application of mitigation measures would reduce the amount of soil loss. The application of water to the exposed soil surface can allow a crust to form. This crust reduces the amount of unconsolidated soil particles that can be dispersed due to winds. Another mitigation measure is the use of tackifiers. These are special organic polymers that are sprayed on the ground to bind the soil, also forming a crust. This crust would also reduce the amount of soil erosion due to wind. Although the tackifiers can be expensive, these compounds can be applied once and reduce the dependency of the construction crew on water and water tanks.

Standard construction practices would be employed to prevent water erosion due to overland flow of storm water or as a result of the impact of rainfall. These practices would include the construction of berms and channels to direct flowing water from the construction site.

4.3.7 Water Resources

4.3.7.1 Proposed Action

Groundwater Resources.

Construction Phase. Vandenberg AFB currently uses groundwater derived from the San Antonio Creek Valley Basin at a rate of 4,000 acre-ft per year. The City of Los Alamos withdraws 300 acre-feet per year and agricultural practices use approximately 16,000 acre-ft per year. Approximately

70 percent of the water used by northern Vandenberg AFB is derived from the San Antonio Creek Valley Basin. It has been estimated that the San Antonio Creek Valley Basin is overdrawn by 12,000 acre-ft per year as the estimated safe yield of the basin is 8,000 acre-ft per year.

During the construction of the facilities required by the SSD mission, 3,152 gallons of water per acre disturbed would be used to spray down exposed soil surfaces to reduce wind-blown sediments and mitigate the erosion potential of this resource. Based on the acres disturbed during construction, 842,209 gallons of water would be used to control windblown soil for Option I. This amount of water would be used to control windblown sediments when appropriate. Construction outfits commonly spray down the site once a day to control windblown dust. Options II through V would require less acres for construction activities and subsequently less water to mitigate blown dust.

Surface Water.

Construction Phase (Option I). As previously described, the Base Support Area of Vandenberg AFB is sited on a marine terrace called Burton Mesa. This mesa is drained by a dendritic pattern of ephemeral stream courses. These all drain either to the San Antonio Creek to the north or the Santa Ynez River to the south. All waters within these drainage systems will either drain into the coastal dune fields or into the ocean if flow rates are enough to breach the sand dune barrier to the ocean. As these drainage patterns generally do not contain potable water, construction activities would not affect any surface water found in the Base Support Area.

Operational Phase (Option I). The existing drainage patterns do not support potable water. Therefore, future operational activities would have no effect.

4.3.7.2 Alternative Actions

If one of the remaining options (II through V) were to be realigned at Vandenberg AFB, impacts to water resources would decrease corresponding to how much construction would be required. The areas designated for the various components of the realigned mission would require water but as only a portion of the facilities would be required, only a relational fraction of groundwater would be needed.

4.3.7.3 No Action Alternative

There would be no adverse impact to the existing water resources of Vandenberg AFB if the no action alternative was selected.

4.3.7.4 Mitigation Measures

Groundwater Resources.

Construction Phase (Options I - V). To offset any water shortages, more water would need to be purchased. Further drawdown of the water table must be avoided and purchasing water from another source would be necessary. It has been estimated that the state water system being studied currently will allow water from the California Aqueduct to flow to the City of Santa Maria. This is estimated to occur in 1996. Vandenberg AFB will be allowed 8,000 acre-ft per year of this water at this time. This water would help mitigate further water demand during a portion of the construction activity. The use of alternative technologies to reduce windblown dust other than by spraying water may be appropriate.

Operational Phase (Options I - V). To offset any water shortages, more water would have to be purchased. Further drawdown of the water table must be avoided and purchasing water from another source would be necessary. The future use of water from the California Aqueduct would serve the needs of the realigned mission.

Surface Water.

Construction Phase (Options I - V). As there is no surface water, no mitigation for Options I - V is necessary.

Operational Phase (Options I - V). As there is no surface water, no mitigation for Options I - V is necessary.

4.3.8 Air Quality

In the short term, construction and operation of the proposed facilities would affect air quality primarily through soil disturbance (fugitive dust) and construction vehicle emissions. Long-term effects of the project would be caused by emissions from the additional vehicles used by project personnel and their families. Short-term impacts were determined by comparing project emissions with the estimated Santa Barbara County emissions inventory. The long-term impacts from related increases in motor vehicle traffic were estimated using the California CALINE 4 line source dispersion model. The primary sources of particulates during construction would be from clearing and grading activities which generate wind-blown dust, and exhaust emissions from heavy-duty construction equipment. Emission factors for fugitive dust and combustive emissions from heavy-duty diesel equipment were obtained from the Environmental Protection Agency's (EPA's) "Compilation of Air Pollution Emission Factors (AP-42) (EPA, 1985). Particulate emissions were assumed to be reduced by 50 percent through the application of water on disturbed soil during and after grading activities. Construction activities were assumed to occur over a 3-year period. The assumed distribution of equipment categories and annual operation hours (AP-42) are shown in Table 4.3.8-1. Exhaust emissions were calculated by estimating annual usage of the equipment. A comparison of total annual construction emissions, with Santa Barbara County emissions is presented on Table 4.3.8-2. As shown in the table, the project emissions for all pollutants are less than 1 percent of the county emissions. Therefore, the air quality impacts from project construction activities would not be significant.

The primary short- and long-term air quality impacts, resulting from operations of the proposed project, would be due to carbon monoxide (CO) emissions from a project-related increase in motor vehicle traffic. The greatest increase in CO emissions would occur at the intersection outside the main gate where a traffic light controls the flow of vehicles. Assuming a worst-case situation in which the peak hourly traffic would be doubled, the CALINE 4 model predicted an increase in the maximum hourly concentrations from 5 parts per million (ppm) to 6 ppm. A background CO concentration of 6 ppm to 17 ppm was assumed. Thus, operational emissions from added vehicular traffic would not cause violations of the California or federal ambient air quality standards for CO. Also, the emissions of criteria pollutants from project stationary sources are quite low.

Table 4.3.8-1

Assumed Distribution of Construction Equipment and Annual Usage

Quantity	Construction Equipment Category	Annual Usage (hours/year)
3	Bulldozers (track)	3,150
1	Front loaders (track)	1,100
2	Front loaders (wheel)	2,280
3	Scrapers	6,000
2	Rollers	1,480
3	Off-highway trucks	12,000
2	Motor graders	1,660
2	Cranes	2,000

Table 4.3.8-2

Comparison of Project Construction Emissions with Santa Barbara County Emissions (Tons Per Year)

Source	CO	THC	NO_x	SO_x	Part
Construction Emissions	16.9	2.8	44.0	4.8	12.6
Santa Barbara County	66,729	69,244	14,593	996	40,479
% County Emissions	0.03	0.004	0.30	0.48	0.03

(Section 3.2.5.3). Therefore, the overall long-term impact of project emissions on air quality would not be significant.

4.3.9 Noise

Construction of project facilities would take approximately 3 years and would comprise the main source of noise associated with the project.

The residential area of the cantonment contains the closest sensitive receptors to the potential construction sites. Using the inverse square law, it was determined that none of the proposed construction sites were sufficiently close to the residential area to constitute a significant impact. The construction of new housing adjacent to the existing residential area could result in noise levels of about 60 decibels on the A-weighted scale (dBA) at nearby residences. However, since current day-night (L_{dn}) noise levels in this area range from 46 dBA to 85 dBA (Section 3.3.6.2), the noise from construction activities would not be significant.

The only long-term noise impacts would result from the increase in vehicular traffic. Assuming a doubling of traffic along the major arteries that access the main gate, the Federal Highway Administration traffic noise models (STAMINA) predicted an emission of about 3 dBA in L_{dn} noise levels at 100 feet from the highway. This increase would be barely detectable and would not be considered a significant impact.

4.3.10 Biological Resources

4.3.10.1 Proposed Action

Vegetation. Most of the development planned in the proposed action for Sites 1, 2A, 2B, and housing Site 1 would be in areas of Vandenberg AFB which have been previously developed or disturbed. Preliminary studies indicated that the proposed development of these areas will not have a significant impact on the vegetation of the region. The loss of small "islands" of Burton Mesa Chaparral at Site 2A will not have a significant impact on Burton Mesa chaparral as a whole.

The construction of housing at proposed housing Site 2 would result in the loss of approximately 155 acres of relatively undisturbed Burton Mesa chaparral. This would have a significant impact on this rare plant community. (See Threatened and Endangered Species discussion).

Wildlife. The proposed action would include development of previously undeveloped but highly disturbed land at Sites 1, 2A, and proposed housing Site 1. This will result in the temporary and permanent disturbance of habitat for small mammals, reptiles, and raptors. Preliminary studies indicate that, because of the habitat alternatives available, the proposed action would not have a significant impact on the wildlife resources of these areas.

A variety of wildlife occurs in the Burton Mesa chaparral at proposed housing Site 2. However, habitat alternatives do exist in the area, and the loss of some individuals and displacement of others is not expected to have a significant impact on the wildlife of this area.

Threatened and Endangered Species. Species unique to Burton Mesa chaparral and other federal candidate species present there would be significantly affected by the development of proposed housing Site 2. Rapid development of areas of Burton Mesa chaparral is quickly eradicating this vegetation type. The most feasible mitigation measure in the present case is the relocation of the proposed housing site.

Because of the alternative habitats that exist in the area, the proposed action would not have a significant impact on the threatened and endangered species onbase which occur in areas other than Burton Mesa chaparral.

Wetlands. The wetlands at the boundaries of both proposed housing sites would be affected by changes in the drainages feeding them. These impacts will not be significant. If permanent and construction-based erosion control methods are employed and if additional runoff is directed in proportional amounts to existing drainages.

4.3.10.2 Alternative Actions

Vegetation. The impacts of the alternative actions on the plant resources of the area would decrease in direct relation to decreases in acreage disturbed.

Wildlife. The impacts of the alternative action on the wildlife resources in the area would decrease in direct relation to decreases in acreage disturbed.

Threatened and Endangered Species. The impacts of the alternative action on the threatened and endangered species in the area would decrease in direct relation to decreases in acreage disturbed.

Wetlands. The impacts of the alternative action on the wetlands on and around Vandenberg AFB would decrease in direct relation to decreases in acreage disturbed.

4.3.10.3 No Action Alternative

Vegetation. The no action alternative would not have a significant impact on the plant resources of the area.

Wildlife. The no action alternative would not have a significant impact on the wildlife resources of the area.

Threatened and Endangered Species. The no action alternative would have no significant impact on the threatened and endangered species of the area.

Wetlands. The no action alternative would not have a significant impact on the area's wetlands.

4.3.11 Cultural and Paleontological Resources

Site 1 may contain prehistoric sites which represent day-use camps or hunting locations. Site 1 has been previously disturbed through military development, and prehistoric sites may have been redeposited or disturbed. Day-use camps and hunting locations may be small lithic scatters with little

subsurface materials. Such sites may not be considered National Register of Historic Places (NRHP) eligible. No historic standing structures are located within this site and any historic archaeological sites recorded may not be considered eligible because they lack physical integrity. No fossiliferous outcrops occur in this area.

Site 2A may also contain day-use camps or hunting locations; however, this area also has been previously disturbed by military activity. These site types are usually small artifact scatters and may not be considered NRHP eligible. No historic standing structures are located within this site. It is possible that historic archaeological sites may be identified during survey, but it is unlikely that such sites would be considered NRHP eligible. No fossiliferous outcrops occur in this area.

Site 2B is located near an outcrop of the Monterey Formation, a cherty siliceous shale with marine microfossils. Prehistoric sites, which may be located in Site 2B, most likely would represent quarry locations or lithic reduction stations associated with nearby outcrops. Such sites may be considered eligible for the NRHP because they would provide information on local lithic procurement strategies. No historic standing structures occur in this option; historic archaeological sites may be recorded during survey. However, such sites would most likely not be considered NRHP eligible. Paleontological materials in the form of marine diatoms are found in the Monterey shale formation, which outcrops south of this area. These fossils are relatively abundant onbase.

The proposed housing area is located on the terrace overlooking San Antonio Creek. Prehistoric sites that may occur in this area are seasonal residential bases, day-use camps, and hunting locations. Seasonal residential base camps would be considered NRHP eligible whereas the smaller limited-activity sites would most likely be considered not eligible. No historic resources or fossiliferous outcrops are located in this area.

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4.4 MARCH AIR FORCE BASE, CALIFORNIA

4.4.1 Community Setting

4.4.1.1 Proposed Action

Population and Employment. The proposed action would cause the Region of Influence (ROI) which includes March AFB to experience a 0.5 percent increase in population over and above its baseline growth between 1993 and 1996. The immigration resulting from the project would be 4,764 in 1993, 2,210 in the peak construction year of 1996 and then fall by 526 in 1997. The net addition to area population as a result of the proposed action would be 13,891.

Of the 13,981 people who would immigrate during the operations phase of the project, 2,135 would live onbase while 11,756 would live offbase. This would constitute 0.3 percent of the area's population. As a result, the effects of the proposed action on the surrounding community would be insignificant.

The proposed action would generate 5,927 new jobs beginning in 1993, increase to a peak of 16,055 jobs in 1996, and stabilize at 15,145 in 1997. During the peak year for construction (1996), 8,010 of the 16,055 jobs would constitute direct jobs while 8,045 would be secondary in nature. Of this total, 5,810 would be filled by local employees.

The proposed action would represent 2 percent of the total employment in the impacted ROI during the peak year of the project. This would result in an unemployment rate for the ROI of 0.1 percentage points lower in 1996 than if the project had not been undertaken.

The proposed action would generate $150,718,000 of personal income in the ROI in 1993, $408,805,000 in the peak construction year of 1996, then fall to $385,346,000 in 1997 and every year thereafter.

Housing. The proposed action would create a demand for 2,155 housing units in the first year of construction, 5,868 units in the project's peak year, and 5,511 units in 1997 and each year thereafter.

Most of the unaccompanied military personnel reassigned to March AFB as a result of the proposed action would be assigned quarters onbase. The Air Force would most likely house approximately 50 percent of its new personnel onbase. Given the 5.4 percent vacancy rate among the 475,534 units currently existing in Riverside County and the surrounding area, the proposed action would reduce the rate to 4.1 percent, assuming a static housing supply, and could exert pressure on rental costs and home prices.

Education. As a result of the proposed action, enrollment will increase by 1,945 within the ROI. This represents a 0.054 percent increase in the ROI over baseline projections. Existing school facilities would be able to accommodate these additional students and, as a result, no construction would be needed. The project would increase the pupil-to-teacher ratio from 28.5 to 28.6 and necessitate the hiring of 68 more teachers to maintain the baseline ratio. Without the employment of 68 additional teachers, the schools would still be within the weighted average maximum state standard of 30.

Community Services. Medical care in the communities surrounding March AFB would be affected by the proposed action through demand for medical services by civilian employees of the project and by military personnel who participate in the CHAMPUS program.

The infusion of new workers would raise the resident-to-hospital bed ratio from the current rate of 193 to 204.6 in 1996 and 204.2 in 1997 and each year thereafter. This would put moderate strain on the ability of the existing medical facilities to provide adequate care. March AFB would not be able to serve the 4,270 additional military personnel and military dependents without increasing its medical staff and facilities.

The 4,270 military personnel and dependents brought to March AFB by the proposed action would add to the number of people drawing on such services as the base exchange, commissary, and recreational facilities. Without an expansion of such facilities and staffs, service to military retirees who draw on base resources will be degraded.

The introduction of 13,891 people to the communities in the vicinity of March AFB by the proposed action would not place a significantly greater demand on recreational facilities in the area than now exists, given the relative abundance of public recreational resources at present.

Current staffing for fire and police departments in Riverside County would be adequate given the population increase created by the proposed action. With regard to public services in general, Riverside County now employs 28.66 personnel per 1,000 residents. To maintain current service levels, 393 additional public employees would be needed if the proposed action is undertaken. If public employment is not increased, the number of government employees per 1,000 residents would fall to 27.862. This would not have a significant impact on the quality of service provided to the county's citizens.

4.4.1.2 Alternative Actions

Realignment scenarios other than the original proposal for the sole and complete closure of Los Angeles AFB have been envisioned by the Air Force. Among these are the concurrent relocation of BMO to the base which will receive HQ SSD, resulting in the reassignment of 10,000 personnel. Partial closure of Los Angeles AFB and the reassignment of either 5,000, 2,500, or 1,000 personnel to a new base has also been proposed. The socioeconomic changes associated with these options should March AFB be chosen are summarized in Table 4.4.1-1 (TBS)

4.4.1.3 No Action Alternative

Under the No Action Alternative, socioeconomic activity in the region surrounding March AFB will be characterized by the baseline descriptions found in Chapter 3.

4.4.2 Land Use and Aesthetics

4.4.2.1 Proposed Action

In studying the land use and aesthetic impacts of the proposed action and alternatives of the proposed action, several siting alternatives were analyzed:

- The proposed action installation facilities consists of two sites; site 1 and site 2 (Figure 4.4.2-1 - TBS); and

- The proposed action military housing area would be located in west March at one site (Figure TBD).

Site 1 Alternative. Site 1 would be located on a site upon the site currently occupied by the Weapons Storage Area (WSA) resulting in the displacement and relocation of this facility to a new site located in East March between the March AFB Airfield and the right-of-way of U.S. Interstate 215 and the ATF Railroad. Site 1 abuts the Explosive Ordnance Disposal (EOD) Area. The EOD would not be relocated since site is located outside the explosives safety zone. Site 1 is located on the summit of a hill of a divide known locally as "Canyon Crest" with views of March AFB, Moreno Valley and Riverside. The surrounding area is in a state of transition from a rural landscape to an urban one. The Orangecrest area of the City of Riverside currently is being developed south of the WSA with a planned buffer of light industrial to be constructed in between the developing residential subdivisions and the WSA.

Project facilities, while visible to the urban area of Riverside and Moreno Valley, are anticipated to blend in with the surrounding urbanized pattern.

The relocated WSA would be located on a site currently vacant adjacent to the airfield, national cemetery, vacant land and the corridor of Interstate 215. Option 1, furthermore, is consistent with the March AFB comprehensive plan and the adopted city of Moreno Valley and Riverside and County of Riverside general plans. The WSA is placed in a site where the explosive safety zones would be kept on base with no threat to offbase uses.

Site 2 Alternative. Site 2 would be located upon a site currently occupied by the Arnold Heights Family Housing Area, which is projected for demolition, and will be relocated to a private sector financed housing project for development on a 130-acre parcel west of its present location. Option 1 would then be constructed upon placed in this planned vacant area. The site is on essentially flat land located west of the U.S. Interstate 215 and East March and north of the U.S. Riverside National Cemetery and east of the Arnold Height Elementary School. The facilities of Option 1 would be surrounded by March AFB and the cemetery and would be compatible with surrounding uses including the school. The facilities of the proposed action while visible to Van Buren Boulevard and U.S. Interstate 215, would blend in with the urban and military views present along both corridors.

Military Housing. The military housing area would be placed in a site within West March located on an elevated area of Canyon Crest south of Van Buren Boulevard. The site is currently vacant, located between the developing residential areas of Orange Crest (offbase) and Air Force Village west (onbase). The proposed action would develop the military housing in rapidly of developing urbanizing area of Western Riverside County.

Offbase Host Communities. The employees of BSD would not move from their present residences in the host communities of Norton AFB. The Cities of Moreno Valley, Perris, Riverside are the host communities to March AFB. Employees also would choose to reside in other cities and communities elsewhere in Riverside and San Bernardino Counties. Collectively the area is know as the Inland Empire, one of the most rapidly urbanizing areas of the United States. It is anticipated the Host communities of Moreno Valley, Perris, Riverside and the other communities of the Inland Empire would easily assimilate the employees of Option 1 choosing to live offbase without any adverse impacts. The land use impacts to the host communities resulting from March AFB SSD, and Aerospace Corporation employees living offbase is anticipated to be not significant.

4.4.2.2 Alternative Actions

Land use changes associated with Options II thru V would be about the same as in the proposed action; however, the number of people seeking residences in the host communities would be proportionally smaller per option.

4.4.2.3 No Action Alternative

March AFB would continue with its existing missions and future missions. The Arnold Heights Family Housing Area would still be demolished and be relocated to its new site at West March; the site of Arnold Heights would await a new mission to be sited here.

4.4.3 Transportation -- TBS

4.4.4 Utilities

Due to construction personnel still on site, the 1996 projected figures for program-related requirements are peak figures. The 1997 figures represent the proposed action in full operation.

4.4.4.1 Proposed Action

Water Supply. The average daily potable water demand for the City of Riverside would increase from 61.59 MGD to 62.71 in 1996; and 62.07 MGD to 63.14 MGD in 1997 from program-related needs. The present system with a capacity of 100 MGD would be able to meet the increased demand of the proposed action. Per capita consumption was estimated utilizing 225 gpcd.

Eastern Municipal Water District, which serves March AFB and the cities of Perris and Moreno Valley, would have increased average daily of 2.68 MGD in 1996 and 2.61 MGD in 1997 from project-related requirements. This would increase the projected demand to 77.98 MGD in 1996 and 79.21 in 1997. Present plans to update the capacity of the system would meet projected demands of the proposed action. Per capita consumption was estimated utilizing 200 gpcd for the cities of Moreno Valley and Perris. Air Force Manual 88-10 was utilized to project per capita consumption on base; 50 gpcd for non-residents and 150 gpcd for residents.

Wastewater Treatment. Average daily flows for the City of Riverside would increase from a projected baseline level of 30.5 MGD to 30.7 MGD in 1996 and 31.0 MGD to 31.8 MGD in 1997. Estimated increased flow was calculated using 100 gpcd. The existing system, which is presently being upgraded to a capacity of 40 MGD, would meet the project-related increased flows.

The treatment facility for the City of Moreno Valley would have increased flows 14.5 MGD and 15.08 in 1996 and 1997. Program-related increases represent .50 MGD and .48 MGD or 3 percent a program-related increase. The facility would be affected by the proposed action.

The wastewater treatment facility for the City of Perris would have increased flows from a baseline level of 2.3 MGD to a peak of 2.54 MGD in 1997. Program-related flows would represent a .24 MGD or 10 percent increase to the system. The treatment facility is designed for phase expansion to 3-6-12-18 MGD and would meet the projected increased flows. Per capita demand is based on 100 gpcd for both the City of Moreno Valley's treatment facility and the City of Perris's treatment facility.

Program-related wastewater flows from military housing and the facilities would increase the projected flow of .75 MGD to 1.59 MGD in 1996 to the wastewater treatment plant on base. This increased flow would exceed the present system capacity of 1.25 MGD, requiring expansion of the existing facility.

Solid Waste. Solid waste generated by the proposed action would be an increase of less than 1 percent of the solid waste management program in Riverside County. Present landfill capacity would meet the program-related increases. March AFB, which also utilizes the public landfill, will have an increased solid waste generation of approximately 16 T/day, this represents a 43 percent increase of solid waste generation and would impact the equipment and personnel necessary to dispose of the increased generation. Solid waste generation due to construction will be significantly larger for proposed site 2. The demolition of the present buildings would increase generation of 8 T/day during the demolition activity from the expected 3.18 T/day. The county landfill would have the capacity to meet the increased generation of the proposed action. Per capita generation estimates were determined by using 3.5 lbs/day for residential generation, .6 and 1.5 lbs/day multipliers were used for construction and demolition generation, and 2 lbs/day was used for facility solid waste generation.

Energy. Riverside Public Utility, a municipal corporation services the city of Riverside. Program-related electrical consumption represents less than 1 percent of the system. The 1989 peak demands used one quarter of the available supply. The proposed action will not impact the system. Southern California Edison Company services the remaining areas impacted by the proposed action. The company has a total capacity of 20,136 MW and will be able to meet the program-related energy requirements. Load estimates for the facility are approximately 17 MW peak requirement. The present system at March AFB would be impacted by the increased peak requirement demands of the proposed action.

Natural gas is supplied to the entire area by Southern California Gas Company. Project-related natural gas consumption would be adequately met with the infrastructure and reserves of the company.

4.4.4.2 Alternative Actions

Water Supply. If only a part of the mission were to realign to March AFB, as suggested in options II through V, demands to the potable water supply systems of the City of Riverside and the Eastern Municipal Water District would decrease correspondingly with each option. Capacity is available in both systems to meet the demands of Options II through V.

Wastewater Treatment. The city of Riverside wastewater treatment facility would have the capacity to treat the incremental decreased flows of Options II through V.

The recently update wastewater treatment facility in Moreno Valley would not have the capacity to handle any additional flow from the four options of the alternative action as shown in Table 4.4.4. Option V, with the least additional flow is increasing the operating capacity of the system from 88 percent to 92 percent. Option II through V would impact the wastewater treatment facility.

The wastewater facility for the City of Perris would be able to handle the program-related flows for Options II through V of the proposed action.

Increased program-related wastewater flow from all options would impact the wastewater treatment facility on March AFB. Estimated flows are: 1.5 MGD for Option I, 1.4 MGD for Option II, 1.35 MGD for Option III, 1.25 MGD for Option IV, and 1.22 MGD for Option V.

Solid Waste. The generation of solid waste would decrease with each option. The Cities of Riverside, Moreno Valley, and Perris would be able to handle the decreased solid waste generation of each of the options. Program-related solid waste generation associated with Options II and III would increase solid waste generation by 23 percent and 16 percent on March AFB. Equipment and personnel requirements would be affected by Options II and III. Options IV and V would increase solid waste

generation by 8 and 5 percent. The present infrastructure would be able to meet the increased demand.

Energy. Electrical consumption and peak demands would decrease with each of the four options. In that the present systems would be able to meet the demands of the proposed action, they would also meet the decreased demands of Options II through V. The load requirement for the facility in Option II is approximately 12 MW for peak demand. Demand on the present system is expected to increase to a peak demand of 26 MVA and would not be able to handle the increased loads of Option II of the proposed action. The peak demand for Options III, IV, and V is considerably less than the proposed action and Option II of the alternative action. The system would be able to handle the increased demands of these options.

Total natural gas demands will decrease incrementally with each of the options. Southern California Gas will be able to meet the program-related increases for Options II through V.

4.4.4.3 No Action Alternative

There would be no adverse impact to the existing potable water systems, wastewater treatment facilities, solid waste disposal infrastructure, or increased energy requirements for March AFB or the area surrounding the base if the no action alternative were selected.

4.4.5 Hazardous Materials

4.4.5.1 Proposed Action

Volume and composition of hazardous waste would increase at March AFB from the proposed action. It would be incorporated into the existing management program, stored on-base, and transported to disposal facilities. Any needed California and federal permits would be obtained.

4.4.5.2 Alternative Actions

The hazardous wastes generated by the options of the alternative action would be incorporated into the existing management system and transported to treatment and disposal facilities. Any permits required by the state or federal regulations would be obtained.

4.4.5.3 No Action Alternative

Program-related hazardous waste generation would not occur on March AFB if the no action alternative was selected.

4.4.6 Geology and Soils

4.4.6.1 Proposed Action

Geologic Hazards. March Air Force Base is located on the Perris Plain Block which is a portion of the Peninsular Ranges Physiographic Province located between the San Jacinto Fault Zone and the Elsinore Fault Zone. The San Jacinto Fault Zone is located to the east of March AFB and is an active seismic area. Epicenters of several seismic events have occurred in the March AFB area. Seismicity of reported earthquakes have ranged from 4.0 to 5.9 in magnitude on the Richter Scale for the period of 1932 through 1987 (Figure 4.4.1-1).

No significant faults are known to cross within Site 1, Site 2 or the Housing Area identified as the alternative beddown location for either of Options I through V. Movement along the San Jacinto Fault to the east will occur with unpredictable frequency and will expose the relocated mission to the same risk as the surrounding community.

Soils.

Construction Phase. Some impacts may occur to the soil resources in the proposed alternative areas as a result of construction activity. Construction of the necessary facilities has the potential to increase erosion unless proper mitigation measures are taken.

Erosion is the wearing away of land surfaces by geological processes such as water and wind. To help quantify the potential amount of soil lost as a result of construction operations, there are two equations that may be employed in order to estimate the amount of soil that may be lost from the erosive effects of water or wind.

The Universal Soil Loss Equation (USLE) has been developed to quantify the amount of soil lost as a result of water forces. The predicted soil loss in tons/acre/year is defined by the following equation:

$$A = RKLSP \qquad [1]$$

Where: A = Predicted soil loss (tons/acre/year)

R = Rainfall and runoff

K = Soil erodibility

L = Slope length

S = Slope gradient or steepness

C = Cover and management

P = Erosion control practice

The rainfall and runoff factor (R) measures the erosive forces of rainfall and runoff. This factor provides the intensity, plus duration of rainfall to the area being studied. The soil erodibility factor (K) indicates the inherent erodibility of a soil based on the infiltration capacity and structural ability of that soil. The topographic features (LS) of the soil reflects the influence of the length and steepness of the slope associated with the soil analyzed. The cover and management factor (C) indicates the influence of cropping systems and management variables on soil loss. The final factor, the support practice factor (P) describes the benefits of contouring, strip cropping or other management practices being used.

Within the soil survey for the March AFB area, the Fallbrook and Montersate series predominate within Site 1, Site 2, and the Housing Area. Both soils have sandy loam textures, but vary through the sites by slope and particle size classification. For simplicity, the potential amount of soil loss because of water erosion was calculated for the Fallbrook series. The following

assumptions/calculations were made for the various parameters required to determine the potential soil loss from water erosion.

The rainfall and runoff factor value was derived from isopleth maps indicating the average rainfall in a 6 hour rainfall event. This information was then used to interpolate the erosive force of rainfall and runoff for the March AFB area from a graph demonstrating an annual average erosion index and rainfall occurring within 6 hours. The erodibility of the Fallbrook series was obtained from the SCS Soil Survey of the March AFB area (1971). The topographic factors were based on an average slope length of 200 feet and an average percent slope of 9 percent for the Fallbrook series (SCS Handbook 537 1978). The cover and management factor assumed no canopy cover, and the vegetation on the soil surface was composed of litter. The final factor, the support practice factor, was judged to be of no consequence as there are no farming practices employed within the relocation sites. The predicted amount of soil lost as a result of water erosion was determined to be 3.13 tons/acre/year for the March AFB area. As this rate does not exceed the average amount of soil formed of 5 tons/acre/year, the loss from water erosion is not expected to be significant.

Wind erosion commonly occurs in arid and semiarid regions and has similar parameters to define the potential amount of soil loss as the water erosion formula. The following equation has been used to define soil loss caused by wind erosion:

$$E = f(ICKLV) \quad [2]$$

Where:
- E = The quantity of erosion per unit area (tons/acre/year)
- I = The soil erodibility
- C = A local wind erosion climate factor
- K = The soil surface roughness
- L = The width of the area examined
- V = The quantity of vegetative cover

The potential quantity of erosion per unit area (tons/acre/year) is a function of the soil erodibility, a local wind erosion climate factor, the soil surface roughness, the width of the area examined and the quantity of vegetative cover. The soil erodibility was determined from a standard chart based on texture of the soil series (SCS unpublished data 1990). The local wind erosion climate factor was based on prevailing wind velocity and direction across the area being analyzed. The surface roughness

was determined as inconsequential. Because of construction activities, it was assumed that the surface of the various zones would be leveled; hence, all microtopographic structures would be essentially uniform. The field width was considered to be the distance across the construction sites, and the quantity of vegetative cover was rated as zero as any present would be scraped off to facilitate construction activity. Based on this equation, the predicted average annual soil loss caused by wind would be 13 tons/acre/year. The is considered significant as it exceeds by greater than two times the average soil formation rate of 5 tons/acre/year (USDA Handbook 537, 1978).

Operational Phase (Option I). A buildings and landscapes will be installed, pavement established for parking lots and roads, no impact to the soil resources due to erosion is anticipated.

4.4.6.2 Alternative Actions

If only part of the SSD mission was to be realigned at March AFB, impact on soil resources would decrease correspondingly to how much construction would be required. The areas designated for the various components of the realigned mission would still be set aside; but, as only a portion of the facilities would be required, only a relational fraction of the land might be exposed to the erosional forces of wind and water.

4.4.6.3 No Action Alternative

There would be no adverse impact to the existing geology and soil resources of the proposed alternative area at March AFB if the alternative no action was selected.

4.4.6.4 Mitigations

During the construction phase, soil loss caused by wind would be a significant impact. This can be mitigated in various ways. Through the months of October to March, the Santa Ana Winds can exert a dominant influence to increase erosional activities. Awareness of these windy months and application of mitigation measures will reduce the amount of soil loss. The application of water to the exposed soil surface can allow a crust to form. This crust reduces the amount of unconsolidated soil particles dispersed by wind. Another mitigation measure is the use of tackifiers. These are

special organic polymers that are sprayed on the ground to bind the soil, also forming a crust. This crust will also reduce the amount of soil erosion caused by wind. Although the tackifiers can be expensive, these compounds can be applied once and reduce the dependency of the construction crew on water and water tanks. Standard construction practices would be employed to prevent water erosion due to overland flow of storm water as a result of the impact of rainfall. These practices would include the construction of berms and channels to direct flowing water from the construction site.

4.4.7 Water Resources

4.4.7.1 Proposed Action

Groundwater Resources. March AFB currently uses water purchased from the Eastside Municipal Water District. Groundwater resources around March AFB have not been developed. Hence, there is no withdrawal of local groundwater, and realigning the mission to March AFB would not impact this resource.

Surface Water.

Construction Phase. During the construction of the facilities required 3,152 gallons of water per acre would be used to spray down exposed soil surfaces to reduce wind-blown sediments and mitigate the erosion potential of this resource. (Draft Environmental Impact Statement Peacekeeper Rail Garrison Program, 1988). Based on 294 acres disturbed during construction, 925,231 gallons of water would be used to control windblown soil for Option I. This amount of water would be used to control sediments when appropriate. Construction outfits generally spray the site down every day. Options II through V would require less acres for construction activities and subsequently less water to mitigate flowing dust.

Operational Phase. The use of this resource during the operational phase of this mission would necessitate an increase in water to the base. This could be accomplished by purchasing more water from the Eastern Municipal Water District.

4.4.7.2 Alternative Actions

If one of the remaining options (II through V) were to be realigned at March AFB, impact to water resources would decrease correspondingly based on how much construction would be required. The areas designated for the various components of the realigned mission would require water; but, as only a portion of the facilities would be required, only a relational fraction of the water would be needed.

4.4.7.3 No Action Alternative

There would be no adverse impact to the existing water resources of the proposed alternative area at March AFB if the no action alternative was selected.

4.4.7.4 Mitigations

Construction Phase. To offset any water shortages, more water will be required to be purchased. It may be feasible to use alternative technologies for reducing the amount of wind-blown sediments. As previously mentioned, using organic polymers commonly known as tackifiers will reduce the water requirement during construction activities.

Operational Phase. If the daily operations of the realigned mission results in water usage that exceeds the current water use by March AFB, more water must be purchased from the Eastern Municipal Water District.

4.4.8 Air Quality

The assumptions regarding emissions from construction and operations of the proposed facility at Vandenberg AFB (Section 4.3.8) are applicable to March AFB. However, the significance of air quality impacts were determined from the comparison of daily emission rates with the emission rate criteria identified by the SCAQMD in their air quality handbook for preparing EIRs. Comparison of project construction emissions and stationary source missions with SCAQMD criteria are presented in Tables 4.4.8-1 and 4.4.8-2 (TBS), respectively.

As shown in Table 4.4.8-1, all of the criteria pollutant emissions, except NO_x, are less than the SCAQMD criteria mission rates. Therefore, the short-term air quality impacts would be considered significant. However, upon the completion of the project, the emissions would cease and would no longer have an impact on the air quality.

The long-term air quality impacts would result from the stationary source emissions and secondary emissions from vehicular traffic. Since the relocation of the facilities from the Los Angeles AFB to March AFB would take place within the South Coast Air Basin, the overall changes in secondary vehicular emissions would be small. Changes in stationary source emissions would also be small. However, it should be noted that project THC emission rate exceed the SCAQMD THC criterion (Table 4.4.8-2). Therefore, the long-term air quality impacts would be significant, and additional air quality analyses would be required if this alternative as selected.

4.4.9 Noise

Neither construction nor operation of the proposed facilities at March AFB would produce significant noise impacts. Construction of the facilities would take approximately 3 years and would comprise the main source of noise associated with the project. The nearest sensitive receptors are in a trailer park located about 1,200 feet north of proposed site one. L_{dn} noise levels in the area are presently about 70 dBA to 72 dBA. These high levels are the result of aircraft traffic at March AFB. Noise levels in the trailer park from construction activity would range 60 dBA to 65 dBA. The combined noise levels would range from 70 dBA to 73 dBA, or an increase of about 1 dB. This increase could not be detected by the human ear, and therefore the noise impacts would be insignificant.

Long-term noise impacts that would result from increased vehicular traffic would be negligible because of the current high background noise levels, discussed previously.

4.4.10 Biological Resources

4.4.10.1 Proposed Action

Vegetation. Most of the land which will be developed at Site 1 and for housing under the proposed action is previously disturbed grassland. Small areas of woody, riparian vegetation occur in drainages around Site 1 and in the proposed housing site, just south of Van Buren Boulevard. While large areas of disturbed grassland and some small sections of riparian vegetation will be destroyed or disturbed, preliminary studies indicate that the proposed action will not result in any significant impact to the area's plant resources.

Wildlife. The proposed action will result in the destruction or disturbance of a considerable amount of habitat for small mammals, reptiles, and birds. Some amphibians, in the riparian areas of the proposed housing site, may be destroyed or displaced. However, preliminary studies indicate that sufficient alternative habitats exist in the region, and the proposed action will not significantly impact the wildlife resources of the area.

Threatened and Endangered Species. Preliminary studies do not indicate the presence of any of the sensitive plant species in Table 3.4.10-1 within the area affected by the proposed action. Therefore, the proposed action is not expected to have any significant impact on these species.

The habitat, burrow, and animal destruction, and potential for genetic isolation which would result from the implementation of the proposed action would have a significant impact on the Stephen's kangaroo rat (SKR). The SKR is listed as an endangered species. The County of Riverside March AFB, and nearby city agencies are currently working with the USFWS to establish an SKR habitat conservation program. This HCP is expected to include the delineation of an ecological corridor/preserve to connect the scattered populations of SKRs. Officials of the county and the USFWS should be consulted (formally and informally) through all phases of development in order to minimize any impacts on this species.

Four sensitive bird species are believed to occur within the area affected by the proposed action. The Ferruginous Hawk and Prairie Falcon, which are USFWS category 2 candidate species, and the

Northern Harrier, which is a California Fish and Game (CFG) "species of special concern", may forage in the grasslands on the west part of March. Preliminary studies indicate that the loss of habitat resulting from the proposed action will not, by itself, be a significant impact on these species, since alternative habitats exist in the area. The proposed action in combination with other development in the area may have a cumulative impact on these species.

Surveys indicate the presence of the Burrowing owl, a CFG "species of concern", in the area of the proposed housing site. The loss of habitat and decline of this species throughout its range may lead to a rapid elevation in its federal status. Mitigation for the loss of this colony's habitat might include relocation of the proposed housing site or relocation of the individuals in the colony. Studies indicate that this species may be relocated with relative ease through trapping and the use of artificial burrows (D. Zembal, pers. comm.).

The orange-throated whiptail and San Diego Coast horned lizard are both USFWS category 2 candidate species which occur in the coastal sage scrub plant community. This plant community is not expected to be disturbed by the proposed action. Preliminary studies indicate that these reptiles will not suffer significant impacts from the proposed action.

Wetlands. Preliminary studies indicate that the proposed action will not have a significant impact on any wetlands. Future development west of site one may significantly affect the drainages supplying the riparian woodlands in that area.

4.4.10.2 Alternative Actions

Vegetation. The impact of the Alternative Actions on the plant resources of March AFB and the vicinity would decrease in direct relation to decreases in the number of acres to be disturbed.

Wildlife. The impact of the Alternative Actions on the area's wildlife resources would decrease in direct relation to decreases in the number of acres to be disturbed.

Threatened and Endangered Species. The impact of the Alternative Action on the area's threatened and endangered species would decrease in direct relation to decreases in the number of acres to be disturbed.

Wetlands. The impact of the Alternative Action on the area's wetlands would decrease in direct relation to decreases in the number of acres to be disturbed.

4.4.10.3 No Action Alternative

Vegetation. The No Action Alternative will not have a significant impact on the plant resources of the area.

Wildlife. The No Action Alternative will not have a significant impact on wildlife resources of the area.

Threatened and Endangered Species. The No Action Alternative will have no significant impact on the threatened and endangered species of the area.

Wetlands. The No Action Alternative will not have a significant impact on the area's wetlands.

4.4.11 Cultural and Paleontological Resources

Option Site 1 may contain prehistoric milling slicks or bedrock mortars used by prehistoric populations to grind plants and seeds. Nineteen bedrock mortars have been identified on west March; although, none are associated with campsites or other features or artifacts. Bedrock mortars are expected to occur in Option Site 1 but are not likely to be eligible because they may represent limited-activity locations. Historic sites may be identified during survey; however, these sites may be small and lack physical integrity. Historic sites found in this area may not be considered NRHP eligible. The granitic bedrock in this portion of the base does not contain any paleontological materials.

Option Site 2 may contain prehistoric milling slicks or bedrock mortars; however, these sites may not be considered NRHP because they have limited research potential. Portions of Camp Haan, a World War II training center, are located in the northern part of this area and consist of concrete foundations and several standing structures. However, Camp Haan has been determined not eligible for the NRHP (SHPO concurrence letter). No paleontological materials are associated with the granitic bedrock in this area.

The proposed housing area may contain prehistoric milling slicks or bedrock mortars; however, these sites have limited research potential and may not be considered NRHP eligible. Concrete foundations associated with Camp Haan may occur in the southern part of the housing area; however, Camp Haan has been determined to be not eligible for the NRHP. No paleontological materials are associated with the granitic bedrock in this area.

4.5 PETERSON AND FALCON AIR FORCE BASES, COLORADO

4.5.1 Community Setting

4.5.1.1 Proposed Action

Population and Employment. The proposed action would cause the ROI which includes Peterson Air Force Base (AFB) to experience a 4 percent increase in population over and above its baseline growth between 1993 and 1996. The inmigration resulting from the project would be 5,565 in 1993, 3,015 in the peak construction year of 1996 and then fall by 526 in 1997. The net addition to area population as a result of the proposed action would be 17,098.

Of the 17,098 people who would immigrate during the operations phase of the project, 1,067 would live onbase while 16,031 would live offbase. This would constitute 3.3 percent of the area's population. As a result, the effects of the proposed action on the surrounding community would be fairly significant.

The proposed action would generate 5,529 new jobs beginning in 1993, grow to a peak of 15,017 jobs in 1,996, and stabilize at 14,167 in 1997. During the peak year for construction (1996), 8,010 of the 15,017 jobs would constitute direct jobs while 7,007 would be secondary in nature. Of this total, 1,162 would be filled by local employees.

The proposed action would represent 6 percent of the total employment in the impacted ROI during the peak year of the project. This would result in an unemployment rate for the ROI of 0.85 percentage points lower in 1996 than if the project had not been undertaken.

The proposed action would produce $140,085,000 of personal income in 1993, $380,835,000 in the peak construction year of 1996, then fall to $358,989,000 in 1997 and every year thereafter in the ROI.

Housing. The proposed action would create demand for 2,293 housing units in the first year of construction, 6,318 units in the project's peak year, and 5,961 units in 1997 and each year thereafter.

Most of the unaccompanied military personnel reassigned to Peterson AFB as a result of the proposed action would be assigned quarters onbase. The Air Force would most likely house approximately 25 percent of its new personnel onbase. Given the 10 percent vacancy rate among the 159,621 units currently existing in El Paso County and the surrounding area, the proposed action would reduce the rate to 6.2 percent, assuming a static housing supply, and could exert pressure on rental costs and home prices.

Education. As a result of the proposed action, enrollment will increase by 2,394 within the ROI. Existing school facilities would be able to accommodate these additional students and, as a result, no construction would be needed. The project would increase the pupil-to-teacher ratio from 18.5 to 19.15 and necessitate the hiring of 130 more teachers to maintain the baseline ratio. Without the employment of 130 additional teachers, the schools would still be within the weighted average maximum state standard.

Community Services. Medical care in the communities surrounding Peterson AFB would be affected by the proposed action through demand for medical services by civilian employees of the project and by military personnel who participate in the CHAMPUS program.

The infusion of new workers would raise the resident-to-hospital bed ratio from the current rate of 300 to 328 in 1993 and 365 in 1997 and each year thereafter. This would put moderate strain on the ability of the existing medical facilities to provide adequate care. Peterson AFB would not be able to serve the 4,270 additional military personnel and military dependents without increasing its medical staff and facilities.

The 4270 military personnel and dependents brought to Peterson AFB by the proposed action would add to the number of people drawing on such services as the base exchange, commissary, and recreational facilities. Without an expansion of such facilities and staffs, service to military retirees who draw on base resources will be degraded.

The introduction of 17,098 people to the communities in the vicinity of Peterson AFB by the proposed action would not place a significantly greater demand on recreational facilities in the area than now exists, given the relative abundance of public recreational resources at present.

Current staffing for fire and police departments in El Paso County would be adequate given the population increase created by the proposed action. With regard to public services in general, El Paso County now employs 40.54 personnel per 1,000 residents. To maintain current service levels, 693 additional public employees would be needed if the proposed action is undertaken. If public employment is not increased, the number of government employees per 1,000 residents would fall to 39.11. This would not significantly reduce the quality of service provided to the county's citizens.

4.5.1.2 Alternative Actions

Realignment scenarios other than the original proposal for the sole and complete closure of Los Angeles AFB have been envisioned by the Air Force. Among these are the concurrent relocation of BMO to the base which will receive HQ SSD, resulting in the reassignment of 10,000 personnel. Partial closure of Los Angeles AFB and the reassignment of either 5,000, 2,500, or 1,000 personnel to a new base has also been proposed. The socioeconomic consequences associated with these options should Peterson AFB be chosen have been summarized in Table 4.5.1-1 (TBS).

4.5.1.3 No Action Alternative

Under the No Action Alternative, socioeconomic activity in the region surrounding Peterson AFB will be characterized by the baseline descriptions found in Section 3.4.5.1.

4.5.2 Land Use and Aesthetics

4.5.1 Proposed Action

The surrounding host community of the City of Colorado Springs has historically housed Peterson AFB and Falcon AFB employees residing offbase. In studying the land use and aesthetic changes that could be associated with the proposed action, several siting alternatives were analyzed:

- The proposed action installation facilities at Peterson AFB contain three sites; Site 1, Site 2, and Site 3 (Figure 3.5-2);

- The proposed action installation facilities at Falcon AFB contain one site (Figure 3.5-3); and

- The proposed action military housing area consists of one site at Peterson AFB for support of any of the three sites at Peterson AFB and the Falcon AFB site.

Site 1. The Site 1 alternative at Peterson concerns 150 acres of land recently acquired from the City of Colorado Springs known as the Lease "Amendment/Option Area". The land abuts land owned by the City of Colorado Springs and currently is being developed as a runway for the new municipal airport expansion. The remaining land surrounding the land as well as Site 1 consists of rangeland devoted to cattle grazing. The conversion of the land from open rangeland to military use would be a logical expansion of the existing Peterson AFB and Colorado Springs Municipal Airport area.

Site 2. Site 2 is bisected by Marksheffel Road. Approximately 70 acres would be located in the "Lease Amendment/Option Area" (Site 1) and 140 acres would be acquired from private land of incorporated area under the jurisdiction of the City of Colorado Springs. The subject private property is a portion of the approved Banning-Lewis Ranch, a 24,312-acre approved master planned community. The property currently is undeveloped rangeland used to graze cattle. The approved specific plan would allow a mixture of future uses including residential, commercial/office, research and development, a middle school, elementary school, and a park.

Site 3. Site 3 is located entirely within the Banning-Lewis Ranch and would require the acquisition of 220 acres of private land. The land use is the same as the Banning-Lewis Ranch description mentioned for Site 2.

Military Housing. The military housing area is planned to support any one of the selected sites at Peterson AFB or the Falcon AFB site. The military housing area would require the acquisition of approximately 190 acres of private land in the Banning-Lewis Ranch. The current land use is the same as that of Site 1. The land planned under the Banning-Lewis Ranch Specific Plan would designate the construction of future residential uses, elementary school, parks, and other public purposes.

Falcon AFB. The 180-acre site would be located to the east of the existing Falcon AFB. The land consists of Air Force ~~fee single~~ owned lands outleased for cattle grazing. The existing land use consists of rangeland used for cattle grazing other than the developed Air Force base located west of the site. The land is zoned A-4 (Agriculture 5 acre [minimum parcel size]) under the jurisdiction of El Paso County, Colorado.

The land use impacts associated with Peterson AFB Sites 1 through 3, Military Housing Area site, and the Falcon AFB site would be the same: not significant. In all instances the base would be expanded in a logical manner. The proposed uses are consistent with existing developed use or would involve the conversion of vacant residential use (Peterson AFB) or agricultural use (Falcon AFB) to a higher and better use to the benefit of the property owners and the County of El Paso and City of Colorado Springs.

Offbase Host Community. The City of Colorado Springs is the community anticipated to be host to those Peterson/Falcon AFB and Aerospace Corporation employees living offbase. The City of Colorado Springs has historically been host to most of the Peterson AFB and Falcon AFB employees choosing to reside offbase (including military, civil service, and civilian contractors). It is anticipated that Colorado Springs would continue to be the host community to Peterson AFB and Falcon AFB. The city has indicated that it can accommodate the new offbase employees of Option 1 with existing housing. As a result, no significant land use changes are anticipated.

4.5.2.2 Alternative Actions

Changes resulting from Options II through V at Peterson/Falcon AFB would be about the same as for Option I (not significant), except proportionally fewer acres of land would be used. The land use changes in the host community of Colorado Springs would be the same as the proposed action: negligible.

4.5.2.3 No Action Alternative

Peterson AFB and Falcon AFB would continue with their existing missions. The acquisition of private lands offbase (Peterson AFB) would not occur. The no action alternative would produce no land use and/or aesthetic changes.

4.5.3 Transportation -- TBS

4.5.4 Utilities

Due to construction personnel still on site, the 1996 projected figures for program-related requirements are peak figures. The 1997 figures represent the proposed action in full operation.

4.5.4.1 Proposed Action

Water Supply. Program-related requirements of 4.25 MGD in 1996 and 4.10 MGD in 1997 would increase the average daily demand to 70.41 MGD in 1996 and 71.57 MGD in 1997 for the City of Colorado Springs treatment facility. Peterson AFB represents .78 MGD in 1996 and .75 MGD in 1997 of the additional flow. The presently planned expansion of the facility would be able to handle increased program-related demands. Per capita potable water estimates are based upon 200 gpcd for city residents. Estimates for Peterson AFB are base on 150 gpcd for residents and 50 gpcd for non-residents.

Water requirements for new installations on Falcon AFB have increased the projected water demand to within a 100 percent of the contracted amount of water with the Cherokee Water District. The program-related demands of .54 MGD and .50 MGD impact the projected water demands on Falcon AFB with respect to other demands on the system. Estimates of 50 gpcd and an eight-hour shift was utilized to estimate the water demand for the proposed action.

Wastewater Treatment. The 50 MGD capacity treatment facility for Colorado Springs would receive an average increased flow of 2.35 MGD in 1996 and 2.28 MGD in 1997 from program-related flow. This

would increase projected flows to 35.55 MGD and 36.23 MGD in 1997. The present system would be able to handle the increased flows.

The planned upgrades for the wastewater treatment facility on Falcon AFB will be able to meet the increased project-related average daily flows of 0.24 MGD and 0.20 MGD of the proposed action.

Solid Waste. Total project-related increase in solid waste generation would be 59.88 T/day. The metropolitan area of Colorado Springs would be able to handle the additional 6 percent increase of solid waste generated by the proposed action.

Energy. Western Power Administration, which markets and transmits electricity to the entire state of Colorado would meet the increased electrical energy demands of the proposed action. There would be an additional increased annual residential consumption of 57,910 MWh. The facility located at Peterson AFB or Falcon AFB would generate an estimated electrical demand of 14,825 kW. The present system at Peterson AFB is being updated and will be able to meet the increased demand. The system at Falcon AFB is designed to provide 24,000 KW and would be able to meet the additional demands of the proposed action.

Natural gas supplies to the area are extensive. The City of Colorado Springs services the metropolitan area and Peterson AFB. With present reserves of 40 percent, natural gas demands for the proposed action would be met. The present construction of the natural gas line to Falcon AFB would meet the demands of the proposed action.

4.5.4.2 Alternative Actions

Water. The water supply system would not be impacted by any of the alternative proposals. Options II through V each have incrementally less demand.

The water supply system at Falcon AFB would be impacted by any of the proposed alternatives. The existing water supply system does not have adequate capacity to serve any of the alternative actions average daily water demand.

Wastewater. The wastewater treatment facility in Colorado Springs and the planned expanded wastewater treatment facility located on Falcon AFB would have the capacity to meet the average daily demands of option II through V of the alternative action.

Solid Waste. Solid Waste generation will decrease with each option of the alternative action. Program-related generation and disposal would be met by the city and private contractors.

Energy. Estimated increased program-related electrical demands decrease incrementally with each option of the alternative action. The Colorado Springs area electrical supply is more than adequate to meet the demands of option II through V of the alternative action. The decreased from each option would be met on both Peterson AFB and Falcon AFB.

Natural gas reserves and infrastructure are more than adequate to meet the demands of option II through V.

4.5.4.3 No Action Alternative

There would be no adverse effect to the existing potable water systems, wastewater treatment facilities, solid waste disposal infrastructure, or increased energy requirements for Peterson AFB or Falcon AFB or the surrounding area if the no action alternative was selected.

4.5.5 Hazardous Materials

4.5.5.1 Proposed Action

Hazardous waste volume and composition would increase at Falcon and Peterson AFB's due to program-related hazardous waste generation. The wastes would be incorporated into the present management system, stored on the base, and transported to treatment and disposal facilities. Any required state and federal permits would be obtained.

"focus on waste stream that leaves base"

"materials that come on base are not as much a concern as the waste stream"

4.5.5.2 Alternative Actions

The hazardous waste generated by the options of the alternative action would be incorporated into the existing management system, stored on-base, and transported to treatment and disposal facilities. Any required state and federal permits would be obtained.

4.5.5.3 No Action Alternative

No hazardous waste associated with the program would be generated if the no action alternative were selected.

4.5.6 Geology and Soils

4.5.6.1 Proposed Action

Geologic Hazards. Peterson and Falcon AFBs are in the Colorado Piedmont along the western margin of the Great Plains Physiographic Province. Colorado has a low seismicity potential, and within the Colorado Springs area, only three recorded earthquakes have occurred.

Soils.

Construction Phase. Some impacts may occur to soil resources in the proposed alternative areas as a result of construction activity. Construction of the necessary facilities has the potential to increase erosion unless proper mitigation measures are taken.

Erosion is the wearing away of land surfaces by geological processes such as water and wind. To help quantify the potential amount of soil lost as a result of construction operations, there are two equations that may be employed to estimate the amount of soil that may be lost from the erosive effects of water or wind.

The Universal Soil Loss Equation (USLE) has been developed to quantify the amount of soil lost as a result of water forces. The predicted soil loss in tons/acre/year is defined by the following equation:

$$A = RKLSP \qquad [1]$$

Where: A = Predicted soil loss (tons/acre/year)
R = Rainfall and runoff
K = Soil erodibility
L = Slope length
S = Slope gradient or steepness
C = Cover and management
P = Erosion control practice

The rainfall and runoff factor, R, measures the erosive forces of rainfall and runoff. This factor provides the intensity plus duration of rainfall to the area being studied. The soil erodibility factor, K, indicates the inherent erodibility of a soil based on the infiltration capacity and structural ability of that soil. The topographic features, LS, of the soil reflects the influence of the length and steepness of the slope associated with the soil analyzed. The cover and management factor, C, indicates the influence of cropping systems and management variables on soil loss. The final factor, the support practice factor, P, describes the benefits of contouring, strip cropping, or other management practices being used.

Within the soil survey for Peterson, the Blakeland loamy sand series is the predominate soil. This soil has a sandy loam texture, and does not vary through the sites by slope or particle size classification. The soil survey for the Falcon AFB area indicates that the Bresser Sandy Loam and the Ascalon Sunday Loam is the predominate soil. These soils do vary by slope through site. The potential amount of soil loss because of water erosion was calculated for the Blakeland series. As the Blakeland Loamy Sand has the coarsest texture, this soil would be more susceptible to the effects of erosion than either the Bresser Sandy Loam or the Ascalon Sandy Loam. The following assumptions/calculations were made for the various parameters required to determine the potential soil loss from water erosion.

The rainfall and runoff factor value was derived from isopleth maps indicating the average rainfall in a 6-hour rainfall event. This information was then used to interpolate the erosive force of rainfall

and runoff for the Peterson and Falcon AFB area from a graph demonstrating an annual average erosion index and rainfall occurring within 6 hours. The erodibility of the Blakeland series was obtained from the Soil Conservation Service (SCS) Soil Survey of the Peterson and Falcon AFB areas (1971). The topographic factors are based on an average slope length of 200 feet and an average slope of 5 percent for the Blakeland series (SCS Handbook 537, 1978). The cover and management factor assumed no canopy cover, and the vegetation on the soil surface was composed of litter. The final factor, the support practice factor, was judged to be of no consequences because there are no farming practices employed within the relocation sites. The predicted amount of soil lost as a result of water erosion was determined to be 3 tons/acre/year for the Peterson AFB areas. As this rate does not exceed the average amount of soil formed, which is 5 tons/acre/year (SCS, 1981), the loss from water erosion is not expected to be significant.

Wind erosion commonly occurs in arid and semiarid regions and has similar parameters to define the potential amount of soil loss as the water erosion formula. The following equation has been used to define soil loss caused by wind erosion:

$$E = f(ICKLV) \qquad [2]$$

Where:
- E = The quantity of erosion per unit area (tons/acre/year)
- I = The soil erodibility
- C = A local wind erosion climate factor
- K = The soil surface roughness
- L = The width of the area examined
- V = The quantity of vegetative cover

The potential quantity of erosion per unit area (tons/acre/year) is a function of the soil erodibility, the local wind erosion climate factor, the soil surface roughness, the width of the area examined, and the quantity of vegetative cover. The soil erodibility was determined from a standard chart based on texture of the soil series (SCS unpublished data, 1990). The local wind erosion climate factor was based on prevailing wind velocity and direction across the area being analyzed. The surface roughness was determined as inconsequential. Because of construction activities, it was assumed that the surface of the various zones would be leveled; therefore, all microtopographic structures would be essentially uniform. The field width was considered to be the distance across the construction sites, and the

quantity of vegetative cover was rated as zero as any present would be scraped off to facilitate construction activity. Based on this equation, the predicted average annual soil loss caused by wind would be 92 tons/acre/year. This is considered significant as it exceed(s) by greater than 18 times the average soil formation rate of 5 tons/acre/year (SCS, 1982).

Operational Phase. As buildings and landscapes would be installed, and pavement established for parking lots and roads, no impact to soil resources due to erosion is anticipated.

4.5.6.2 Alternative Actions

If one of the remaining options (II through V) were to be realigned to Peterson or Falcon AFB, impacts on soil resources would decrease correspondingly to how much construction would be required. The areas designated for the various components of the realigned mission would still be set aside, but because only a portion of the facilities would be required, only a relational fraction of the land might be exposed to the erosional forces of wind and water.

4.5.6.3 No Action Alternative

There would be no adverse impact to the existing geology and soil resources of the proposed alternative area at Peterson or Falcon AFB if the alternative no action alternative was selected.

4.5.6.4 Mitigation Measures

Geologic Hazards. No significant faults are known to occur within the Peterson or Falcon AFB area. Therefore, no mitigation is required for geologic hazards.

Soils. During the construction phase, soil loss caused by wind would be a significant impact. This can be mitigated in various ways. During the months of TBD to TBD, the prevailing winds can exert a dominate influence in increasing erosional activities. Awareness of these windy months and application of mitigation measures would reduce the amount of soil loss. The application of water to the exposed soil surface can allow a crust to form. This crust reduces the amount of unconsolidated soil particles dispersed by winds. Another mitigation measure is the use of tackifiers. These are

special organic polymers that are sprayed on the ground to bind the soil, also forming a crust. This crust would also reduce the amount of soil erosion caused by wind. Although the tackifiers can be expensive, these compounds can be applied once and reduce the dependency of the construction crew on water and water tanks. Standard construction practices would be employed to prevent water erosion due to overland flow of storm water or as a result of the impact of rainfall. These practices would include the construction of berms and channels to direct flowing water from the construction site.

4.5.7 Water Resources

4.5.7.1 Proposed Action

Groundwater Resources.

Construction Phase. The Colorado Springs area, including Peterson and Falcon AFBs, withdraw water from the Arkansas and Dawson Aquifer (U.S.Geological Survey 1984). No groundwater wells are established on either Peterson or Falcon AFBs. All water required by Peterson and Falcon AFBs are purchased from the local water utility company. No impact to groundwater is anticipated by construction activity.

Operational Phase. The use of this resource during the operational phase of this mission would necessitate an increase in water to the base. This could be accomplished by purchasing more water from the public utility company of Colorado Springs for Peterson AFB and from Cherokee Water District for Falcon AFB. Operational water use would add to overdraft of local aquifers.

Surface Water.

Construction Phase. During the construction of the facilities required 3,152 gallons of water per acre would be used to spray down exposed soil surfaces to reduce wind-blown sediments and mitigate the erosion potential of this resource (Draft Environmental Impact Statement Peacekeeper Rail Garrison Program, 1988). Based on 198 acres disturbed during construction, 622,695 gallons of water would be used to control windblown soil for Option I. This amount of water would be used to control

sediments when appropriate. Construction outfits generally spray the site down every day. Option II through V would require less acres for construction activities and subsequently less water to mitigate blowing dust.

Operational Phase. Long-term project operations are not expected to significantly impact surface water.

4.5.7.2 Alternative Actions

If one of the remaining options (II through V were to be realigned at Peterson and Falcon AFBs, impacts to water resources would decrease correspondingly based on how much construction would be required. The areas designated for the various components of the realigned mission would require water, but, because only a portion of the facilities would be required, only a relational fraction of the water would be needed.

4.5.7.3 No Action Alternative

There would be no adverse impact to the existing water resources of the proposed alternative area at Peterson and Falcon AFBs if the no action alternative was selected.

4.5.7.4 Mitigation Measures

Surface Water.

Construction Phase. To offset any water shortages, more water would need to be purchased. It may be feasible to use alternative technologies for reducing the amount of wind-blown sediments. As previously mentioned, using organic polymers commonly known as tackifiers would reduce the water requirement during construction activities.

Operational Phase. If the daily operations of the SSD facility results in water usage that exceeds the current water use by Peterson and Falcon AFBs, more water must be purchased from the local water

utility company. The impact of the proposed action and options II through V of the alternative action to the potable water use at Falcon AFB would be mitigated by increasing the annual delivery of water necessary to supply the base. The Cherokee Water District appears to be willing to negotiate a new agreement with the base. Amounts to be negotiated would be limited due to the overdraw of the aquifer. A water conservation and reuse program would also be necessary.

4.5.8 Air Quality

The assumptions made regarding emissions from the construction and operation of the proposed facility at Vandenberg AFB (Section 4.3.3) are applicable to Peterson and Falcon AFBs. However, total secondary mobile emissions from project-related emissions were also calculated and added to the project stationary emissions. It was assumed for these calculations that, on the average, about 7,500 round trips per day would be added to the area. An average distance of 30 miles was assumed for each round trip. Emission factors were obtained from Environmental Protection Agency's (EPA) "Compilation of Air Pollution Emission Factors" (AP-42)(EPA, 1985).

Pollutant emissions resulting from construction emissions would be temporary. A comparison of these pollutant emissions with total El Paso County emissions are shown in Table 4.5.8-1. As the table indicates, all criteria pollutant emissions from project construction are well below 1 percent of the county emissions. Thus, short-term air quality impacts at both Peterson and Falcon AFB's would not be significant.

The long-term project emissions are related to emissions from stationary and mobile sources generated by the project. A comparison of total project emissions is presented in Table 4.5.8-2. All of the project criteria pollutant emissions, except carbon monoxide (CO), are below 1 percent of the county emissions. Most of the CO emissions are the result of the increase in vehicular traffic. Since Peterson AFB is in an area classified nonattainment for CO, long-term air quality impacts would be significant. However, because Falcon AFB is in a CO attainment area, air quality impacts would not be considered significant for this site.

no!

if there is a nonattainment area
do not let modeling justify
to analyze; recognize hot spots

Table 4.5.8-1

Comparison of Project Construction Emissions with 1987 El Paso County Emissions (ton per year)

	POLLUTANT				
Source	CO	THC	NO_x	SO_x	Part
Construction Emissions	16.9	2.8	44.0	4.8	12.6
El Paso County	98,666	26,317	23,871	10,364	108,702
% of County Emission	0.017	0.011	0.184	0.046	0.012

Table 4.5.8-2

Comparison of Project Stationary and Mobile Source Emissions with 1987 El Paso County Emissions

	POLLUTANT				
Source	CO	THC	NO_x	SO_x	Part
Total Project	1,195	135	89	0.12	0.58
El Paso County	98,666	26,317	23,871	10,364	108,702
% of County Emission	1.2	0.5	0.4	Neg	Neg

review EIA study

4.5.9 Noise

Temporary construction noise at Peterson AFB would not cause any significant impacts because the nearest sensitive receptors are about 1-mile from the proposed sites. In addition, at Falcon AFB, no ~~significant~~ major noise impacts would occur because ~~of~~ the administrative and industrial ~~nature of existing facilities.~~ land use is compatible. Since most activities take place inside the Consolidated Space Operations Center facility, where noise would be buffered, construction noise levels would be reduced to insignificant levels. omit

Long-term noise from the project would be the result of increased vehicular traffic in the area. Increased traffic along the roadway leading to the proposed sites would increase present day-night (L_{dn}) noise levels by decibels on the A-weighted scale 2 (dBA) to 3 dBA. Background L_{dn} noise near Peterson AFB ranges from 60 dBA to 65 dBA. These increased noise levels are largely due to civilian and military aircraft operations. This ~~small~~ increase (2 to 3 dBA) in noise levels would ~~hardly be noticed, and the noise impacts would be considered insignificant~~ not lead to unacceptable noise. At Falcon AFB, where there are few sensitive receptors on or off the base, the noise impacts would also be insignificant. However, the increase in L_{dn} noise levels in the vicinity of Falcon AFB would be noticed more than at Peterson AFB, because the present L_{dn} background levels are quite low in the former area ranging from 40 dBA to 45 dBA. It is well known that noise increases in quiet areas (background less than 50 dBA) may be perceived as greater than the same increase in noise areas. omit

4.5.10 Biological Resources

4.5.10.1 Proposed Action

Vegetation.

Peterson AFB. The proposed action would involve development resulting in temporary and permanent disturbance of some native short-grass prairie habitat on the eastern portion of the base. Preliminary studies indicate that the proposed action may not have a significant impact on the plant resources of the area. Significant impacts may be revealed, upon subsequent field studies.

Falcon AFB. The proposed action at Falcon AFB would involve development on the eastern portion of the base resulting in the temporary and permanent disturbances of short-grass prairie habitats. Preliminary studies indicate that the proposed action would not have a significant impact on plant resources.

Wildlife.

Peterson AFB. The proposed action at Peterson AFB would result in both temporary and permanent disturbance of a small amount of habitat for mammals, reptiles, amphibians, and birds common to short-grass prairie. A small amount of raptor forage area may also be affected. Preliminary studies indicate that the proposed action would not have a significant impact on the wildlife resources of the area. Subsequent field investigations may reveal significant impacts.

Falcon AFB. The proposed action on Falcon AFB would result in the temporary and permanent disturbance of a small amount of wildlife habitat. Preliminary studies indicate that the proposed action would not have significant impacts on wildlife resources. Subsequent field investigations may reveal significant impacts.

Threatened and Endangered Species.

Peterson AFB. Preliminary studies indicate that the proposed action would not have a significant impact on the threatened and endangered species or communities of the area. Subsequent field investigations may reveal significant impacts.

Falcon AFB. Existing evidence indicates that the proposed action would not have a significant impact on threatened and endangered or exemplary species or communities onsite. Subsequent field investigations may reveal significant impacts.

Wetlands.

Peterson AFB. Preliminary studies indicate that no wetlands occur on the site of the proposed action. The proposed action would not have a significant impact on wetlands. Subsequent field investigations may reveal significant impacts.

Falcon AFB. Preliminary studies indicate that wetlands occur on the site of the proposed action. These isolated seasonally wet potholes are important biological resources, but may be avoided by the proposed action. The proposed action may not have a significant impact on wetlands. Subsequent field investigations may reveal significant impacts.

4.5.10.2 Alternative Actions

Vegetation.

Peterson AFB. The impacts of the alternative action on the plant resources of the area would be less than the impacts for the proposed action.

Falcon AFB. The impacts of the alternative action on the plant resources of the area would be less than the impacts for the proposed action.

Wildlife.

Peterson AFB. The impacts of the alternative action on the wildlife resources of the area would be less than the impacts for the proposed action.

Falcon AFB. The impacts of the alternative action on the wildlife resources of the area would be less than the impacts for the proposed action.

Threatened and Endangered Species.

Peterson AFB. The impacts of the alternative action on the threatened and endangered species in the area would be less than the impacts for the proposed action.

Falcon AFB. The impacts of the alternative action on the threatened and endangered species in the area would be less than the impacts for the proposed action.

Wetlands.

Peterson AFB. The impacts of the alternative action on the wetlands on and around the base would be less than the impacts for the proposed action.

Falcon AFB. The impacts of the alternative action on the wetlands on and around the base would be less than the impacts for the proposed action.

4.5.10.3 No Action Alternative

Vegetation.

Peterson AFB. The no action alternative would not have a significant impact on the plant resources of the area.

Falcon AFB. The no action alternative would not have a significant impact on the plant resources of the area.

Wildlife.

Peterson AFB. The no action alternative would not have a significant impact on the wildlife resources of the area.

Falcon AFB. The no action alternative will not have a significant impact on the wildlife resources of the area.

Threatened and Endangered Species.

Peterson AFB. The no action alternative will have no significant impact on the threatened and endangered species of the area.

Falcon AFB. The no action alternative would have no significant impact on the threatened and endangered species of the area.

Wetlands.

Peterson AFB. The no action alternative would not have a significant impact on the area's wetlands.

Falcon AFB. The no action alternative would not have a significant impact on the area's wetlands.

4.5.11 Cultural and Paleontological Resources

The Peterson AFB option area is characterized by a small ridge and bluffs overlooking the Jimmy Camp Creek drainage to the east. The ridgetop provides a good observation point of the valley, and prehistoric sites are expected. However, these sites may represent limited activity locations that may not be considered National Register of Historic Places (NRHP) eligible. Prehistoric sites are also expected to occur along the bluffs, and site types would include limited activity sites and small campsites. Some small campsites may be considered NRHP eligible. No standing structures occur in this area; however, historic archaeological sites may be encountered. Historic sites, without standing structures, may be small and lack physical integrity or may not be important to understanding local or regional history. Such sites would most likely be considered not NRHP eligible. Paleontological materials associated with the Denver or Laramie formations may be encountered and would be considered important.

The Falcon AFB option area can be characterized as a relatively flat plain with intermittent drainages. Prehistoric sites may occur in this type of setting; however, the sites would be small and represent very limited-activity locations. Such sites would most likely be considered not eligible for the NRHP. Historic sites may also be identified in this area. These sites would most likely reflect ranching and farming activities. Some historic sites, such as windmills or homesteads, may lack physical integrity and may not be considered eligible. Paleontological materials are associated with the Denver Formation and would be considered important if encountered.

4.6 KIRTLAND AIR FORCE BASE, NEW MEXICO

4.6.1 Community Setting

4.6.1.1 Impacts of the Proposed Action

Population and Employment. The proposed action would cause the ROI, which includes Kirtland Air Force Base (AFB), to experience a 3 percent increase in population over and above its baseline growth between 1993 and 1996. The immigration resulting from the project would be 5,565 in 1993, 3,015 in the peak construction year of 1996 and then fall by 526 in 1997. The net addition to area population, as a result of the proposed action, would be 17,098.

Of the 17,098 people who would immigrate during the operations phase of the project, 1,067 would live onbase while 16,031 would live offbase. This would constitute 2.5 percent of the area's population. As a result, the effects of the proposed action on the surrounding community would be fairly significant.

The proposed action would generate 5,509 jobs beginning in 1993, grow to a peak of 14,972 jobs in 1996, and stabilize at 14,123 in 1997. During the peak year for construction (1996), 8,010 of the 14,972 jobs would constitute direct jobs while 6,962 would be secondary in nature. Of this total, 1,162 would be filled by local employees.

The proposed action would represent 5 percent of the total employment in the impacted ROI during the peak year of the project. This would result in an unemployment rate for the ROI of 0.4 percentage points lower in 1996 than if the project had not been undertaken.

The proposed action would produce $139,003,000 of personal income in 1993, $378,087,000 in the peak construction year of 1996, then fall to $356,363,000 in 1997 and every year thereafter in the ROI.

Housing. The proposed action would create demand for 2,293 housing units in the first year of construction, 6,318 units in the project's peak year, and 5,961 units in 1997 and each year thereafter.

Most of the unaccompanied military personnel reassigned to Kirtland AFB, as a result of the proposed action, would be assigned quarters onbase. The Air Force would most likely house approximately 25 percent of its new personnel onbase. Given the 5.7 percent vacancy rate among the 200,053 units currently existing in Bernalillo County and the surrounding area, the proposed action would reduce the rate to 2.7 percent, assuming a static housing supply, and could exert pressure on rental costs and home prices.

Education. As a result of the proposed action, enrollment in Bernalillo County schools will increase by 2,394. This represents a 2.2 percent increase in Bernalillo County over baseline projections. Existing school facilities would be able to accommodate these additional students, and, as a result, no construction would be needed. The project would increase the pupil-to-teacher ratio from 23.78 to 24.2 and necessitate the hiring of 101 more teachers to maintain the baseline rat.). Without the employment of 101 additional teachers, the schools would still be within the weighted average maximum state standard of 24.2.

Community Services. Medical care in the communities surrounding Kirtland AFB would be affected by the proposed action through demand for medical services by civilian employees of the project and by military personnel who participate in the CHAMPUS program.

The infusion of new workers would raise the resident-to-hospital bed ratio from the current rate of 182 to 198 in 1993 and 216 in 1997 and each year thereafter. This would put moderate strain on the ability of the existing medical facilities to provide adequate care. Kirtland AFB would not be able to serve the 4,270 additional military personnel and military dependents without increasing its medical staff and facilities. To offset the proposed action's impact on the resident-to-hospital bed ratio, 94 additional beds would be needed.

The 4,270 military personnel and dependents brought to Kirtland AFB by the proposed action would add to the number of people drawing on such services as the base exchange, commissary, and recreational facilities. Without an expansion of such facilities and staffs, service to military retirees who draw on base resources will be degraded.

The introduction of 17,098 people to the communities in the vicinity of Kirtland AFB by the proposed action would not place a significantly greater demand on recreational facilities in the area than now exists, given the relative abundance of public recreational resources at present.

Current staffing for fire and police departments in Bernalillo County would be adequate given the population increase created by the proposed action. With regard to public services in general, Bernalillo County now employs 17.7 personnel per 1,000 residents. To maintain current service levels, 317 additional public employees would be needed if the proposed action is undertaken. If public employment is not increased, the number of government employees per 1,000 residents would fall to 17.22. This would not have a significant impact on the quality of service provided to the county's citizens.

4.6.1.2 Alternative Actions

Realignment scenarios other than the original proposal for the sole and complete closure of Los Angeles AFB have been envisioned by the Air Force. Among these are the concurrent relocation of BMO to the base which will receive HQ SSD, resulting in the reassignment of 10,000 personnel. Partial closure of Los Angeles AFB and the reassignment of either 5,000, 2,500, or 1,000 personnel to a new base has also been proposed. The socioeconomic impacts of these options should Kirtland AFB be chosen have been summarized in Table 4.6.1-1 (TBS).

4.3.1.3 No Action Alternative

Under the No Action Alternative, socioeconomic activity in the region surrounding Kirtland AFB will be characterized by the baseline descriptions found in Chapter 3.0.

4.6.2 Land Use and Aesthetics

4.6.2.1 Proposed Action

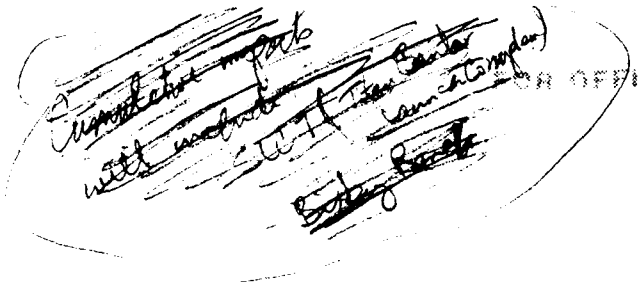
At Kirtland AFB, the surrounding host community of the City of Albuquerque has historically housed Kirtland AFB employees residing offbase. In studying the land use and aesthetic impacts of the proposed action, several siting alternatives of the proposed action were analyzed:

- The proposed action installation facilities contain two sites; Site 1, consisting of Sites A and B, and Site 2 (Figure TBD); and

- The proposed action military housing area consists of two sites, Site 1 and Site 2.

Site 1. The Site 1 alternative involves three areas designated as "Site A", "Site B" and "Site C". Site A concerns 29 acres of Kirtland AFB and 86 acres of DOE land. Approximately 115 acres is undeveloped vacant land and 18 acres consist of a family campground and a Girl Scout campground. The land would be used for military housing. Site 1 would be an expansion and infill of the existing housing area; the direction of growth would be both southward and eastward. The base comprehensive plan has designated the area as Open Space with the exception of the family campground which is designated Recreational. The conversion of the land to military housing would be a logical expansion of the existing military housing area.

The 240 acre HQ SSD, Aerospace Corporation, BSD and AFISC facilities would be located on site C consisting of 240 acres located on an incorporated area under the jurisdiction of the City of Albuquerque, New Mexico. The approximately 230 acres is vacant. The Albuquerque Public Schools owns approximately 220 acres and is currently preparing a specific plan to develop the property. The zoning ordinance would allow a senior high school, junior high school, elementary school, a public park/recreation area, commercial office and residential use. The remaining 20 acres south of the school lands consist 10 acres of vacant land suitable for residential and 10 acres of the developed Sandia Research Park consisting of 25 parcels. To date one light industrial building has been developed and



is occupied. Another property owner intends to initiate construction on 9,800 square foot office building on a one acre zone D parcel.

Site 1B is a 55-acre companion area of Site 1A, which utilizes the existing base facilities. This area of Site 1 would use the existing buildings of the CBPO complex, and the old hospital building (AFSTC). Site 1B would also use existing parking lots along with the demolition of the existing Headquarters 1606th Air Base Wing Building and the base chapel. The Kirtland AFB Comprehensive Plan has designated the area as follows: the administrative building and CBPO are designated Administrative; the hospital is Medical; the chapel and commissary parking lot is Community (Service); and existing parking elsewhere and vacant land use are Open Space.

The Site 1B alternative would use existing facilities and construct new buildings within the base support area, which would result in the redevelopment and infill an existing developed area together with the outward expansion of Kirtland AFB in an orderly and logical manner. One concern would be the impact of the Site 1B alternative on the surrounding facilities due to the taking of existing parking facilities, which may result in a deficit of parking in comparison to parking demand.

The land use impacts for Sites 1A and 1B located onbase and the DOE property would be not significant. The land use impacts for Site C concerning the 240 acres of public school land and private land would be rated not significant because the base would be expanded in a logical manner. The proposed uses are consistent with existing developed use or would involve the conversion of vacant residential developable land to a higher and better use to the benefit of the property owners and the City of Albuquerque.

The aesthetic impacts would be rated negligible since Option 1 is adjacent to the existing developed Kirtland AFB and Sandia National Laboratories. The planned use is an expansion of these uses and would not deviate from the existing views.

Site 2. The Site 2 alternative consists of developing HQ SSD, Aerospace Corporation BSD facilities and military housing on a site located approximately 2.5 miles southeast of the base support area on a 360-acre site more than a mile south of the closest base boundary. The site is within a sparsely developed

area of the base. The SSD, BSD and Aerospace Corporation facilities would be on a 180-acre site, located in between the Kirtland AFB Tijeras Arroyo Golf Course to the northwest and the multiuse facility to the southeast. The multiuse facility contains the Kirtland AFB riding club, consisting of horse stables, riding arena, rodeo grounds, a five acre irrigated alfalfa field, and caretakers mobilehome residences; the radioactive burial site 27933, identified as Radioactive Burial Site No. 11 (RB-11) in the Installation Restoration Program (IRP); and a Cobalt-60 storage facility managed by a scientific laboratory. The Cobalt-60 facility has recently received a new supply of Cobalt-60 which will enable its use for the next five years without any replenishment. RB-11 is a part of the Kirtland AFB IRP. An active sewage plant site abuts the multiuse facility to the northeast, the sewage plant is planned to be deactivated in approximately 2 years.

The military housing area of the Site 2 alternative is located on a 180-acre site abutting the golf course and proposed SSD/Aerospace Corporation/BSD facilities to the southwest. The Sandia Fault Zone bisects both the housing area and the SSD/Aerospace Corporation/BSD facility site. It is assumed that the fault zone would be investigated in detailed geologic studies so that adequate setbacks from the fault and any of its branches would be established for the residences and facilities. The fault zone area would be available for undeveloped recreational uses or parking facilities. As a result, the presence of the fault and adequate setbacks would not result in significant land use impacts.

The entire 360-acre Site 2 area is bounded to the north by four active INWS Radioactive Training Areas (TS) identified TS-1 through TS-8. Four other TSS numbered 5 through 8 are located west of Site 2 and have been place in an inactivated status due to the establishment of the new WSA. A Veterans Administration dumpsite, hazardous waste facility (PCB), Landfill Number 4 (LF-04), and LF-06 are located in the vicinity of Site 2. LF-04 is bounded to the north by LF-06. LF-04 was jointly operated by the City of Albuquerque and Kirtland AFB where general refuse was buried. LF-04 is now inactive. LF-06 is an active landfill operated by Kirtland AFB (IR, 1985). The entire site is also overlain by the three-kilometer exclusion area of the DOE Area V nuclear reactors. DOE has the authority to regulate all land use within exclusion areas; residences are prohibited.

The site is visible to the Four Hills Village Community of Albuquerque located on the high alluvial fan of Manzano Mountain. However the distance between the community and the site being more than a mile away would result in some reduction of the site visibility.

The land use conflicts associated with Site 2 would be significant, due to the site being overlain by an exclusion area of nuclear reactors. It is doubtful the DOE would permit the siting of a facility of this type due to the large number of personnel planned to work in the facility and the housing area would be prohibited. The aesthetic changes associated with Site 2 would be negligible.

Offbase Host Community. The City of Albuquerque is the community anticipated to be host to those Kirtland AFB and Aerospace Corporation employees living offbase. The City of Albuquerque has historically been host to most of the Kirtland AFB employees choosing to reside offbase (including military, civil service, and civilian contractors). It is anticipated that Albuquerque would continue to be a host community to Kirtland AFB; including Option 1. The city has indicated that it can accommodate the new off base employees of Option 1.

4.6.2.2 Alternative Actions

Land use changes associated with Options II at Kirtland AFB would be about the same as for Option I except proportionally fewer acres of Kirtland AFB and offbase lands would be used. Land use conflicts at Site 2 would be significant since the DOE regulations probably would prohibit the siting of Options II, III, IV, and V at this site. Land use effects the host community of Albuquerque would essentially be the same as the proposed action.

4.6.2.3 No Action Alternative

Kirtland AFB would continue with its existing missions. The acquisition of private lands offbase would not occur.

4.6.3 Transportation -- TBS

4.6.4 Utilities

Due to construction personnel still on site, the 1996 projected figures for program-related requirements are peak figures. The 1997 figures represent the proposed action in full operation.

4.6.4.1 Proposed Action

Water Supply. Average daily requirements for the City of Albuquerque treatment system would increase from a baseline level of 136.7 MGD in 1996 and 138.3 MGD in 1997 to 142.3 MGD in 1996 and 143.73 MGD in 1997. Program-related demands from the city would equal 5.6 MGD in 1996 and 5.43 MGD in 1997, or a 4 percent increase in both years. The city's 210 MGD facility would be operating at 68 percent and would adequately meet the increased demands of the proposed action.

Kirtland AFB presently supplements its groundwater supply with purchased water from the City of Albuquerque. About 1,452,700,000 gallons of water are presently being pumped from the bases wells, this represents 70 percent of the allowable pumped water allocation. Program-related demands of 0.62 MGD in 1996 and 0.60 MGD in 1997 would be met with increased purchased supplies or groundwater supplies onbase.

Wastewater Treatment. Average daily flows for the City of Albuquerque would increase from a projected baseline level of 62.77 MGD in 1996 and 63.50 MGD in 1997, to 65.77 MGD in 1996 and 66.39 MGD in 1997. Program-related demands from the city and the base represent a 4 percent increase to the facility for each year. The planned expansion of 72 MGD would be operating at 88 percent to capacity in 1996 and 91 percent to capacity in 1997. Program-related increased flow would impact the expanded facility. The present plans to upgrade the system to 72 MGD should probably be revised and increased to meet the addition demand of the proposed action and Option II of the alternative action.

Solid Waste. Project-related solid waste generation for the City of Albuquerque will increase solid waste generation 32 T/day in 1996 and 31 T/day in 1997. This represents less than 2 percent of the solid waste generation for the city. With city haulers already adequately handling solid waste disposal for the city, program-related increases would be met. Present landfill capacity would be able to meet the increased demand.

Solid waste generation would increase from the baseline of 40 T/day to 55 T/day in 1996 and decreasing to 51 T/day in 1997. This would be a 28 percent increase in solid waste generation on the

base, impacting the collection of the refuse. The landfill on-base has a projected lifespan of 10 years and would be able to handle the increased demand.

Energy. The Public Service Company of New Mexico has extensive power supplies to meet the increased project-related electrical demands of the proposed action. The estimated increased peak demand of 17 MW for the facility would be met by 125 MVA electrical system on the base.

Natural gas supplies are also extensive. The Public Service Company of New Mexico supplies the entire area and has adequate capacity to meet the required natural gas demands of the proposed action.

4.6.4.2 Alternative Actions

Water. Options II through V estimate decreasing average daily demand of the City of Albuquerque's system. Capacity is available to meet the required demand for the alternative actions.

Wastewater. Option II of the alternative action would impact the wastewater treatment facility. Option II would add an increased average daily flow of 1.77 MGD. The expanded treatment facility would be operating at a 91 percent capacity and would not be able to meet the increased project-related flows. The wastewater treatment facility would have the capacity to treat the decreased flows from option III, IV, and V. The facility would be operating at less than 90 percent of its capacity in each of these options.

Solid Waste. The generation of solid waste would decrease incrementally with each of the options. The City of Albuquerque would be able to meet the solid waste generation demands of each of the options.

Solid waste generation for Option II is 27 percent of the Kirtland AFB's present baseline. Option III is 16 percent, Option IV is 8 percent, and option V is 3 percent. Options II and III represent a significant impact to the collection of the refuse. The present landfill would be able to meet the needs of all of the options.

Energy. Adequate capacity is available to meet the program-related electrical and natural gas requirements of options II through V of the proposed action. Each option requires less energy demand.

4.6.5 Hazardous Materials

4.6.5.1 Proposed Action

Hazardous waste volume and composition would increase on Kirtland AFB due to program-related hazardous waste generation. The waste generated would be incorporated into the present management system, stored on-base, and transported to treatment and disposal facilities. Any required state or federal permits would be obtained.

4.6.5.2 Alternative Actions

Wastes generated from any of the four options of the alternative action would also be incorporated in the same manner as handling of the hazardous wastes were in the proposed action.

4.6.5.3 No Action Alternative

Program-related hazardous waste generation would not occur on Kirtland AFB if the no action alternative were selected.

4.6.6 Geology and Soils

4.6.6.1 Proposed Action

Geologic Hazards. Kirtland AFB is located in the Rio Grande Valley of the Mexican Highland Subdivision of the Basin and Range Physiographic Province. Four major fault systems exist within the boundaries of Kirtland AFB. The Tijeras Fault and the Hubbell Springs Fault intersect on the base southwest of the location of Site 2. The Sandia Fault appears to bisect the main base portion from the Sandia area of Kirtland and is just south of Site 2. It is believed that the Sandia represents the northern

extension of the Hubbell Springs Fault. This fault system is currently active but seismicity of earthquake events has not been recorded to exceed 2.5 on the Richter scale from 1980 to 1985.

Soils.

Construction Phase. Some impacts may occur to soil resources in the proposed alternative sites on Kirtland AFB as a result of construction activity. Construction of the necessary facilities has the potential to increase erosion unless proper mitigation measures are taken.

Erosion is the wearing away of land surfaces by geological processes such as water and wind. To help quantify the potential amount of soil lost as a result of construction operations, there are two equations that may be employed to estimate the amount of soil that may be lost from the erosive effects of water or wind.

The Universal Soil Loss Equation (USLE) has been developed to quantify the amount of soil lost as a result of water forces. The predicted soil loss in tons/acre/year is defined by the following equation:

$$A = RKLSP \qquad [1]$$

Where: A = Predicted soil loss (tons/acre/year)
R = Rainfall and runoff
K = Soil erodibility
L = Slope length
S = Slope gradient or steepness
C = Cover and management
P = Erosion control practice

The rainfall and runoff factor, R, measures the erosive forces of rainfall and runoff. This factor provides the intensity plus duration of rainfall to the area being studied. The soil erodibility factor, K, indicates the inherent erodibility of a soil based on the infiltration capacity and structural stability of that soil. The topographic features, LS, of the soil reflects the influence of the length and steepness of the slope associated with the soil analyzed. The cover and management factor, C, indicates the

influence of cropping systems and management variables on soil loss. The final factor, the support practice factor, P, describes the benefits of contouring, strip cropping, or other management practices being used.

Within the soil survey for the Kirtland AFB area, the Madurez-Wink Association, Tijeras and Embudo gravelly fine Sandy loam are predominate soil within Site 1a, Site 1b, and Site 2. The Madurez-Wink Association has a sandy texture, and has little slope sites at 1A and 1B. Although as mentioned, there are other soil types found on site 2, but the Madurez-Wink Association representative and the potential amount of soil loss because of water erosion was calculated for only this association. The following assumptions/calculations were made for the various parameters required to determine the potential soil loss from water erosion.

The rainfall and runoff factor value was derived from isopleth maps indicating the average rainfall in a 6-hour rainfall event. This information was then used to interpolate the erosive force of rainfall and runoff for the Kirtland AFB area from a graph demonstrating an annual average erosion index and rainfall occurring within 6 hours. The erodibility of the Madurez-Wink Association was obtained from the Soil Conservation Service (SCS) Soil Survey of the Kirtland AFB area (1971). The topographic factors are based on an average slope length of 200 feet and an average percent slope of 4 percent for the Madurez-Wink Association (SCS Handbook 537, 1978). The cover and management factor assumed no canopy cover, and the vegetation on the soil surface was composed of litter. The final factor, the support practice factor, was judged to be of no consequence because there are no farming practices employed within the relocation sites. The predicted amount of soil lost as a result of water erosion was determined to be TBD tons/acre/year for the Kirtland AFB area. As this rate does not exceed the average amount of soil formed, which is 5 tons/acre/year, the loss from water erosion is not expected to be significant.

Wind erosion commonly occurs in arid and semiarid regions and has similar parameters to define the potential amount of soil loss as the water erosion formula. The following equation has been used to define soil loss caused by wind erosion:

$$E = f(ICKLV) \qquad [2]$$

Where: E = The quantity of erosion per unit area (tons/acre/year)

I = The soil erodibility

C = A local wind erosion climate factor

K = The soil surface roughness

L = The width of the area examined

V = The quantity of vegetative cover

The potential quantity of erosion per unit area (tons/acre/year) is a function of the soil erodibility, the local wind erosion climate factor, the soil surface roughness, the width of the area examined, and the quantity of vegetative cover. The soil erodibility was determined from a standard chart based on texture of the soil series (SCS unpublished data, 1990). The local wind erosion climate factor was based on prevailing wind velocity and direction across the area being analyzed. The surface roughness was determined as inconsequential. Because of construction activities, it was assumed that the surface of the various zones would be leveled; therefore, all microtopographic structures would be essentially uniform. The field width was considered to be the distance across the construction sites, and the quantity of vegetative cover was rated as zero as any present would be scraped off to facilitate construction activity. Based on this equation, the predicted average annual soil loss caused by wind would be 130 tons/acre/year. The is considered significant as it does (not) exceed(s) by greater than 26 times the average soil formation rate of 5 tons/acre/year (SCS unpublished data, 1990).

Operational Phase (Option I). As buildings and landscapes would be installed, and pavement established for parking lots and roads, no impact to soil resources due to erosion is anticipated.

4.6.6.2 Alternative Actions

If one of the remaining options (II through V) were to be realigned at Kirtland AFB, impacts on soil resources would decrease correspondingly to how much construction would be required. The areas designated for the various components of the realigned mission would still be set aside, but as only a portion of the facilities would be required, only a relational fraction of the land might be exposed to the erosional forces of wind and water.

4.6.6.3 No Action Alternative

There would be no adverse impact to the existing geology and soil resources of the proposed alternative area at Kirtland AFB if the no action alternative was selected.

4.6.6.4 Mitigations

Geologic Hazards. No significant faults are known to cross Site 1a or Site 1b. The Sandia Fault appears to bisect the alternative Site 2. Movement along the Sandia Fault would occur with unpredictable frequency and would expose the relocated mission to the same risk as the surrounding community. Mitigation measures for this hazard might include placing of buildings and facilities a safe distance from the fault zone.

Soils. During the construction phase, soil loss caused by wind would be a significant impact. This can be mitigated in various ways. Through wind months the prevailing winds can exert a dominant influence to increase erosional activities. Awareness of these windy months and application of mitigation measures would reduce the amount of soil loss. The application of water to the exposed soil surface can allow a crust to form. This crust reduces the amount of unconsolidated soil particles dispersed by winds. Another mitigation measure is the use of tackifiers. These are special organic polymers that are sprayed on the ground to bind the soil, also forming a crust. This crust would also reduce the amount of soil erosion caused by wind. Although the tackifiers can be expensive, these compounds can be applied once and reduce the dependency of the construction crew on water and water tanks. Standard construction practices would be employed to prevent water erosion due to overland flow of storm water or as a result of the impact of rainfall. These practices would include the construction of berms and channels to direct flowing water from the construction site.

4.6.7 Water Resources

4.6.7.1 Proposed Action

Groundwater Resources. Kirtland AFB currently uses groundwater from wells onbase that cannot be withdrawn at a greater rate than the allocated amount of 6,398 acre-feet per year. The balance required by Kirtland AFB is purchased from the City of Albuquerque. The water requirement for the proposed action would not affect the groundwater resources beneath Kirtland AFB as the withdrawal rate cannot exceed the current allocation.

Surface Water.

Construction Phase. During the construction of the facilities required by the SSD mission, 3,152 gallons of water would be used to spray down exposed soil surfaces to reduce wind-blown sediments and mitigate the erosion potential of this resource. (Draft Environmental Impact Statement Peacekeeper Rail Garrison Program, 1988). Based on the 145 acres disturbed during construction, 456,652 gallons of water would be used to control windblown soil for the proposed action. This amount of water would be used to control windblown sediments when appropriate. Construction outfits commonly spray down the site once a day to control windblown dust. Options II through V would require less acres for construction activities and subsequently less water to mitigate blowing dust.

Operational Phase. The use of this resource during the operational phase of this mission would necessitate an increase in water to the base. This could be accomplished by purchasing more water from the public utility of Albuquerque.

4.6.7.2 Alternative Actions

If one of the remaining options (II through V) were to be realigned at Kirtland AFB, impacts to water resources would decrease correspondingly based on how much construction would be required. The areas designated for the various components of the realigned mission would require water, but, because

only a portion of the facilities would be required, only a relational fraction of the water would be needed.

4.6.7.3 No Action Alternative

There would be no adverse impact to the existing water resources of the proposed alternative area at Kirtland AFB if the no action alternative was selected.

4.6.7.4 Mitigations

Surface Water.

Construction Phase. To offset any water shortages, more water would need to be purchased. It may be feasible to use alternative technologies for reducing the amount of wind-blown sediments. As previously mentioned, using organic polymers commonly known as tackifiers would reduce the water requirement during construction activities.

Operational Phase. If the daily operations of the Air Force and the realigned mission resulted in water usage that exceeds the current water use by Kirtland AFB, more water must be purchased from the Albuquerque water district.

4.6.8 Air Quality

The assumptions made regarding emissions from the construction and operation of the proposed facilities at Vandenberg AFB (see Section 4.3.3) are applicable to Kirtland AFB. However, in addition to emissions from project stationary sources, emissions from project mobile sources (vehicles) were also calculated. For those calculations, it was assumed that on the average about 7,500 additional round trips per day would occur in the area. An average distance of 30 miles was assumed for each round trip. Emission factors were obtained from the Environmental Protection Agency's (EPA's) Compilation of Air Pollution Emission Factors (AP-42) (EPA, 1985).

Pollutant emissions resulting from construction emissions would be temporary because once construction ceases, pollutant emissions also cease. A comparison of project construction emissions with the total Bernalillo County emissions are shown in Table 4.6.3-1 (TBS). As the comparison indicates, all criteria pollutant emissions resulting from project construction are well below 1 percent of the county emissions. Therefore, short-term air quality impacts at Kirtland AFB would not be significant.

The long-term project emissions are related to emissions from stationary and mobile sources generated by the project. A comparison of total project emissions with the 1987 Bernalillo County emissions is presented in Table 4.6.3-2 (TBS). All project criteria pollutant emissions are below 1 percent of the county emissions. However, since the Kirtland AFB/Albuquerque area is presently classified as nonattainment for carbon monoxide (CO), even this relative small percentage increase (0.6 percent) of CO could cause a delay in the achievement of attainment status for the area. Therefore, the long-term air quality impacts would be significant.

4.6.9 Noise

Noise levels resulting from construction in the proposed Site 1A and 1B areas would be annoying to inhabitants of nearby base residential areas when the day-night (L_{dn}) noise levels range from 52 decibels on the A-weighted scale (dBA) to 57 dBA. Construction activities in these site areas would cause an increase of 5 dBA to 10 dBA in the nearby areas, which include a hospital and an elementary school. Therefore, short-term noise impacts for the proposed Site 1A and 1B areas would be significant.

Noise levels resulting from construction in the proposed Site 2 area would not have a significant impact because no sensitive receptors are close to the site.

Long-term noise from the project would result from increased vehicular traffic in the area. Residential properties near Kirtland AFB and the Albuquerque International Airport, Interstates 25 and 40, arterial roadways, and industrial areas are currently affected by ~~excessive~~ L_{dn} noise levels (i.e., 62 to 67 dBA). The increase in noise levels resulting from project-related vehicular traffic would be would hardly be noticeable

2 dBA to 4 dBA. This increase would be hardly noticeable in the percent high background ambient noise. Therefore, the long-term noise impacts would be insignificant.

4.6.10 Biological Resources

4.6.10.1 Proposed Action

Vegetation. Recent investigations indicate that no significant impacts are expected to occur as a result of construction and development in the three proposed areas. However, further field studies will be conducted to verify this conclusion. Sites 1A and 1C have some development and may be completely distorted. Field studies will need to be conducted in this area.

Site 1B is in a previously developed area; therefore, no significant impacts are expected to occur here. Site 2 lies between a golf course to the north and riding stables to the south. Preliminary studies indicates that the impacts of construction and development on biological resources in Site 2 may be significant. Further field studies will be conducted in this area.

Wildlife. Recent studies confirm the abundance of wildlife within the grassland and Pinyon-juniper woodlands. Based on previous reports, the areas proposed for construction are currently disturbed; therefore, impacts to wildlife habitats would not be significant.

Threatened and Endangered Species. Potential habitat for gramma grass cactus (Pediocactus papyracanthus) and Wright's pincushion cactus (Mammillaria wrighii) exist on Kirtland AFB and their presence is probable. Field surveys will be conducted to determine the presence or absence of these two species. Habitats for the American peregine falcon (Falco peregrinus anatum) may occur onbase. However, nesting areas are not likely to occur in areas of human disturbance.

The bald eagle's (Haliaeetus leucocephalus) preferred habitat is open bodies of water and, sometimes, riparian areas. Bald eagles are not likely to occur near human occupation areas. Therefore, impacts on bald eagle habitats will be not significant. Further field studies would be conducted to deny or confirm the absence within the proposed areas.

"List discuss real issues if there is or there is not"

Consult with others to find an answer.

Whooping cranes (Grus americana) are known to overwinter in New Mexico and are uncommon around edges of human occupation. If they occur within the areas, foraging flights may occur between open fields and roosting areas. Field studies are required to better document their potential use in the project area.

Wetlands. Existing reports indicate that no wetlands occur within Sites 1A, 1B and 1C; therefore, there would be no significant impacts to wetlands in Sites 1A, 1B and 1C from construction and development. Ephemeral streams exist in Site 2 and may support seasonal riparian wetland. Further field studies will be conducted to determine the presence and extent of wetlands within the proposed site.

4.6.10.2 Alternative Actions

Vegetation. The impacts of the alternative actions on the plant resources of the area would be the same as for the proposed action.

Wildlife. The impacts of the alternative actions on the wildlife resources of the area would be the same as for the proposed action.

Threatened and Endangered Species. The impacts of the alternative actions on the threatened and endangered species in the area would be the same as for the proposed action.

Wetlands. The impacts of the alternative actions on the wetlands would be the same as for the proposed action.

4.6.10.3 No Action Alternative

Vegetation. The no action alternative would not have a significant impact on the plant resources of the area.

Wildlife. The no Action alternative would not have a significant impact on the wildlife resources of the area.

Threatened and Endangered Species. The no action alternative would have no significant impact on the threatened and endangered species of the area.

Wetlands. The no action alternative would not have a significant impact on the area's wetlands.

4.6.10 Cultural and Paleontological Resources

Site 1A may include part of Tijeras Arroyo; prehistoric sites have been identified on ridges overlooking the arroyo. These sites include ceramic and lithic scatters, agricultural terraces, and Anasazi villages with structures, lithics, and ceramics. These types of sites may be present in Site 1A, and most of the sites would be potentially National Register of Historic Places (NRHP) eligible. Historic sites may also be identified in this area; however, it is likely that any historic site located here may lack physical integrity and be considered not eligible. Geological deposits in the area are Quaternary gravels which may contain Pleistocene fauna. Intact Pleistocene fossils may be considered important.

No prehistoric sites have been identified in the area of Site 1B. Five standing structures (Buildings 20200, 20201, 20202, 20203, and 20204) are identified in this area; one (Building 20200) was built in 1947, the rest were built in 1948. These buildings are not considered NRHP eligible because they do not meet the 50-year age requirement, do not represent a unique or unusual architectural style, and are not representative of particular events important in history. It is possible that Pleistocene faunal remains may be identified in this area; however, only intact deposits (i.e., complete skeletons) would be considered important.

explain

Site 2 has been previously inventoried for cultural resources. No prehistoric sites were identified. One historic site, a modern dump with a few historic artifacts, has been recorded in this area. However, this small historic site lacks integrity and is not considered NRHP eligible. Pleistocene fauna has been associated with the Quaternary deposits in the region and intact paleontological materials may be considered important.

4.7 RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY OF THE ENVIRONMENT

The closure of the Space Systems Division (SSD) facilities at Los Angeles Air Force Base (AFB) and in San Bernardino, California, and the relocation of SSD operations to selected Air Force installations, ~~was recommended by the Secretary of Defense's Commission on Base Realignment and Closure~~.

Total or partial closure of Los Angeles AFB would discontinue some or all current military and civilian activities on the base. ~~After closure, the risk of accidental spills of hazardous materials by the military would be eliminated or reduced. Reuse or development of lands associated with Los Angeles AFB containing hazardous waste sites would be precluded until those sites have been fully characterized and all remedial work is accomplished.~~ all necessary remedial responses are completed

The total or partial relocation of SSD to Vandenberg AFB, California; March AFB, California; Peterson/Falcon AFBs, Colorado; and/or Kirtland AFB, New Mexico would result in the short-term use of some human and natural resources, but the use of these resources would not significantly affect the maintenance and enhancement of long-term productivity.

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4.8 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable commitments of resources ~~due to~~ will result from the closure of Los Angeles AFB and relocation of SSD functional units to other Air Force locations ~~will be minor~~. Energy usage will temporarily increase while personnel and materials are transported to receiving bases. The proposed and alternative actions would require the use of relatively small amounts of labor, materials, energy, and other resources during both the construction and operations phases. Lands utilized for program activities would be committed for the duration of the operation.

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5.0 CONSULTATION AND COORDINATION

Listed below are the federal, state, and local agencies; private organizations; and individuals that were contacted during the course of preparing the Environmental Impact Statement (EIS). A number of other agencies and officials were notified of the scoping meetings and to provide comments on the EIS. These are listed in Appendix C, Draft Environmental Impact Statement Mailing List.

California:

- California Coastal Conservancy, Oakland CA (Reed Holderman)
- Advisory Council on Historic Preservation, Golden, CO (Alan Stanfill)
- California Dept. of Health Services, Sacramento, CA (Kenneth Kizer)
- Federal Highway Administration Region IX, San Francisco, CA (Edwin Wood)
- US Environmental Protection Agency Region IX, San Francisco, CA (Daniel McGovern)
- Regional Water Quality Control Board, Los Angeles CA, Robert Ghirelli
- Lower Mississippi Delta Development Commission, Memphis, Tennessee (Wilbur Hawkins)
- Bureau of Indian Affairs, Riverside CA
- Federal Aviation Administration, Los Angeles, CA (Gerald Chavkin)

Colorado:

- Colorado Highways Department, Denver CO, (A.Ray Chamberlain)
- Colorado Department of Health, Denver CO, (Thomas Looby)
- Federal Aviation Administration, Seattle, WA (Frederick Issac)
- Federal Highway Administration, Fort Worth, TX, (Wesley Mendenhall)
- US Environmental Protection Agency, Dallas TX, (Robert Layton)
- Division of Local Governments, Denver Colorado

New Mexico:

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APPENDIX A - GLOSSARY OF TERMS AND ACRONYMS

TERMS

Acre-Foot. The volume of the water that covers 1 acre to a depth of 1 foot; approximately 326,000 gallons.

Active Fault. A fault on which movement has occurred during the past 10,000 years and which may be subject to recurring movement usually indicated by small, periodic displacement or seismic activity.

Advisory Council on Historic Preservation. A 19-member body appointed, in part, by the President of the United States to advise the President and Congress and to coordinate the actions of federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological cultural resources, and to perform other duties as required by law (Public Law 89-655; 16 USC § 470).

Air Installation Compatible Use Zone. A concept developed by the Air Force to promote land use development near its airfields in a manner that protects adjacent communities from noise and safety hazards associated with aircraft operations, and to preserve the operational integrity of the airfields.

Air Quality Control Region. An area designated by Section 107 of the Clean Air Act, which is based on jurisdictional boundaries, urban-industrial concentrations, and other factors including atmospheric areas, that is necessary to provide adequate implementation of air quality standards.

Alluvium. A general term applied to sediments deposited by a stream or running water.

Ambient Air. That portion of the atmosphere, outside of buildings, to which the general public has access.

Ambient Air Quality Standards. Standards established on a state or federal level that define the limits for airborne concentrations of designated "criteria" pollutants (e.g., nitrogen dioxide, sulfur dioxide, carbon monoxide, total suspended particulates, ozone, lead, and hydrocarbons) to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Aquifer. The water-bearing portion of subsurface earth material that yields or is capable of yielding useful quantities of water to wells.

Archaeology. A scientific approach to the study of human ecology, cultural history, and cultural process.

Archaic. A stage of prehistoric cultural development, recognized throughout North America, characterized by broad spectrum hunting and gathering economies and seasonal mobility. The material remains are recognized by the development of barbed and stemmed spear points, the extensive use of groundstone tools, and the lack of ceramics. The Archaic is also commonly used to designate a prehistoric period (generally 6000 B.C. to A.D. 500), but the dates vary from one region to another.

Arterial. Signalized streets with signal spacings of 2 miles or less and turning movements at intersections that usually do not exceed 20 percent of total traffic. Urban arterials primarily serve through-traffic, and, as a secondary function, provide access to abutting properties (urban); roadways that provide large traffic volume capacity between major traffic generators, designed to facilitate traffic movement and discourage land access when feasible. Includes primary state roads (functional).

Artifact. Anything that owes its shape, form, or placement to human activity. In archaeological studies, the term is applied to portable objects (e.g., tools and the by-products of their manufacture).

Attainment Area. An area that has been designated by the Environmental Protection Agency and the appropriate state air quality agency as having ambient air quality levels below the ceiling levels defined under the National Ambient Air Quality Standards.

Attenuation. A decrease in the amplitude or energy (intensity) of a seismic wave with distance from the epicenter.

Available Vacancy. A vacant housing unit that is either for sale or for rent.

Average Annual Daily Traffic. For a 1-year period, the total volume passing a point or segment of a highway facility in both directions, divided by the number of days in the year.

Baseline. The existing and future-growth characterization of an area without the proposed program.

Basin. A drainage or catchment area of a stream or lake.

Bedrock. Geologic formation or unit which underlies soil or other unconsolidated surficial deposits.

Biological Diversity. Refers to the number of species and their relative abundance in an area or habitat.

Biome. Major regional ecological community of plants and animals extending over large natural areas.

Bonds. Financial instruments used by government agencies to fund major capital improvement projects; typically either a general obligation bond or revenue bond.

Bottomland. Land topographically low and typically found along a stream course.

Breaks. Terrain characterized by abrupt changes in surface slope (e.g., a line of cliffs and associated spurs and small ravines).

Budget. Document prepared by a government unit which estimates future revenues expected to be collected and the expenditure needs of the jurisdiction in a forthcoming fiscal year or years; includes estimates of potential revenues and expected expenditures by major fund groups (governmental funds, proprietary funds, and fiduciary fund types).

Cairn. A distinctly artificial pile of rocks that may mark or enclose burials, vision quests, caches, or geodetic locales.

Campsite. A short-term habitation site containing evidence of daily living activities, as opposed to specialized activities (e.g., quarry site). Campsites are generally open-air occupations of perhaps weeks to months in duration.

Capacity (Transportation). The traffic-carrying ability of a facility while maintaining prescribed operational qualities (e.g., a specific level of service); the maximum amount of traffic that can be accommodated by a given facility. (Note: Traffic facilities generally operate poorly at or near capacity, and facilities are rarely designed or planned to operate within this range.)

Capacity (Utilities). The maximum load a system is capable of carrying under existing service conditions.

Capehart Housing. A design of onbase family housing that was generally built in the 1950s.

Capital Costs. Expenditures by local governments on physical infrastructure.

Capital Projects Fund. One of the governmental fund types used to account for capital improvement projects other than those financed by proprietary funds or special assessment funds.

Carbonaceous. Pertaining to a sedimentary rock containing carbon as the major constituent.

Cenozoic. An era in geologic history extending from 66 million years ago to the present which is characterized by the rapid evolution of mammals, birds, grasses, shrubs, and higher flowering plants.

Ceramic Scatter. A spatially limited distribution of pot sherds on the ground surface.

Ceramic Sherd. Broken fragment of a clay vessel.

Ceremonial Center. The central portion of a prehistoric village site containing large civic and ceremonial structures.

Chronology. The science of arranging time in periods and ascertaining the dates and historical order of past events.

Civilian Labor Force. The sum of the number of persons who are unemployed but able, willing, and actively seeking work and the number of nonmilitary persons who are working. The number of unemployed divided by the civilian labor force defines the unemployment rate. Military personnel are not considered in the unemployment rate calculations because, by definition, persons working in the military are fully employed and inclusion would tend to skew rates downward.

Climate. The prevalent or characteristic meteorological conditions (and their extremes) of any given location or region.

Collector Streets. Surface streets that provide land access and traffic circulation service within residential, commercial, and industrial areas (urban); secondary roads that provide access to higher-type roads, connect small communities and nearby areas, and serve adjacent property (functional).

Collocate. To set side by side.

Component. One location or element within a settlement/subsistence system. Archaeological sites may contain several components that reflect the use of the locality by different groups in different time periods.

Comprehensive Plan. A public document, usually consisting of maps, text, and supporting materials, adopted and approved by a local government legislative body, which describes future land uses, goals, and policies.

Confined Aquifer. An aquifer that is overlain by an impermeable stratum and within which water pressure may build up so that penetration by a well will result in a static water level that is considerably higher than the top of the aquifer.

Constant Dollars. Dollar values that reflect values for a specific year after adjusting for inflation.

Corridor. A strip of land of various widths on both sides of a particular linear facility such as a highway or rail line.

Cultural Complex. A group of artifacts and sites that are distinct from other groups.

Culture. The system of behavior, beliefs, institutions, and objects human beings use to relate to each other and to the environment.

Cumulative Impacts. The combined impacts resulting from all programs occurring concurrently at a given location.

Curie. A unit of radioactivity equal to 3.7×10^{10} disintegrations per second.

Current Year Dollars. Dollar values that reflect the value in the year for which they are referenced before adjusting for inflation.

Debitage. Waste flakes resulting from stone tool manufacture.

Debt Service. The scheduled repayment of a loan made to a local government, usually resulting from the sale of bonds.

Debt Service Funds. One of the governmental funds used to account for annual payments required to pay back money that is borrowed by a governmental unit; generally limited to account for long-term debt from issuance of bonds.

Decibel. The unit of measurement of sound level calculated by taking ten times the common logarithm of the ratio of the magnitude of the particular sound pressure to the standard reference sound pressure of 20 micropascals and its derivatives.

Decommissioning. The process of removing a weapon system from service.

Delay. Additional travel time experienced by a driver, passenger, or pedestrian beyond what would reasonably be desired for a given trip.

Deployment. Strategic emplacement of a weapon system.

Developed. Said of land, a lot, a parcel, or an area that has been built upon, or where public services have been installed prior to residential or commercial construction.

Direct Effects. Effects that are immediate consequences of program activities. In economics, the initial increase in employment and income resulting for program employment and material purchases before the indirect effects of these changes are measured.

Direct Employment. Military and civilian personnel who are employed by the Department of Defense and its contractors, and who are working onsite on the program.

Direct Expenditure. Expenditures of local governments directly related to the provision of goods or services.

Direct Impact. Effects resulting solely from program implementation.

District. National Register of Historic Places designation of geographically defined area (urban or rural) possessing a significant concentration, linkage, or continuity of sites, structures, or objects united by past events (theme) or aesthetically by plan of physical development.

Disturbed Area. Land that has had its surface altered by grading, digging, or other construction-related activities.

Dolomite. A general term applied to sedimentary rocks composed of calcium and magnesium carbonate.

Drawdown. The distance between the static water level and the temporarily depressed water level caused by well pumpage.

Earthquake. A sudden motion or trembling in the earth caused by the displacement of rocks below the earth's surface due to a release of strain.

Ecotone. Transitional zone between two distinct ecological communities (e.g., grasslands to forest). Important because of the greater diversity provided by the presence of species from both communities.

Effect. A change in an attribute. Effects can be caused by a variety of events, including those that result from program attributes acting on the resource attribute (direct effect); those that do not result directly from the action or from the attributes of other resources acting on the attribute being studied (indirect effect); those that result from attributes of other programs or other attributes that change because of other programs (cumulative effects); and those that result from natural causes (e.g., seasonal change).

Effluent. Wastewater discharge from a wastewater treatment facility.

Employment. The total number of persons working (includes all wage and salary workers), both civilian and military, and proprietors.

Endangered Species. A species that is threatened with extinction throughout all or a significant portion of its range.

Energy. The capacity for doing work; taking a number of forms which may be transformed from one into another, such as thermal, mechanical, electrical, and chemical; in customary units, measured in kilowatt-hours or British thermal units.

Environmental Impact Analysis Process. The process of conducting environmental studies as outlined in Air Force Regulation 19-2.

Eocene. An epoch of the Tertiary period extending from about 58 million to 36 million years ago.

Ephemeral. Lasting or existing briefly or temporarily.

Epicenter. The point on the earth's surface directly above the focus of an earthquake.

Escarpment. A long cliff or steep slope separating two comparatively level or more gently sloping surfaces; results from erosion or faulting.

Ethnography. The description of human groups and their behavior by direct observation and/or by transcription of statements by living persons.

Eutrophication. The enrichment of a body of water with nutrients, which, in the presence of sunlight, can stimulate the growth of algae and other aquatic plants to the point that undesirable effects may result, such as highly turbid water or a depletion of dissolved oxygen.

Expenditure. A disbursement of funds by a government entity; includes operation and maintenance costs, as well as capital costs.

Farmstead. Horticultural community consisting of one house and associated structures or features.

Fault. A fracture or zone of fractures along which there has been movement of the sides relative to one another and parallel to the fracture.

Fault Zone. An area or region that is expressed as a zone of numerous fractures or faults.

Fauna. Nonportable portion of an archaeological site. These include facilities such as fire pits, storage pits, or foundations.

Federal-Candidate Species. Taxa placed in Federal Categories 1 and 2 by the U.S. Fish and Wildlife Service, which are candidates for possible addition to the List of Endangered and Threatened Species.

Fiscal Year. In government finance, the 12-month period that corresponds to the jurisdiction's accounting period, typically beginning July 1st and ending June 30th.

Flake. A small stone fragment produced as a by-product of stone tool manufacturing; may also be used unmodified as a tool itself.

Floodplain. The relatively flat land lying adjacent to a river channel that is covered by water when the river overflows its banks.

Flora. Plants; organisms of the plant kingdom taken collectively.

Fluvial (Fluviatile). Pertaining to a river or stream.

Forage. Food for animals (e.g., deer), especially when taken by browsing or grazing.

Freeway. A multilane, divided highway with a minimum of two lanes for exclusive use of traffic in each direction, allowing full control of access and egress.

Fugitive Dust. Particulate matter composed of soil that is uncontaminated by pollutants from industrial activity. Fugitive dust may include emissions from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or redistributed.

Fugitive Emissions. Emissions released directly into the atmosphere that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

Full-Scale Development. The stage of development of a weapon system when all components are built and tested at full scale.

Full-Time Equivalent. Employment based on a 40-hour work week (i.e., one person working 40 hours would equal 1 full-time equivalent; one person working 20 hours would equal 0.5 full-time equivalent).

General Fund. One of the governmental fund types, used to account for all financial transactions and resources except those required to be accounted for in other funds. Typically supports governmental activities supported by local taxes, for example, public safety, public health, and general administration functions. In school districts, accounts for all direct instructional costs.

General Obligation Bond. Financial instrument used by government agencies to fund major capital improvements; backed by full faith and credit of the issuing agency. The total amount of general obligation bond indebtedness is subject to statutory limitations, measured as a percentage of the jurisdiction's tax base. Used primarily for general purpose projects (e.g., administrative facility construction, parkland acquisition, and law enforcement and fire protection facility construction) that do not lend themselves to revenue bond financing.

Geologic Hazard. A naturally occurring or man-made geologic condition or phenomenon that presents a risk or is a potential danger to life and/or property.

Geologic Time Scale. Scale of time ranging from Precambrian (approximately 3.8 billion years ago) to the present.

Geologic Unit. A geologic formation, group, or member.

Geothermal. Pertaining to heat in the earth's interior.

Governmental Funds. One of the major fund groups consisting of the general fund, special revenue funds, capital projects funds, debt service funds, and special assessment funds, as differentiated from proprietary funds (enterprise and internal service funds) and fiduciary funds (trust and pension fund accounts); accounts for almost all of the financial transactions of a jurisdiction.

Granite. A broadly used term for a quartz-bearing, coarse, crystalline igneous rock formed deep beneath the earth's surface.

Ground Surface Rupture. Surface expression of fractures that are usually a result of seismic activity.

Groundstone Artifacts. Stone artifacts made by grinding rather than flaking (e.g., milling stones and mortar and pestle).

Group. A stratigraphic unit consisting of two or more contiguous or associated geologic formations.

Hazardous Materials. Both nonradioactive (e.g., missile propellants and diesel fuel) and radioactive materials.

Hazardous Waste. A waste, or combination of wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hearth/Firepit. A feature used for the placement of fires; may be lined with clay or stones.

Herptiles. Referring to amphibians and reptiles.

Historic. A period of time after the advent of written history dating to the time first Euro-American contact in an area. Also refers to items primarily of Euro-American manufacture.

Holocene. The time since the end of the Pleistocene epoch, characterized by the absence of large continental or Cordilleran ice sheets and the extinction of large mammalian life-forms. Generally considered to be the last 10,000 years.

Household Size. The average number of individuals residing in a single dwelling unit.

Hydrology. The science dealing with the properties, distribution, and circulation of water on the surface of the land and in the soil and underlying rocks.

Impact. An assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the adverse effects, usually measured using a qualitative and nominally subjective technique.

Inactive Fault. A fault with no historic activity; not recognized as a source of earthquakes.

Indirect Employment. Employment resulting from the purchases of workers who are directly working on a specified program. Also includes any subsequent employment arising from the increase in purchases in the area.

Indirect Impacts. Program-related impacts (usually population changes and resulting impacts) not directly attributable to the program itself. For example, direct program employees will spend some of their income locally. As a result, local industries will tend to hire more workers as they expand in response to the increased demand. This additional employment is termed an "indirect impact."

Inhabited Structure. Any building currently being used for the purposes of a dwelling or residence, workplace, place of business or industry, or an institutional function. Agricultural buildings such as barns do not generally meet the definition of an inhabited structure.

Inmigrants. All persons relocating to a defined geographic area as a result of the proposed program, usually calculated on an annual basis.

Intercontinental Ballistic Missile. A large missile capable of accurate weapon delivery over intercontinental ranges (usually greater than 5,000 miles).

Intermittent Stream. A stream that does not flow continuously during all periods of the year.

Interstate. The designated National System of Interstate and Defense Highways located in both rural and urban areas; they connect the East and West coasts and extend from Canadian border points to various points on the Mexican border.

Isolated Artifact. An artifact, or a small, disarticulated group of artifacts, that cannot be associated with, or are situated outside of, a cultural resource site.

K-factor. The soil erodibility factor (K) used tin the Universal Soil Loss Equation. The index is a measure of the susceptibility of a soil to erode as related to physical and chemical properties of the soil.

Kilowatt. A unit of power equivalent to 1,000 watts.

Known Geological Structure. An area containing oil and gas leases in which an accumulation of hydrocarbons has been discovered by drilling and determined to be productive. The limits include all acreage that is hypothetically proven productive (43 CFR § 3100.0-5[a]).

Known Geothermal Resource Area. An area in which the geology, nearby discoveries, competitive interests, and other indicators would, in the opinion of the Department of the Interior, engender a belief in those who are experienced in the subject matter that the prospects for the extraction of geothermal resources are good enough to warrant expenditures of money for that purpose (43 CFR § 3200.0-5).

Lacustrine. Pertaining to, produced by, or formed in a lake environment.

Land Use Plans and Policies. Guidelines adopted by governments to direct future land use within their jurisdictions.

Landslide. The downslope movement of soil and/or rock material under gravitational influence.

L_{dn} Noise Level. The 24-hour average-energy sound level expressed in decibels, with a 10-decibel penalty added to sound levels between 10:00 P.M. and 7:00 A.M.

L_{eq} Noise Level. A constant amount of acoustic energy equivalent to the energy contained in the time-varying noise measured from a given source for a given time.

Level of Impact. The measure of the magnitude or degree of impact expressed as negligible, low, moderate, or high for each environmental resource.

Level of Service. In transportation analyses, a qualitative measure describing operational conditions within a traffic stream and how they are perceived by motorists and/or passengers. In public services, a measure describing the amount of public services (e.g., fire protection and law enforcement services) available to community residents, generally expressed as the number of personnel providing the services per 1,000 population.

Liquefaction. The transformation during an earthquake of unconsolidated, water-saturated sediment into a liquid form.

Lithic Scatter. An archaeological site consisting only of stone artifacts.

Lithology. The physical character of a rock such as its color, hardness, mineral composition, and grain size.

Locality. A particular spot within a geologic unit from which a specimen is obtained or may be found; usually a location of dense or well-preserved fossils.

Loess. A typically buff-colored, windblown silt directly attributable to glacial outwash.

Long Term. Impacts that would occur over an extended period of time, whether they start during the construction or operations phase. Most impacts from the operations phase are expected to be long term since program operations essentially represent a steady-state condition (i.e., impacts resulting from actions that occur repeatedly over a long period of time). However, long-term impacts could also be caused by construction activities if a resource is destroyed or irreparably damaged or if the recovery rate of the resource is very slow.

Magnitude (earthquake). A measure of strength of an earthquake or the energy it releases.

Maximum Credible Earthquake. The largest earthquake capable of being produced from a source, structure, or region under the currently known tectonic framework.

Maximum Tolerable Soil Loss. Represents the maximum amount of soil that can be removed by wind and/or sheet erosion without reducing the productivity of the land or altering the natural ecosystem of an area. The value conceptually represents a balance between the rate of soil formation and soil erosion of a given area.

Megafauna. Various species of large mammals that became extinct in North America sometime before 6,000 years before present. These mammals include the mammoth, giant bison, camel, and giant sloth.

Megawatt. One thousand kilowatts or one million watts.

Mesotrophic. A body of water with moderate amounts of plant nutrients that result in a medium level of primary productivity, and that usually has a moderate level of dissolved oxygen.

Mesozoic. An era in geological history, ranging from about 245 million to 66 million years ago, characterized by the development of reptiles.

Microcurie. One-millionth of a curie.

Microgram. One-millionth of a gram.

Midden. Soil horizon resulting from the accumulation of human living debris containing artifacts and cultural refuse (e.g., bone and shell fragments, fire-cracked rocks, charcoal, chipping detritus, stone tools, or organic residues).

Miocene. An epoch of the Tertiary period, 24 million to 5 million years ago, market by the development of apes and the appearance of ancestral gibbons.

Mississippian. A period of the Paleozoic era extending from about 360 million to 320 million years ago.

Mitigation. A method or action to reduce or eliminate program impacts.

Mixed Open Space. A land use type that includes range and pasture land, noncommercial forests, riparian areas, water bodies, and vacant land.

Multifamily Housing. Townhouse or apartment units that accommodate more than one family though each dwelling unit is only occupied by one household.

Multilane Highway. A highway with at least two lanes for the exclusive use of traffic in each direction, with no or partial control of access, that may have periodic interruptions to flow at signalized intersections.

National Landmark (Historic). A site, building, or object in private or public ownership that possesses national significance in American history, archaeology, or culture. In order to achieve landmark status, a property must be, or have the clear potential to be, recognized, understood, and appreciated publicly and professionally for the strength and clarity of its historical association, its architectural or design excellence, or its extraordinary information content on a national scale.

National Register of Historic Places. A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a)(1) of the National Historic Preservation Act of 1966, as amended.

Native Americans. Used in a collective sense to refer to natives of North America.

Native Vegetation. Plant life that occurs naturally in an area without agricultural or cultivational efforts.

Nonattainment Area. An area that has been designated by the Environmental Protection Agency and the appropriate state air quality agency as exceeding one or more National Ambient Air Quality Standards.

Overall Vacancy. Total number of single-family, multifamily, or mobile homes that are not occupied at any given time.

Paleo-. Prefix meaning "old" or "ancient."

Paleontological Resources. Fossilized organic remains from past geological periods.

Paleozoic. An era in geological history occurring between 570 million and 245 million years ago, marked by the culmination of almost all invertebrates except the insects; in its later periods, marked by the first appearance of land plants, amphibians, and reptiles.

Peak Demand. The highest instantaneous amount of electrical power (in kilowatts) that an electrical system is required to supply over a given time frame, usually 1 year.

Peak Hour. The hour of highest traffic volume on a given section of roadway between 7 A.M. and 9 A.M. or between 4 P.M. and 6 P.M.

Peak Year. The year when a particular program-related effect is greatest.

Pennsylvanian. A period of the Paleozoic era extending from about 320 million to 286 million years ago.

Perennial Stream. A stream that flows continuously throughout the year.

Permanent Housing. Units intended for year-round use.

Permanently Disturbed Land. Surfaces covered by impervious materials or kept in a cleared condition to accommodate buildings, parking lots, roads, and security zones.

Permian. A period of the Paleozoic era extending from about 286 million to 245 million years ago.

Personal Income. Current income received by persons from all sources; includes transfer payments from governments or businesses.

Petroglyph. Schematic or representational art incised or pecked into a rock surface.

Physiographic Province. A region with similar geologic structure and climate that has a unified geomorphic history.

Pictograph. Schematic or representational art painted or drawn onto a rock surface.

P.L. 81-874 Programs. Federal law that authorizes financial assistance to local school districts when federal actions place fiscal burdens on the districts.

Pleistocene. The last 1.6 million years of geological history, marked by repeated glaciation and the first indication of social life in human beings.

Pliocene. An epoch of the Tertiary period extending from about 5 million to 1.6 million years ago.

Potentiometric Level. The level to which groundwater would rise under unconfined conditions; it may assume values higher than the local topography.

Precambrian. All geologic time before the Paleozoic era, equivalent to about 90 percent of geologic time.

Prehistoric. The period of time before the written record, and before Europeans entered an area.

Prevention of Significant Deterioration Area. A requirement of the Clean Air Act (§ 160 et seq.) that limits the increases in ambient air pollutant concentrations in clean air areas to certain increments even though ambient air quality standards are met.

Primary Road. A consolidated system of connected main roads important to regional, interstate, and statewide travel; they consist of rural arterial routes and their extensions into and through urban areas of 5,000 or more population.

Prime Farmland. Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture (Farmland Protection Policy Act, 7 CFR § 658).

Principal Aquifer. The particular aquifer that supplies the majority of the groundwater used in a given region.

Property Tax. Tax imposed by local governments based on the value of the property within their jurisdiction.

Proprietary Funds. One of the major fund groups, consisting of enterprise fund accounts and internal service fund accounts.

Protohistory. The period when nonliterate Native American cultures were affected by Euro-Americans without direct contact. For instance, inland Indian tribes received trade goods and reports of European cultures from coastal tribes before the arrival of European explorers in the interior.

Public Finance. Finances of, or relating to, a government entity.

Quarry. A locality where lithic material was extracted and initially prepared for the manufacture of stone implements. In the narrow sense, the term refers to places where raw materials were actually excavated, but its use is commonly extended to localities where materials are collected at the surface (e.g., gravel deposits).

Quaternary. A geologic period representing the last 1.6 million years of earth's history which includes the Pleistocene and Holocene (Recent) epochs.

Recent. A geologic epoch of the Quaternary period representing the last 10,000 years of geologic time.

Recharge. The process by which water is absorbed and added to the zone of saturation, either directly into a formation or indirectly by way of another formation.

Region of Influence. That area where program-induced effects of any magnitude may be expected to occur.

Relief. The vertical difference in elevation between the hilltops or mountain summits and the lowlands or valleys of a given region.

Reserve Bonding Capacity. Statutory limit of long-term debt of a jurisdiction minus current outstanding debt.

Revegetation. Regrowth or replacement of a plant community on a disturbed site. Revegetation may be assisted by site preparation, planting, and treatment, or it may occur naturally.

Revenue. Money that a government entity collects or receives.

Revenue Bond. Financial instrument used by government agencies to fund major capital improvements. Used for projects that generate revenue from user charges or similar fees or charges that are applied toward both project operation and debt retirement (e.g., water and sewer plant operations).

Richter Magnitude Scale. Measure of an earthquake size based on the amplitude of seismic waves that are recorded on a seismograph. The magnitude is based on a logarithmic scale (base 10) of the largest ground motion.

Riparian. Of or relating to land lying immediately adjacent to a water body, and having specific characteristics of that transitional area (e.g., riparian vegetation).

Rockshelter. A naturally formed sheltered overhang that was commonly inhabited by prehistoric groups; it is generally found on a vertical rock face and is not as deep as a cave.

Runoff. The noninfiltrating water entering a stream or other conveyance channel shortly after a rainfall event.

Rural Area. The area outside towns, cities, or communities that is characterized by very low-density housing concentrations, agricultural land uses, and a general lack of most public services.

Safe Yield. The pumpage from a groundwater basin or aquifer that can be permanently maintained without substantially lowering the groundwater below a predetermined level.

Sampling. The selection of a portion of a study area or population, the analysis of which is intended to permit generalization about the entire population. In archaeology, samples are often used to reduce the amount of land area covered in a survey or the number of artifacts analyzed from a site. Statistical sampling is generally preferred since it is possible to specify the bias or probability of error in the results, but judgmental or intuitive samples are sometimes used.

Sandstone. A sedimentary rock composed of detrital materials generally consisting of quartz and deposited by physical processes.

Secondary Employment. In economics, the additional employment and income generated by the economic activity required to produce the inputs to meet the initial material requirements. The term often is used to include induced effects.

Secondary Highways. Rural major collector routes that carry extensive local traffic.

Seismic. Pertains to the characteristics of an earthquake or earth vibrations including those that are artificially induced.

Seismic Zone. An area of intense local seismicity.

Seismotectonic Province. A region characterized by similar tectonic and seismic characteristics.

Shale. A fine-grained sedimentary rock formed by the consolidation of clay, silt, and mud.

Sheet Erosion. Erosion caused by a layer of water moving downward on a surface that has not yet developed channels, rills, or gullies. Uneven sheet erosion leads to the formation of rills and eventually gullies.

Short Term. Transitory effects of the proposed program that are of limited duration and are generally caused by construction activities or operations start-up.

Significance. The importance of a given impact on a specific resource as defined under the Council on Environmental Quality regulations.

Siltstone. A fine-grained sedimentary rock composed of silt-sized detritus.

Single-Family Housing. A conventionally built house consisting of a single dwelling unit occupied by one household.

Site. Any location where humans have altered the terrain or discarded artifacts.

Slough. A water-filled channel with little flow; often a former river channel.

Soil. A natural body consisting of layers or horizons of mineral and/or organic constituents of variable thickness and differing from the parent material in their morphological, physical, chemical, and mineralogical properties, and biological characteristics.

Soil Association. A collection of soils found to geographically occur together.

Soil Series. The lowest category used for differentiating groups of soils based on similar properties and characteristics. Soils are homogenous with respect to profile characteristics except for the A or surface horizon, which may vary in texture.

Soil Types. A category or detailed mapping unit used for soil surveys based on phases or changes within a series (e.g., slope, salinity).

Sole Source Aquifer. An aquifer that provides all or most of the potable water in an area and that has been specifically designated by the Environmental Protection Agency as provided for in the Safe Drinking Water Act. Projects that might affect a sole source aquifer are subject to special review procedures.

Special Assessment Funds. One of the governmental fund types used to account for financing of public improvements or services deemed to benefit the properties against which special assessments are levied (e.g., a charge for sidewalk construction, based on the linear footage of property frontage and a cost per linear foot for sidewalk construction).

Special District. Local government unit charged with provision of a specific service. Examples include water supply districts, lighting districts, and flood control districts. Generally, funding is from property taxes levied on the property benefitting from the service.

Special Revenue Funds. Used to account for the proceeds of special revenue sources (redistributed state-shared revenues such as gasoline taxes) that are legally restricted to expenditures for specific purposes (e.g., road construction); also supported in part by local property taxes.

State Historic Preservation Officer. The official within each state, authorized by the state at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act.

State Historic Programs. Educational aid programs run by states in support of local school districts. Accounts for majority of revenues available to local districts.

State-Sensitive/State-Recognized Species. Plant and wildlife species in each state that are monitored and listed for purposes of protection.

Stratified Site. An archaeological site exhibiting various strata or layers of occupation; usually implies a large site with a long occupation. The interpretation and analysis of strata are concerned with the original succession and age relations of layered materials and their individual properties (i.e., cultural materials are dated relative to each other by their position in stratigraphic layers).

Subsistence Economy. The method of producing the food or goods necessary to provide a minimal standard of living, as opposed to a market economy in which a surplus is produced for redistribution.

Subsistence/Settlement Pattern. The distributional patterns of site types in relation to the environment that reflect a particular adaptation. Aspects of land use include the function, duration, and seasonality of individual sites.

Surface Collection. Systematic mapping and removal of artifacts from a site by means not involving excavation.

Tax Revenue. Revenue of local governments, generally based on the valuation of goods or services; includes property, sales, excise, and other miscellaneous taxes.

Taxon (pl.) Taxa. A taxonomic entity (species, subspecies, or variety) or a group of such entities.

Tectonic. Dealing with the regional assembling of structural or deformational features, and includes a study of their mutual relations, origin, and historical evolution.

Temporarily Disturbed Land. Surfaces disturbed during construction, but later regraded and/or revegetated; or those able to return to a natural state during the operational life of the program.

Temporary Housing. Dwellings meant for occupancy on a temporary basis (generally for less than a month), such as rooms in hotels and motels.

Terrace. A flat portion of land created when a stream or river cuts farther into its channel and migrates laterally to a different location. In river valleys, they typically represent former levels of the valley floodplain.

Terrain Failure. A generalized term for any number of mechanisms by which soil or rock is transported downslope under the effect of gravity.

Terrestrial. Living on or in, or growing from, the land.

Tertiary. The first period of the Cenozoic era extending between 66 million and 1.6 million years ago.

Threatened Species. Taxa likely to become endangered in the foreseeable future.

Thrust Fault. A fault with a low angle of dip on which the hanging wall has moved upward relative to the footwall.

Ton. A unit of weight equal to 2,000 pounds.

Topsoil. The upper or productive layer(s) of a soil.

Total Dissolved Solids. The concentration of solid materials that are dissolved in a sample of water; determined as the weight of the residue of a water sample upon filtration and evaporation divided by the volume of the sample.

Total Water Use. The amount of water withdrawn from the natural resource base for a beneficial purpose, excluding water used for hydroelectric power generation, and certain nonconsumptive uses such as once-through cooling water for thermoelectric power generation, wildlife habitat, and fish farming.

Triassic. A period of the Mesozoic era extending from about 245 million to 208 million years ago.

Two-Lane Highway. A roadway having a two-lane cross section, with one lane for each direction of flow, and where passing maneuvers must be made in the opposing lane.

Unconfined Aquifer. An aquifer where the water table is exposed to the atmosphere through openings (pores) in the overlying materials.

Unemployment Rate. The number of civilians, as a percentage of the total civilian labor force, without jobs but actively seeking employment.

Unique and Sensitive Habitats. Areas that are especially important to regional wildlife populations or protected species that have other important biological characteristics (e.g., severe wintering habitats, nesting areas, and wetlands).

Unique Farmland. Land other than prime farmland that is used for production of specific high-value food and fiber crops as determined by the Secretary of Agriculture. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables.

Universal Soil Loss Equation. An equation that estimates the amount of soil lost to rainfall erosion, commonly measured in tons per acre per year, based on factors such as rainfall intensity, K-factor, slope, and management practices.

Upland. Ground elevated above bottomlands (e.g., rolling hill terrain and terraces).

Vacant Housing Units. Units that are not occupied at the time of enumeration. These units are subdivided into three categories: (1) available vacant units that are vacant year-round units being offered for sale, for rent, or for sale or rent; (2) vacant units under contract that are vacant year-round units that are rented or sold, awaiting occupancy, or held for occasional use; and (3) other vacant units that are vacant year-round units that do not fit into the first two categories. Boarded up units are included in this category.

Visual Attributes. The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture. These factors give an area the distinctive quality which distinguishes it from other areas.

Volume (Transportation). The total number of vehicles that pass over a given point or section of a roadway during a given time interval. Volumes may be expressed in terms of annual, daily, hourly, or subhourly periods.

Water Table. The sustainable volume of water discharged from a well per units of time, often expressed in gallons per minute.

Waterfowl. Birds species (e.g., ducks, geese, cranes) that live on or near water bodies.

Watershed. See Basin.

Watt. A unit of electrical power equal to 1/756th horsepower.

Well Yield. The sustainable volume of water discharged from a well per unit of time, often expressed in gallons per minute.

Wetlands. Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil, including swamps, marshes, bogs, and similar areas.

Wherry Housing. A design of onbase family housing that was generally built before World War II.

Wind Erodibility Group. An assemblage of soils grouped by their similar properties that affect their resistance to soil blowing.

Wind Erosion. Detachment, transportation, and deposition of loose topsoil by wind action.

Wind Erosion Equation. An equation that estimates the amount of soil lost as a result of wind erosion based on factors such as soil erodibility, climate, and vegetative cover.

Worker Spending. In reference to regional economic impacts, refers to the amount of money spent in local area by program-related workers after leakages (taxes, nonlocal spending, as examples) are taken into account.

Year-Round Housing. Dwellings meant for occupancy throughout the year as distinguished from temporary housing (e.g., hotels and motels). Includes single-family structures, multifamily structures, and mobile homes.

Zoning. The division of a municipality (or county) into districts for the purpose of regulating land use, bulk of building, required yards, necessary off-street parking, and other prerequisites to development. Zones are generally shown on a map and the text of the zoning ordinance specifies requirements for each zoning category.

10-Year, 7-Day Low Flow. Based on a statistical analysis of historical flow records, the lowest average flow over a period of 7 successive days that would be expected to occur once during any 10-year period.

ACRONYMS

AADT	Average Annual Daily Traffic
ACHP	Advisory Council on Historic Preservation
A&CO	Assembly and Checkout
AFB	Air Force Base
AFR	Air Force Regulation
AICUZ	Air Installation Compatible Use Zone
APCD	Air Pollution Control District
AQCR	Air Quality Control Region
ARB	Air Resources Board
ASCS	U.S. Agricultural Stabilization and Conservation Service
ATC	Air Training Command
BEA	Bureau of Economic Analysis
BN	Burlington Northern Railroad
CBD	Central Business District
CBRC	Commission on Base Realignments and Closures
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CHAMPUS	Civilian Health and Medical Program of the Uniformed Services
COE	U.S. Army Corps of Engineers
CY	Calendar Year
DEIS	Draft Environmental Impact Statement
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EAC	President's Economic Adjustment Committee
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
HC	Hydrocarbons
HQ	Headquarters
HUD	U.S. Department of Housing and Urban Development
HWSF	Hazardous Waste Storage Facility
IRP	Installation Restoration Program
ISCST	Industrial Source Complex Short Term
LOI	Level of Impact
LOS	Level of Service
MSL	Mean Sea Level
MTMC	Military Traffic Management Command
NAAQS	National Ambient Air Quality Standards

NCO	Noncommissioned Officer
NEDS	National Emission Data System
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPL	National Priorities List
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OEA	Office of Economic Adjustment
POL	Petroleum, Oil and Lubricants
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROI	Region of Influence
ROW	Right-of-Way
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SCS	U.S. Soil Conservation Service
SHPO	State Historic Preservation Officer
SPEGL	Short-Term Public Exposure Guidance Level
SSD	Space Systems Division
SSWG	System Safety Working Group
TAC	Tactical Air Command
TDS	Total Dissolved Solids
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and Disposal Facility
TSP	Total Suspended Particulates
UP	Union Pacific Railroad
U.R.F.	Unit Risk Factor
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
WSA	Weapon Storage Area

UNITS OF MEASUREMENT

acre-ft	acre-foot
acre-ft/yr	acre-foot per year
Bcf	billion cubic feet
°C	degrees Celsius
dB	decibel
dBA	decibel on the A-weighted scale
ft	foot
g	acceleration of gravity

kg	kilogram
km	kilometer
kV	kilovolt
kWh	kilowatt-hour
L_{dn}	day/night equivalent noise level
L_{eq}	energy-equivalent continuous noise level
MBtu	million British thermal units
Mcf	thousand cubic feet
MG	million gallons
MGD	million gallons per day
mi	mile
MMcf	million cubic feet
mph	miles per hour
MVA	megavolt-ampere
MW	megawatt
PM_{10}	particulate matter (less than 10 micrometers in diameter)
ppm	parts per million
sq ft	square foot
sq km	square kilometer
sq mi	square mile
T/ac	ton per acre
T/ac/yr	ton per acre per year
T/day	ton per day
T/yr	ton per year
$\mu Ci/m^2$	microcuries per square meter
$\mu Ci/m^3$	microcuries per cubic meter
$\mu g/m^3$	microgram per cubic meter

CHEMICAL ABBREVIATIONS

CO	Carbon Monoxide
O_3	Ozone
NO_x	Nitrogen Oxides
NO_2	Nitrogen Dioxide
PCB	Polychlorinated Biphenyls
SO_x	Sulfur Oxides
SO_2	Sulfur Dioxide
TCE	Trichlorethylene
VOC	Volatile Organic Compounds

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APPENDIX B - RECORD OF PUBLIC NOTIFICATION

As part of the scoping process, the Air Force conducted a series of meetings to determine the issues and concerns that should be identified in the Environmental Impact Statement (EIS) for the proposed closure of Los Angeles Air Force Base (AFB), California, and the relocation of Headquarters Space Systems Division and appropriate supporting units to Vandenberg AFB, California.

The Air Force notified the public of both the scoping meetings and the preparation of the EIS through Notices of Intent (NOIs) published in the *Federal Register* on 9 February 1990. Copies of the NOIs follow.

NOTICE OF INTENT
TO PREPARE ENVIRONMENTAL IMPACT STATEMENTS
LOS ANGELES AFB, CA

The United States Air Force intends to study the closing of Los Angeles AFB, CA beginning in FY 1993. As part of that study process, the Air Force will prepare two Environmental Impact Statements (EISs) for use in decision-making regarding the proposed closure and final disposition/re-use of property at Los Angeles AFB.

The first environmental impact statement (EIS) will be prepared to assess the potential environmental impact of the possible closure of Los Angeles AFB. The EIS will discuss the potential environmental impacts of withdrawal of most of Headquarters Space Systems Division (HQ SSD). Los Angeles AFB units not required to support the proposed relocated HQ SSD will be inactivated. The EIS will also analyze the no action alternative to closing Los Angeles AFB and a partial relocation of HQ SSD.

The 2nd other EIS will only be completed if there is a final decision to close the base. This EIS would cover the final disposition/re-use of excess property. All property would be disposed of in accordance with provisions of Public Law, federal property disposal regulations and Executive Order 12512.

The Air Force is planning to conduct a series of scoping meetings to determine the issues and concerns that should be addressed in the two EISs. Notice of the time and place of the planned scoping meetings will be made available to public officials and announced in the news media in the areas where the meetings will be held.

To assure the Air Force will have sufficient time to consider public inputs on issues to be included in the development of the first EIS, comments should be forwarded to the addressee listed below by March 15, 1990. However, the Air Force will accept comments to the addressee below at any time during the environmental impact analysis process.

For further information concerning the study of Los Angeles AFB for possible closure and the EIS activities, contact

Director of Environmental Planning
AFRCE-BMS/DEV
Norton AFB, San Bernardino, CA 92409-6448

NOTICE OF INTENT
TO PREPARE ENVIRONMENTAL IMPACT STATEMENTS
RELOCATION OF SPACE SYSTEMS DIVISION

The United States Air Force intends to study the relocation of Headquarters Space Systems Division (HQ SSD) and appropriate supporting units to Vandenberg AFB, California, by the start of Fiscal Year (FY) 1993. As part of that study process, the Air Force will prepare an Environmental Impact Statement (EIS) for use in decision-making regarding the proposed relocation.

As alternatives, the EIS will also analyze the impacts of relocating HQ SSD and its support units to March AFB, California, Falcon and Peterson AFBs, Colorado or Kirtland AFB, New Mexico. Additionally, the EIS will consider the environmental impacts associated with the relocation of only portions of HQ SSD to Vandenberg, March, Falcon, Peterson, or Kirtland AFBs. The EIS will also analyze the no action alternative to relocating HQ SSD and Los Angeles AFB supporting units.

The Air Force is planning to conduct a series of scoping meetings to determine the issues and concerns that should be addressed in the EIS. Notice of the time and place of the planned scoping meetings will be made available to public officials and announced in the news media in the areas where the meetings will be held. To assure the Air Force will have sufficient time to consider public inputs on issues to be included in the development of the EIS, comments should be forwarded to the addressee listed below by March 15, 1990. However, the Air Force will accept comments to the addressee below at any time during the environmental impact analysis process.

For further information concerning relocation of Space Systems Division and EIS activities contact:

Director of Environmental Planning
AFRCE-BMS/DEV
Norton AFB, San Bernardino, California 92409-6448

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APPENDIX C - DRAFT ENVIRONMENTAL IMPACT STATEMENT MAILING LIST

Los Angeles Air Force Base, California

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Diane E. Watson
Charles R. Willett
Raymond S. Wittig
Marvin & Mary Zeigel

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05/21/90

VANDENBERG AFB, CALIFORNIA

Reid Alexander
Lance Armstrong
Sam Bass
Francis R. Bass
Chuck Balcom
Joyce & Cecil Brown
William C. Byrd
Thomas C. Calkins
Marlene Carter
Russ Crandell
John A. Dougherty
Martin Eberling
Karl Foster
Patricia M. Fresh
Lawrence E. Gauthier
Howard E. Grantz
Jeremy Graves
Edward A. Henry
Lorine Holman
Dewayne Holmdahl
Frances M. Houston
Stamegna Ivano
James G. Jaboreh
Terry E. Johnson
R.E. Jones
Stephen Kashiwada
Yong Kim
Karen Kivela
E. H. Kranz
Diane Long
R.R. Luce
Allen T. Maurer
Michael J. McDermott
W.S. Mollins
Barbara & Archie E. Nogle
Laurie Owens
Jon C. & Pam Picciuolo
Elinor Reeves
Lawrence Riemer
Jerry Schmidt
Linda Sehgal
Joseph Sesto
Donald D. Smith
Maralyn L. Smith
Robert E. Van Tassel
Vojislav Batta Vujicic
Tad Weber
Ritch Wells
J.N. Williams
Betty Williams

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05/21/90

MARCH AFB, CALIFORNIA

Jose Amador
Major Sidney T. Black
Richard A. Burpee
Aloysius G. Casey
Robert M. Denham
Margaret A. Gazaway
Aaron D. Knox
Harley Knox
Dave McPhee
Charles Miller
Michael P. Neufeld
Audie Nishida
Art Pick
Jeff Speeter
Capt. A.V. Stephenson
Al Sykes
Robert Wolf

BCL-C
05/21/90

PETERSON AFB/FALCON AFB, COLORADO

Merle F. Allshouse
Merritt L. Anderson, Jr.
Michael L. Archuleta
LaJoana Archuleta
Lisa D. Are
John Arends
Ted Bachara
David Bacon
William F. Bale
Peter M. Baltuff
M.J. Barber
Charles Bartholomew
Charles H. Batley
Bryon Bednar
Mike Bird
Bill Bishop
Bonnie Jo Bleed
Zane Bowers
Jeffrey M. Burns
Robert A. Carlone
M. D. Cassetti
Matt A. Coleman
Thomas R. Costello
Gary Cuddeback
Donald L. Dandurand
John Darrah
Bob Davies
Andy de Naray
John E. Donovan
Thomas Doran
Margaret Duling
Ruth M. Elk
A.J. Ernster
Col Jerry W. Felder
Duncan A. Fisher
Jack Flannery
James Foster
John D. Fowler
Jeff Fox
Gerald W. Frese
Kenneth L. Gilbert
Virginia L. Gwaltney
Robert K. Hall
Biff Hallenbeck
Barbara Hamrick
Valerie L. Hasberry
Phillip K. Heacock
Dr. Frederic Herman
James R. Hinsey
James W. Holley
Paul Jamieson
David H. Johnson
Ken Johnston
Max A. Karner
Tracy C. Kissler
John C. Kolb
Joseph J. Kondrup, Sr.
Irene L. Kornelly
James Kuhlman
Daniel L. Kupferer
Dan League
Harold U. Littrell
James F. LoJacono
Richard P. MacLeod
Don March
Robert A. Martin
Ron McCallum
Francis X. McCann
Mary Ellen McNally
Terry Miller
W.E. Miller
Gene Mondani
Randall Moore
James D. Munger
Davis M. Nasrallah
Dwayne C. Nuzum
Paul Paulson
Craig T. Paulson
Don Pedersen
Don L. Peterson
Charles L. Price
Mildrit G. Price
Dick Prinster
T.S. Rand
J.C. Ratliff
Raymond & Connie Reeves
Joseph C. Salute
Thomas W. Sawyer
George L. Sayre
Robert D. Sheets
Warren Smith
Connie Scott Solomon

BCL-C
05/21/90

Terence W. Sparks
Tom Spiers
Martin F. Spritzer
Janet Stewart
James M. Stuart
Tim Sullivan
Daniel Teas II
Alvaro J. Testa
Frank D. Tomlinson
Karren "Sparky" Turner
Fred M. Vialpando
C. Wetherill
George Williams
Robin Williams
Stan Williams
Stan Witkowski
Janet Wrestler
Steve Wrestler

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05/21/90

KIRTLAND AFB, NEW MEXICO

Bill Archibeck
Loretta A. Armenta
Rep. Frances Armijo
James Aschenbeck
John Avila
Joseph H. Badal
Graham Bartlett
Everet Beckner
Bruce R. Beebe
J. Michael Bell
Lou Bernasconi
Roy W. Bidwell
Joe Biernat
Janet Blan
Jack Bobroff
Herbert C. Bohannon, Jr.
Don Bradley
Robin Brandin
Bobbi Bryant
Dixie Burch
James A. Caudell
R.L. Coatt
Alan R. Cole
Jim Covell
Roger S. Cox
Donald A. Dalton
L.B. Dean
Eric DeBonis
John W. & Erin L. Dettmer
Bob Duffner
Thomas D. Eden
P.N. Ferraraccio
Wesley Furman
Wayne A. Gaede
Elizabeth Gallegos
John M. Garcia
John D. & Patty German
Keith Glorfield
Brendan B. Godfrey
Joyce Godwin
Cheryl Gordon
Michael Guerrero
Priscilla J. Hart
Lisa J. Hendel
William J. Herman
Stuart & Hill
Bob Hoffman
Laraine Hofstetter
Kenn Holzer
Bettye Rae Holzer
I.B. Hoover
William H. Hora
Maurice D. Howland
Darlene J. Hyer
Bradley D. Irwin
Judy A. Jamison
Bob Johnson
David Kauffman
Ida Kelly
Harry E. Kinney
Richard A. Lampson
C.S. Lanier
David F. Lasge
Gregg Leyendecker
Gordon R. Links
Mary Lee Martin
D. Sterling Mathias
Paul Matthew
Milo L. McGonagle
Terry Melle
Bruce R. Merrill
Duane D. Moore
Steven E. Morgan
Joe H. Mullins
Vic Myer
Jeffrey M. Nathanson
Stanton G. Needham
Charles L. Nefzger
Wesley Nichols
Dan L. Novy
George Pearce
Kenneth Pilgrim
Christopher M. Riggio
Michael L. Roach
Mr. & Mrs. Richard S. Robins
Patrick A. Rodriguez
Gerald Roehm
James Romero
Timothy J. Ross
Bill Rothanbargar
Rep. Kiki Saaredra
Raymond C. Saunders, III

Dwight A. Schneider
David W. Scott
Harold A. Shelton
Jack Sheppard
Stuart C. Sherman
James J. Sikora
Don Silva
Rep. Daniel P. Silva
Marcia Simmons
John Skipper
Kimberly Sollinger-Cuaron
Hal Sorensen
Ronnie Studerus
Tony Thomas
Marilyn Trodden
Al Vaio
Charles J. Vesely
Earl Waid
Cynthia A. Walsh
Dwight M. Walsh, Ph.D.
Ernie Watson
Carl G. Weis
Michael J. Weix
David R. Wenger
Larry D. Willard
Brent Wilson
Lee B. Zink

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Cumulative impacts for Vandenberg AFB include:

- SCL-7 (Titan Sentor Launch Complex).
- Bixby Ranch.