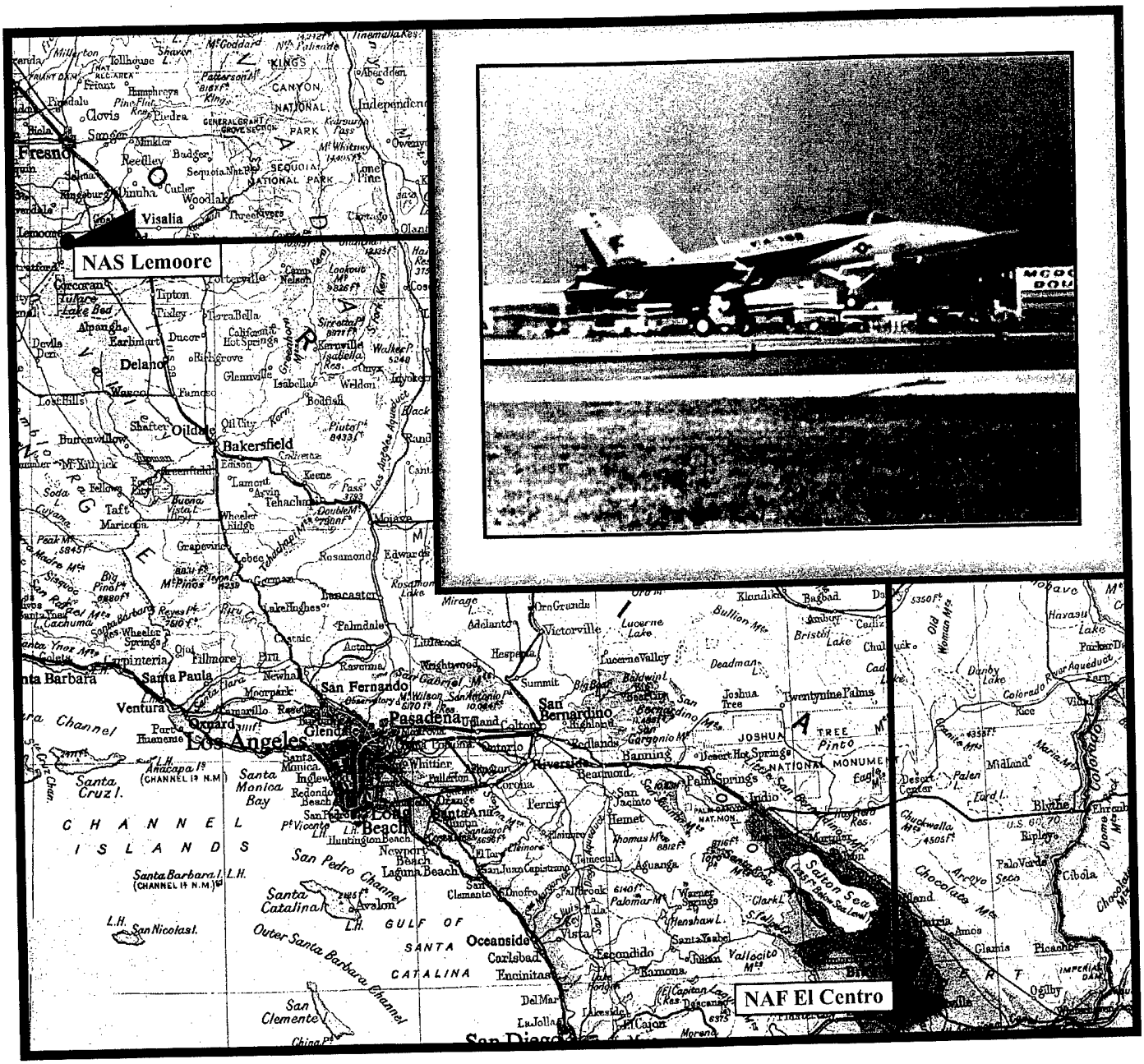
Draft Environmental Impact Statement for Development of Facilities to Support Basing US Pacific Fleet F/A-18E/F Aircraft on the West Coast of the United States

Volume I



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Department of the Navy
F/A-18E/F Fleet Introduction Team

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DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR DEVELOPMENT OF FACILITIES TO SUPPORT THE WEST COAST BASING OF THE F/A-18E/F AIRCRAFT

Lead Agency for the EIS:	US Department of the Navy
Title of Proposed Action:	Development of Facilities to Support West Coast Basing of F/A-18E/F Aircraft
Affected Jurisdictions:	Fresno, Kings, and Imperial Counties, California
Designation:	Draft Environmental Impact Statement

Abstract

The purpose of the proposed action is to develop facilities to support the West Coast basing of the Navy's new F/A-18E/F aircraft. Development of the larger, longer-range F/A-18E/F aircraft was necessary to provide an airframe capable of accommodating new weapons and weapon systems. It is necessary that these aircraft be based on the West Coast to provide a balance in the force structure and to be near the West Coast stationed aircraft carriers on which the aircraft deploy.

The proposed action includes siting 164 F/A-18E/F aircraft, locating associated military personnel and family members, and providing associated training functions at the receiving installation. In addition to the increased staffing and equipment levels, the proposed action would increase Navy activity and flight operations at the receiving installation. Specific facilities will be required to support the training operations and associated personnel. The two installations considered for the West Coast base are Naval Air Station (NAS) Lemoore and Naval Air Facility (NAF) El Centro. NAS Lemoore is the preferred alternative evaluated in this environmental impact statement (EIS).

This EIS evaluates the potential impacts to the human and natural environment that may result from development of facilities to support Navy basing of aircraft and personnel at a naval air station on the West Coast. This EIS has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 as amended, the Council on Environmental Quality (CEQ) implementing regulations [Title 40 Code of Federal Regulations (CFR) Parts 1500-1508], and the Navy's NEPA implementing regulations [OPNAVINST (Office of the Chief of Naval Operations Instruction) 5090.1B].

The EIS analyzes potential environmental impacts to land use and airspace, visual resources, cultural resources, socioeconomics, traffic and circulation, air quality, noise, biological resources, water resources, utilities and services, public health and safety, and hazardous materials and waste. Potentially significant but mitigable environmental impacts include impacts to land use and airspace at NAF El Centro, schools (socioeconomics), traffic, air quality, biological resources at NAF El Centro, and hazardous materials and storage at both installations. Significant and not mitigable impacts to noise have been identified at NAF El Centro.

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LIST OF ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ADT	average daily trips
AEWWINGPAC	Airborne Early Warning Wing Pacific
AFB	Air Force base
AGL	above ground level
AHERA	Asbestos Hazardous Emergency Response Act
AIB	applied instruction building
AICUZ	air installation compatible use zone
AIMD	Aircraft Intermediate Maintenance Department
AIRFA	American Indian Religious Freedom Act
APCD	air pollution control district
APE	area of potential effect
APZ	accident potential zone
AQMD	air quality management district
ARTCC	air route traffic control center
ASD	Aviation Supply Department
AST	aboveground storage tanks
ATC	authority to construct
ATCAA	air traffic control authorized airspace
ATE	automated test equipment
BACT	best available control technology
BASH	bird air strike hazard
BEA	Bureau of Economic Analysis
BEAP	base exterior and architecture plan
BEQ	bachelor enlisted quarters
BMPs	best management practices
BOD	biochemical oxygen demand
BOQ	bachelor officers quarters
BP	before present
BRAC	Defense Base Closure and Realignment Commission
BTU	British thermal unit
BUPERS	Bureau of Naval Personnel
CAA	Clean Air Act
CAAQS	California ambient air quality standards
CALA	combat aircraft loading area
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfd	cubic feet per day
CFR	Code of Federal Regulations

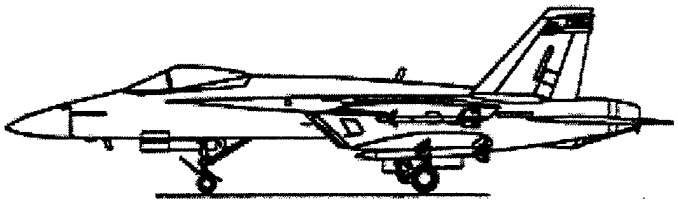
CHSC	California Health and Safety Code
CINCPACFLT	Commander-in-Chief US Pacific Fleet
cm	centimeters
cmd	cubic meters per day
CMWD	Calleguas Municipal Water District
CNEL	community noise equivalent level
CNO	Chief of Naval Operations
CNPS	California Native Plant Society
CO	carbon monoxide
COE	Corps of Engineers
COMNAVAIRPAC	Commander Naval Air Force Pacific Fleet
CONUS	Continental United States
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
CWC	California Water Code
dB	decibel
dBA	A-weighted decibel
DBCRA	Defense Base Closure and Realignment Act
DDT	dichlorodiphenyltrichloroethane
DEIS	draft environmental impact statement
DERP	Defense Environmental Restoration Program
DHS	California Department of Health Services
DOD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
DTSC	California Department of Toxic Substances Control
DWR	Department of Water Resources
EA	environmental assessment
EIS	environmental impact statement
EMR	electromagnetic radiation
EMT	emergency medical technician
EOD	explosive ordnance disposal
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESQD	explosive safety quantity distance
FAA	Federal Aviation Administration
FCLP	field carrier landing practices
FEMA	Federal Emergency Management Agency
FFSRA	Federal Facility Site Remediation Agreement
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FIFRA	Federal Insecticide Fungicide and Rodenticide Act
FIRM	flood insurance rate map
FL	flight level
FRS	fleet replacement squadron
FS	feasibility study
FTA	Federal Transit Authority

FY	fiscal year
GCA	Ground Controlled Approach
gpd	gallons per day
ha	hectare
HABS	historic American building survey
HAER	historic American engineering record
ha-m	hectare-meters
HERF	hazards of electromagnetic radiation to fuel
HERO	hazards of electromagnetic radiation to ordnance
HERP	hazards of electromagnetic radiation to personnel
HRS	hazard ranking system
HSWA	Hazardous and Solid Waste Amendments
IAS	initial assessment study
ICS	Imperial County Sanitation
IDC	independent duty corpsman
IFR	instrument flight rules
IID	Imperial Irrigation District
IR	Installation Restoration
IR	instrument route
IRP	Installation Restoration Program
IWTP	industrial wastewater treatment plant
JATO	jet assisted take-off
JDISS	Joint Deployable Imagery Support System
KCWMA	Kings County Waste Management Authority
kg	kilogram
km	kilometer
km^2	square kilometers
KV	kilovolt
kWh	kilowatt-hour
l	liter
L_{50}	maximum acceptable noise levels at 50 percent of the time
Ldn	day-night average sound level
LBP	lead-based paint
LCP	Local Coastal Program
Leq	equivalent noise levels
LOS	level of service
Lpd	liters per day
m	meters
m^2	square meters
m^3	cubic meters
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
mgd	million gallons per day
mg/L	milligrams per liter
mgy	million gallons per year
MILCON	military construction

mLd	million liters per day
MLLW	mean lower low waterline
mLy	million liters per year
MMPA	Marine Mammal Protection Act
MOA	military operations area
MOU	memorandum of understanding
MSA	major statistical area
msl	mean sea level
MTR	military training route
mVA	million volts per ampere
MW	megawatts
NA	not applicable
NAB	Naval Amphibious Base
NACIP	Naval Assessment and Control of Installation Pollutants Program
NAESU	Naval Aviation Support Engineering Unit
NAF	Naval Air Facility
NAFELCINST	Naval Air Facility El Centro Instruction
NAGPRA	Native American Graves Protection and Repatriation Act
NALF	Naval Auxiliary Landing Field
NAMTRA	naval air maintenance training
NAS	Naval Air Station
NASLEMINST	Naval Air Station Lemoore Instruction
NAVAIR	Naval Air Systems Command
NAWS	Naval Air Weapons Station
NCP	national contingency plan
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NEX	Naval Exchange
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NOTAM	notice to airmen
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	national priorities list
NRHP	National Register of Historic Places
NZ	noise zone
O_3	ozone
OPNAVINST	Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OTF	operational trainer facility
OWS	oil/water separators
PA	physician's assistant
PA	preliminary assessment

PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PG&E	Pacific Gas and Electric Company
PHWA	Port Hueneme Water Agency
PL	public law
PM_{10}	particulate matter (inhalable)
ppm	parts per million
psi	pounds per square inch
PTO	permit to operate
RA	remedial action
RAP	remedial action plan
RATCF	radar air traffic control facility
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RDT&E	Research Development Testing and Evaluating
RI	remedial investigation
ROD	record of decision
ROG	reactive organic compound
RONA	Record of Non-applicability
RTV	rational threshold value
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SCE	Southern California Edison
SCGC	Southern California Gas Company
SCIF	special compartmented information facility
SD	site discovery
SHPO	State Historic Preservation Office (California)
SI	site inspection
SIP	state implementation plan
SJVAB	San Joaquin Valley Air Basin
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control District
SO_2	sulfur dioxide
SOCALOPAREA	Southern California Operations Area
SOP	standard operating procedures
SOx	sulfur oxides
SPCC	spill prevention control and countermeasure
SR	state route
SRA	subregional area
SWAT	special weapons and tactics team
SWMU	solid waste management unit
SWPPP	storm water pollution prevention plan
SWRCB	State Water Resources Control Board
t	tonnes
TACAN	Tactical Air Navigation System

TBD	to be determined
TCM	transportation control measures
TDS	total dissolved solids
TSCA	Toxic Substances Control Act
TSS	total suspended solids
USC	United States Code
USFWS	US Fish and Wildlife Service
UST	underground storage tanks
UWCD	United Water Conservation District
UXO	unexploded ordnance
v/c	volume-to-capacity ratio
VFR	visual flight rules
VR	visual route
WAPA	Western Area Power Administration
WQCP	water quality control plan



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EXECUTIVE SUMMARY

This environmental impact statement (EIS) evaluates the environmental impacts from developing facilities to support F/A-18E/F aircraft, military personnel, and family members at a naval air station on the West Coast of the United States. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 as amended, the Council on Environmental Quality (CEQ) implementing regulations (Title 40 Code of Federal Regulations Parts 1500-1508), and Navy guidelines (OPNAVINST [Office of the Chief of Naval Operation Instruction] 5090.1B). The federal action evaluated in this EIS is that of basing 164 F/A-18E/F aircraft and associated personnel on the West Coast, representing an increase in Pacific Fleet based aircraft. F/A-18E/F aircraft operate from an aircraft carrier as strike fighters, combining the capabilities of bombers (strikers) with those of aerial combatants (fighters). The F/A-18E is a single-seat aircraft, while the F/A-18F is a dual-seat aircraft.

PURPOSE OF THE PROPOSED ACTION

The purpose of the proposed action is to identify a site on the West Coast of the United States suitable for facilities and functions for basing and operating 164 F/A-18E/F aircraft. In addition to the aircraft, the proposed action includes locating military personnel and family members to the receiving installation. The installations considered in detail for the West Coast base are Naval Air Station (NAS) Lemoore and Naval Air Facility (NAF) El Centro, in the State of California.

NEED FOR THE PROPOSED ACTION

The F/A-18E/F aircraft incorporates major operational improvements over existing aircraft that the Navy considers integral to combat capability. These aircraft will replace older and outdated aircraft models that cannot accommodate new weapons and weapons systems. It is necessary for the squadron aircrew and technicians to continually train with the aircraft and for the aircraft to be operated as integral parts of the carrier airwing team with which they will deploy. It is also necessary that these aircraft be based on the West Coast to provide a balanced force structure and to be near the West Coast homeported aircraft carriers on which the aircraft deploy.

PUBLIC SCOPING

Public comment was solicited through notices published in the *Federal Register* and local newspapers, public meetings held in the vicinity of the alternative receiving installations, and direct mail. The public was notified of the Navy's intent to prepare this EIS by a notice of intent (NOI), published in the *Federal Register* on April 23, 1997.

During the scoping period 36 people provided oral comments. In addition, 30 written comments were received during the scoping period. Residential noise, noise over public lands, safety, biological resources, air quality, socioeconomics, and airspace use were the main issues identified in the scoping process. A summary of the scoping issues and comments are included in Appendix A.

PROPOSED ACTION

The proposed action evaluated in this EIS is to provide facilities and functions needed to support the basing and operation of 164 F/A-18E/F aircraft on the West Coast of the United States. In addition to the increased staffing and equipment levels, the proposed action would increase flight operations at the receiving installation. The proposed action would be supported at the receiving installation by expanding or constructing new aircraft maintenance, training, and personnel support facilities. The two installations considered for the West Coast base are NAS Lemoore and NAF El Centro, in the State of California. NAS Lemoore is the preferred alternative evaluated in this EIS with current facilities primarily requiring renovation or adaptation to accommodate the F/A-18E/F aircraft. Some construction or large-scale expansion would be required for aircraft facilities and associated personnel buildings.

Because of Navy policy requiring collocation of most fleet aircraft with the Fleet Replacement Squadron (FRS), the FRS aircraft and fleet squadron aircraft would be based at one receiving facility. This action would result in an increase of 92 aircraft at NAS Lemoore, where the F/A-18C/D strike fighter squadrons are currently based, because 72 of the 164 aircraft would replace existing F/A-18C/D aircraft. Basing the aircraft at NAF El Centro, which does not have existing strike fighter squadrons, would result in an increase of 164 aircraft at that installation.

F/A-18E/F AIRCRAFT SITING CRITERIA

Alternative sites were developed by first identifying sites eligible for consideration within the purpose and need of the proposed action, then determining site screening criteria to identify suitable candidate sites and to eliminate those that could not be upgraded to meet requirements. Candidate sites that passed the screening criteria then were measured against more specific facility requirements in areas of aircraft operations, training, maintenance, supply, personnel, and housing.

Site Eligibility Criteria

To be eligible for consideration as an F/A-18E/F basing facility, an installation would be required to meet the eligibility criteria described below. These criteria

directly support the purpose and need of the proposed action, and installations not meeting these criteria were not considered as candidate sites.

- *All Fleet F/A-18 based within the Commander-in-Chief, US Pacific Fleet (CINCPACFLT) Area of Responsibility.* Normal practice has been to homeport ships and aircraft within the respective fleet Commander-in-Chief's area of responsibility. This concept simplifies logistics, minimizes overhead, and meets Navy goals of minimizing the time spent by personnel away from their homes.

- *Pacific Fleet F/A-18 Based at Maximum Two Sites.* Basing Pacific Fleet F/A-18 operational assets at more than two locations is unacceptable because of operational constraints and duplication of costs associated with maintaining and operating the aircraft in multiple locations. It would impede force readiness levels and decrease training effectiveness for F/A-18 aircrew and support personnel. Neither the Navy's current authorized personnel levels nor the Navy's inventory of F/A-18 spare parts and equipment would be able to adequately support such a separation. The Navy's preference is to locate the Pacific Fleet F/A-18s at one site.

- *Location of Fleet Replacement Squadron with Fleet Squadrons.* It is Navy policy to locate the FRS with most of the fleet squadrons it supports, and Navy preference is to base all fleet squadrons together with the FRS.

Site Screening Criteria

Several West Coast sites were considered as candidate sites and evaluated for their ability to meet the following site screening criteria. Those sites best meeting the criteria were selected for detailed analysis in this EIS. Although NAWS Point Mugu was initially considered a potential candidate, subsequent comparison with site relocation criteria clearly showed that NAWS Point Mugu could not accommodate facility and operational requirements. NAWS Point Mugu was therefore eliminated from consideration in this EIS. Those sites failing to meet a critical component of the criteria were eliminated from further consideration (see Section 2.4 for this analysis).

Field Elevation

Home base field elevation must be less than 1,000 feet (ft) above mean sea level (msl) to adequately replicate aircraft flight characteristics experienced at sea level when operating from aircraft carriers.

Training Ranges

The maximum feasible distance to air-to-air and air-to-ground training ranges is 200 nautical miles (NM). Ranges must be equipped with systems sufficient to support advanced F/A-18E/F tactics, and must be of sufficient size to execute those tactics in a reasonably realistic environment.

At Least Two F/A-18 Squadrons Based at Each Installation

F/A-18 squadrons operate from aircraft carriers as part of a carrier airwing, a tactical unit composed of several separate squadrons of different type aircraft. Although they vary slightly, a typical airwing is made up of nine aircraft squadrons or detachments, two or three of which are F/A-18s. Because extensive training is required to achieve the close coordination characteristic of single combat units, an airwing's F/A-18 "sister squadrons" must be based at the same location ashore.

Airfield Tempo of Operations

The level of existing flight activity must be sufficiently low to permit unrestricted operations of the F/A-18 aircraft based there.

24-Hour Aircraft Operations

The ability to conduct 24-hour aircraft operations without restricting normal traffic flow.

Dual Runways

Home base must have dual runways to permit continuous landings in the event the primary runway should become blocked or otherwise unusable.

Field Carrier Landing Practice

The ability to conduct field carrier landing practice (FCLP) at the home field, concurrently with routine aircraft operations, or at an sufficiently configured outlying airfield within 50 nautical miles of the home field.

Site Facility Requirements

The Navy determines specific airfield capacity and infrastructure requirements from guidelines found in the document, *Facility Planning Criteria for Navy and Marine Corps Shore Installations, NAVFAC P-80.*

Aircraft Operational Facilities

Primary Runway Length. The minimum primary runway length required for the alternatives in this analysis is 9,000 feet.

Secondary Runway Length. The minimum length acceptable for secondary runways at alternatives considered in this analysis is 6,500 feet.

Combat Aircraft Loading Area (CALA). Facilities are required for storing and handling live weapons used by F/A-18E/F aircraft and for loading and arming the aircraft.

Separate Hangar Modules. Individual hangars may contain several modules configured to house specific functions. Each fleet squadron requires a separate hangar module in which to house its maintenance, training, and administrative functions.

Training Facilities

Strike Fighter Weapons School. It is necessary that the Strike Fighter Weapons School be located with the fleet squadron. The school provides training to aircrew on mission planning, tactics, and air-launched weapons release, handling, and loading.

Aircraft Simulators. The complexity of the F/A-18E/F system makes it vital that sophisticated aircraft and weapons system simulators be available for use by both FRS and fleet squadron pilots.

Naval Air Maintenance Training (NAMTRA) Detachment. This training activity requires that personnel be located at the same facility as the aircraft. This activity is used to train personnel in aircraft maintenance.

Aircraft Maintenance Facilities

Organizational Maintenance. The most basic maintenance consisting of day-to-day upkeep and repair performed by the technicians assigned to the squadrons.

Intermediate Level Maintenance. More complex aircraft repairs are conducted at aircraft intermediate maintenance departments (AIMD) by more specialized technicians who repair the inoperative components that the organizational maintenance level has removed from aircraft.

Depot Level Maintenance. This most complex maintenance includes major overhaul, aircraft upgrades, and repair of major airframe damage and would not be required at the selected site.

Supply Facilities

Supply facilities needed for the proposed action include a general warehouse for covered bulk and bin storage, a hazardous-flammable storehouse, receiving space, packing and crating space, secure storage, and administrative space; a general storage shed for gas cylinders and vehicle construction material; and a paved, uncovered open storage area for general supply facilities.

Personnel Support Facilities

Personnel support facilities provide services and goods for personnel and family members affiliated with the proposed action. Several types of facilities are necessary to provide these services, including administrative offices, medical facilities, exchange, commissary, credit union, recreational facilities, youth center, child development center, religious ministry facility, and counseling center.

Housing

Housing must be available for military personnel associated with the proposed action including bachelor enlisted quarters (BEQs), bachelor officer quarters (BOQs), and family housing.

Utilities

In accordance with Navy policy, utilities at the receiving facility would be designed to accommodate demands of aircraft and personnel associated with the proposed action.

DESCRIPTION OF ALTERNATIVES

NAS Lemoore – Preferred Alternative

The 29,823-acre NAS Lemoore base is located approximately 80 miles inland from the Pacific Ocean and half-way between Los Angeles and Sacramento. The cities of Lemoore and Hanford are located approximately 7 miles and 17 miles, respectively, east of the base. The closest large urban center is Fresno, located approximately 35 miles to the northeast. The official mission of NAS Lemoore is to maintain and operate facilities and provide services and material to support operations of aviation activities and units of the operating forces of the Navy and other activities or units as designated by the Chief of Naval Operations (CNO).

Because F/A-18s are currently stationed at NAS Lemoore, most of the facilities necessary for the F/A-18E/F aircraft are available and would require only renovation or adaptation. New construction or large-scale expansion would be required for some aircraft facilities and for associated personnel buildings.

NAF El Centro Alternative

NAF El Centro occupies approximately 2,640 acres in Imperial County, California, approximately seven miles west of the City of El Centro (the County seat). The base is located approximately 100 miles east of the Pacific Ocean and 65 miles west of Yuma, Arizona. The US/Mexico Border is situated 12 miles to the south. The primary mission of NAF El Centro is to serve as a support facility for fleet air squadrons performing tactical air training and to provide additional support to other Department of Defense (DOD) components.

Few of the facilities required for supporting the F/A-18E/F aircraft and personnel are available at NAF El Centro. Most aircraft and personnel support facilities would have to be constructed, including a new runway and associated taxiways necessary for FCLP operations.

No Action Alternative

Under the No Action Alternative, no new or expanded facilities would be built at any potential receiving site nor would there be any increased functional capacity at any site. A receiving site would have to provide adequate facilities and functionality as it exists today. However, because all eligible receiving sites would require facilities to be constructed or modified, the No Action Alternative would not be viable. Consequently, the No Action Alternative is eliminated from consideration; no detailed analysis of the impacts will be conducted.

ALTERNATIVES CONSIDERED BUT ELIMINATED

Initially, nine installations were considered as potential basing sites for the F/A-18E/F squadrons. Following analysis of the operational and facilities requirements for accomplishing the proposed action at these installations, seven sites were eliminated from further consideration because of their inability to meet critical operational criteria (Table ES-1). The sites eliminated from further consideration were NAS Whidbey Island, NAS Fallon, NAWS China Lake, NAWS Point Mugu, NAS North Island, Marine Corps Air Station (MCAS) Miramar, and MCAS Yuma.

Table ES-1
F/A-18E/F Operational Criteria

Installation	Field Elevation	Training Ranges	Capacity 2 Squadrons	Tempo Operations	24-Hour Operations	Dual Runway	FCLP
NAS Whidbey Island	✓	-.-	✓	✓	✓	-.-	✓
NAS Fallon	-.-	✓	-.-	-.-	✓	✓	✓
NAWS China Lake	-.-	✓	✓	-.-	✓	✓	-.-
NAWS Point Mugu	✓	✓	✓	-.-	✓	-.-	-.-
NAS North Island	✓	✓	-.-	-.-	✓	-.-	-.-
MCAS Miramar	✓	✓	-.-	-.-	✓	✓	✓
MCAS Yuma	✓	✓	-.-	-.-	✓	✓	-.-

✓ meets criteria
-.- did not meet operational criteria
Source: US Navy 1997e

ENVIRONMENTAL ANALYSIS

The environmental analysis evaluates the effects of the proposed action on the human and natural environment at the two alternative basing sites. The resource areas analyzed include land use and airspace, aesthetics and visual resources, socioeconomics, cultural resources, traffic and circulation, air quality, noise, biological resources, hydrology/surface water quality, utilities and services, public health and safety, and hazardous materials and wastes.

Affected Environment

Chapter 3, Affected Environment describes existing conditions at each of the proposed receiving bases: NAS Lemoore and NAF El Centro. The information serves as baseline data to identify and evaluate any potential impacts that could result from the proposed action. A brief description of the existing environment at each realignment base is provided below.

NAS Lemoore

NAS Lemoore is surrounded by agricultural land. The topography at NAS Lemoore is relatively flat with no visual relief. Buildings, roads, parking lots, landscaped areas, and disturbed annual grasslands cover most of NAS Lemoore administrative and operational areas.

NAF El Centro

Regional land uses surrounding NAF El Centro are almost entirely agricultural. The topography at NAF El Centro is flat with no visual relief. Most of the lands at NAF El Centro have been heavily disturbed and there are no areas of natural vegetation. Some areas are currently developed with structures or paved with a minimum of landscaping. Other areas have been graded or plowed to reduce the fire hazard, while still other areas are used for agriculture.

Environmental Consequences

Chapter 4, Environmental Consequences, evaluates the potential impacts on the environment that would result from implementation of the proposed action at either alternative site. For each impact, a determination has been made whether it would constitute a significant or less than significant impact. Mitigation measures are identified for any impacts determined to be significant. Table ES-2 at the end of this chapter summarizes overall impacts for each resource at each alternative site. The following summarizes the environmental consequences associated with each resource area.

Land Use and Airspace

Significant but mitigable impacts would occur at NAF El Centro from locating housing facilities in areas incompatible with air installation compatible use zone (AICUZ) safety restrictions. Housing units within Accident Potential Zone (APZ) II would have to be relocated to mitigate these impact to a less than significant level.

Significant but mitigable impacts would occur at NAF El Centro from locating new housing and administrative facilities in areas exceeding AICUZ noise standards. Housing units would have to be located out of this noise zone to mitigate this impact to a less than significant level.

Significant but mitigable impacts would occur at NAF El Centro from locating aircraft support facilities within the helicopter imaginary surface restrictions. Modification of the approach-departure path of the helicopter pad to avoid new structures would reduce impacts to a less than significant level.

No significant impacts related to on-base land use, compatibility with regional land uses, or airspace operations would occur at NAS Lemoore or NAF El Centro.

Aesthetics and Visual Resources

No significant impacts to visual resources are expected from developing facilities to support basing the F/A-18E/F aircraft at NAS Lemoore or NAF El Centro.

Socioeconomics

Significant but mitigable impacts to schools would occur from implementation of the proposed action at NAS Lemoore. Allocation of impact aid funds from the

Department of Education would reduce this impact to a less than significant level. No significant impacts to schools would occur at NAF El Centro.

No significant impacts to population, environmental justice, employment, income, housing, sales volume, net government revenues, or recreational and community facilities would result from implementation of the proposed project at NAS Lemoore or NAF El Centro.

Cultural Resources

No significant impacts to cultural resources would occur at NAS Lemoore or NAF El Centro as a result of the proposed action.

Traffic and Circulation

A significant but mitigable impact would occur at NAS Lemoore at the signalized intersection of Grangeville Road and SR-41 during the PM peak hour. No significant impacts to signalized intersections would occur at NAF El Centro.

Significant but mitigable impacts would occur at NAF El Centro at the unsignalized intersections of Bennett Road and Evan Hewes Highway, and Forrester Road and Evan Hewes Highway. No significant impacts to unsignalized intersections would occur at NAS Lemoore.

Less than significant impacts would occur on key street segments from implementation of the proposed action at NAS Lemoore and NAF El Centro. These traffic facilities would continue to operate at uncongested levels during both the AM and PM peak hours.

Air Quality

Significant but mitigable air quality impacts would result from emissions generated by activities associated with the increased air operation from the F/A-18E/F aircraft at NAS Lemoore. Direct and indirect emissions would exceed the relevant Clean Air Act (CAA) conformity de minimis thresholds for ozone and PM_{10} precursors. A formal CAA conformity determination is required to demonstrate that net emission increases have been addressed as required by the EPA conformity rule.

Significant but mitigable air quality impacts would result from emissions generated by activity associated with the increased air operations from the F/A-18E/F aircraft at NAF El Centro. Direct and indirect emissions would exceed the relevant CAA conformity de minimis thresholds for ozone and PM_{10} precursors. A formal CAA conformity determination is required to demonstrate that net emission increases have been addressed, as required by the EPA conformity rule.

Traffic associated with the NAS Lemoore Alternative would have a less than significant effect on ambient carbon monoxide concentrations at the main gate and Grangeville access points to NAS Lemoore. Traffic associated with the NAF El

Centro Alternative would have a less than significant effect on ambient carbon monoxide concentrations at access points to NAF El Centro.

Noise

A less than significant noise impact would result from increased aircraft operations associated with implementing the proposed action at NAS Lemoore. F/A-18E/F aircraft operations would increase overall noise levels in the NAS Lemoore vicinity by as much as 5 dBA, but off-base land uses generally would not be exposed to incompatible noise levels. The 65-dB CNEL contour would expand to the north, west, and south of NAS Lemoore. Affected land uses are primarily agricultural, with some rural residential development south of NAS Lemoore. The community of Stratford would remain outside the 60-dB CNEL contour. Because noise generation from the F/A-18E/F is similar to that from the F/A-18C/D, there would be no significant change in noise contours around NAS Lemoore. Less than significant noise impact would result from construction activities and additional traffic at NAS Lemoore.

A significant and not mitigable noise impact would result from increased flight operations associated with basing F/A-18E/F aircraft at NAF El Centro. The addition of 164 F/A-18E/F aircraft at NAF El Centro would increase noise levels within 3 to 5 miles of the base by 5 dB or more. The 65-dB CNEL contour would encompass significant off-base areas. The City of Imperial would be encompassed by the 65-dB CNEL contour, and the community of Seeley would be within the 65- to 75-dB CNEL contour. One school in Seeley and three schools in Imperial could be impacted by CNEL values above 65-dB. Less than significant noise impacts would result from construction activities and additional traffic at NAF El Centro.

Biological Resources

A significant but mitigable impact would occur to the western burrowing owl, a California and federal species of concern, at NAF El Centro. Western burrowing owls were observed during a July 1997 site visit at the intersection of taxiway D and taxiway E, and at an area north of the main runway. A pre-construction survey of the area would be conducted to ensure that no burrowing owls are nesting in the area and to determine if the area is burrowing owl habitat. No Section 7 consultation would be required. No significant impacts on special status species would occur at NAS Lemoore.

No significant impacts to jurisdictional wetlands, vegetation and wildlife, birds protected by the Migratory Bird Treaty Act, or existing plans and policies would occur from implementation of the proposed action at NAS Lemoore or NAF El Centro.

Hydrology/Surface Water Quality

No significant impacts related to flood hazards, storm water drainage capacity, or surface water quality would occur from implementation of the proposed action at NAS Lemoore or NAF El Centro.

Utilities and Services

No significant impacts to water supply, wastewater collection and treatment capacity, stormwater collection and treatment, solid waste collection and disposal, natural gas and electric services, child care services, health services, or police and fire protection services would occur from implementation of the proposed action at NAS Lemoore or NAF El Centro. In accordance with Navy policy, utilities at the receiving facility would be designed to accommodate demands generated by aircraft personnel associated with the proposed action.

Public Health and Safety

No significant impacts related to airspace safety, explosive safety, or electromagnetic safety would occur from implementation of the proposed action at NAS Lemoore or NAF El Centro.

Hazardous Materials and Wastes

A significant but mitigable impact would occur at both NAS Lemoore and NAF El Centro from construction of additional fuel storage facilities. Amendment of plans and programs for the new fuel storage area, operation and service requirements for the new fuel storage area, and attention to all regulatory requirements for proper installation and monitoring of the external fuel tank storage area would reduce the risk of public or environmental exposure. These measures, if implemented at either alternative sites, would reduce the impact to a less than significant level.

No significant impacts from hazardous materials management, hazardous wastes management, installation restoration program sites, asbestos, polychlorinated biphenyls (PCBs), pesticides, lead, ordnance, or radon would result from implementation of the proposed action at NAS Lemoore or NAF El Centro.

CUMULATIVE IMPACTS

Chapter 5, Cumulative Impacts, evaluates the effects of the proposed action in combination with other reasonably foreseeable actions taking place in the project areas. No potentially significant cumulative effects were identified for aesthetics/visual resources, socioeconomics, cultural resources, noise, biological resources, hydrology and water quality, utilities and services, public health and safety, or hazardous materials and waste at either alternative site. The following summarizes potentially significant cumulative impacts at each of the alternative sites.

NAS Lemoore (Preferred Alternative)

Cumulative projects would contribute to worsening traffic conditions at intersections accessing NAS Lemoore. The addition of cumulative traffic would result in a change in LOS from E to F at the intersections of SR-198/Main Gate during the AM peak hour and Grangeville Road/SR-41 during the PM peak hour. These intersections would operate at unacceptable levels with or without the proposed action.

Cumulative projects identified for the NAS Lemoore area would cause significant cumulative air quality effects. Emissions from possible relocation of E-2 squadrons, in combination with F/A-18E/F activity, would exceed the CAA conformity rule de minimis thresholds for the San Joaquin Valley, thus requiring a formal conformity determination. Cumulative traffic would add incrementally to regional emissions of ozone and PM_{10} precursors.

NAF El Centro Alternative

The cumulative noise impacts at NAF El Centro from the F/A-18E/F and E-2 aircraft would worsen incompatibilities between noise sensitive land uses and AICUZ noise restrictions. Housing and other types of facilities would have to be relocated off base to achieve compatibility with AICUZ noise restrictions. Continuing to use these facilities under existing or future noise conditions would constitute an unavoidable significant cumulative impact.

The addition of cumulative traffic at NAF El Centro would result in a change in LOS from B to F at the unsignalized intersections of Bennett Road/Even Hewes Highway and Forrester Road/Even Hewes Highway during the AM and PM peak hours. Signal installation at these intersections would reduce the impact to a less than significant level

Cumulative projects identified for the NAF El Centro area would cause significant cumulative air quality effects. Emissions from the possible relocation of E-2 squadrons, in combination with F/A-18 E/F activity, would exceed the CAA conformity rule de minimis thresholds for Imperial County, thus requiring a formal conformity determination. Automotive traffic would contribute cumulatively to regional emissions of ozone and PM_{10} precursors.

OTHER CONSIDERATIONS

Irreversible and Irretrievable Commitment of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are utilized on a long-term or permanent basis. Resources could include non-renewable resources such as metal, wood, fuel, paper, and other natural or cultural resources, and irretrievable resources such as human labor.

The development of facilities to support the West Coast basing of the F/A-18E/F aircraft and associated personnel would require the construction, modification, or

expansion of facilities to provide space for operational, training, maintenance, and personnel support. Construction of the proposed facilities would result in an irretrievable commitment of non-renewable resources such as building materials; fuel for aircraft, construction vehicles, and equipment, and other resources, including labor.

Completion of the proposed action would ultimately result in an increase in the number of aircraft and air operations at the receiving installation, and, subsequently, the commitment of fuel and other non-renewable resources would also be increased. Therefore, the proposed action would constitute an irreversible or irretrievable commitment of non-renewable or depletable resources.

Unavoidable Adverse Impacts of the Proposed Action

Unavoidable adverse impacts of the proposed action would be the increase in noise and air quality impacts resulting from increased aircraft operations at each alternative facility.

Relationship Between Short-term Uses and Long-term Productivity

The basing of the F/A-18E/F aircraft would result in both short- and long-term environmental effects. Short-term effects would be primarily related to construction activities, such as construction-related traffic and emissions. Long-term environmental effects would be related to the increase in noise and air quality impacts associated with F/A-18E/F aircraft operations in the project area. The proposed action's long-term benefit of providing jobs and housing at the alternative bases would offset these environmental impacts.

Executive Order 12898

Executive Order 12898, the "Executive Order on Federal Actions to Address Environmental Justice in Minority and Low-income Populations," was issued on February 11, 1994 and requires that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations (Executive Order No. 12898, 59 Fed. Reg. 7629 [Section 1-101])."

To comply with the executive order, preparation of this EIS included gathering economic, racial, and demographic information to identify areas of low-income and high minority populations in the areas potentially exposed to project impacts; assessing the realignment alternatives for disproportionate impacts resulting from on-site activities associated with the proposed action; and encouraging community participation and input through public hearings and meetings and extensive public notification.

Implementation of the proposed action at NAS Lemoore and NAF El Centro would not result in disproportionately high and adverse environmental effects on

minority or low income populations. Construction and operations produced by basing the F/A-18E/F aircraft at either of the proposed receiving installations would be within the historic fluctuations of the economic resources within the project area, and would have beneficial effects on the local economy, job market, and housing availability. Increased noise levels at each installation would not disproportionately affect low-income and minority populations in the area. All races or ethnic groups would be expected to experience both adverse and beneficial effects from basing the F/A-18E/F squadrons at NAS Lemoore or NAF El Centro.

Executive Order 13045

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (April 21, 1997) recognizes that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because children's bodily systems are not fully developed, because they eat, drink, and breathe more in proportion to their body weight, because their size and weight may diminish protection from standard safety features, and because their behavior patterns may make them more susceptible to accidents. Based on these factors, the President directed each federal agency to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. The President also directed each federal agency to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks and safety risks.

To comply with this executive order, preparation of this EIS included identifying schools within the project area that could be impacted by the proposed action. The impacts of noise and increases to the student population were considered as part of this EO. The impact of future noise generated by the proposed action was evaluated based on noise contour maps illustrating projected noise levels from aircraft operations at the two receiving installations. The future impact of new students to the school system was evaluated based on the potential of the additional students to exceed existing school capacities.

It was determined that projected noise levels at schools near NAS Lemoore would remain within compatible levels (65-dB CNEL or less) for school facilities and therefore would not adversely affect public schools in the area. Because schools in the NAS Lemoore area are either near or over capacity, the additional 788 students generated at NAS Lemoore would significantly affect these schools. School districts may be eligible for compensation for the federally connected students by impact aid, a federal program intended to compensate local school districts for burdens placed on their resources by federal activity.

Noise levels exceeding 65-dB CNEL would encompass significant off-base areas near NAF El Centro. The City of Imperial would be encompassed by the 65-dB CNEL contour, and the community of Seeley would be within the 65 to 75-dB

CNEL contours. Children attending Seeley Elementary School (kindergarten through 8th grade) and three schools in the City of Imperial would be affected by CNEL values above 65-dB. The affected schools near NAF El Centro are below capacity and would therefore not be adversely affected by the additional students generated by the F/A-18E/F squadrons at the facility.

Table ES-2
Summary of Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Land Use and Airspace		
Compatibility with on-base land uses	◐	◐
Consistency with AICUZ: safety	○	○
Consistency with AICUZ: noise	◐	◑
Exceedance of imaginary surface restrictions	◐	◑
Compatibility with regional land uses	◐	◐
Impacts to airspace operations	◐	◐
Visual Resources		
Visual character	◐	◐
Views	◐	◐
Regulatory Considerations	◐	◐
Socioeconomics		
Population	◐	◐
Employment	◐	◐
Income	◐	◐
Housing	◐	◐
Business volume	◐	◐
Net government revenues	◐	◐
Schools	◑	◐
Recreational and Community Facilities	◐	◐
Cultural Resources		
Prehistoric archeological resources	○	○
Traditional cultural resources	○	○
Historic archaeological resources	○	○
Historic architectural resources	○	○
Prehistoric subsurface deposits	○	◐
Historic subsurface deposits	○	◐
Traffic and Circulation		
Signalized intersection LOS	◑	○
Unsignalized intersection LOS	◐	◑
Street segment LOS	◐	◐

LEGEND:
- ● = Significant and not mitigable impact
- ◑ = Significant but mitigable impact
- ◐ = Less than significant impact
- ○ = No impact

Table ES-2
Summary of Impacts *(continued)*

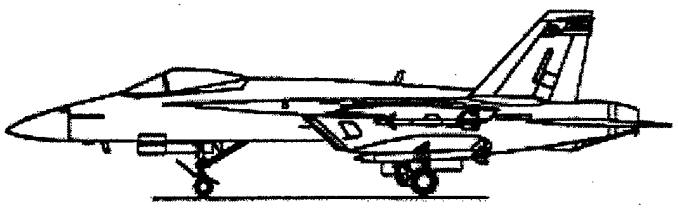
Impact Issues	NAS Lemoore	NAF El Centro
Air Quality		
Emissions of nonattainment pollutants	◑	◑
Clean Air Act Conformity	◑	◑
Intersection carbon monoxide concentrations	◐	◐
Noise		
Construction Noise	◐	◐
Aircraft Noise	◐	●
Traffic Noise	◐	◐
Biological Resources		
Jurisdictional wetlands	○	○
Special status species	○	◑
Vegetation and wildlife	◐	◐
Birds protected by the Migratory Bird Treaty Act	◐	◐
Consistency with plans and policies	○	○
Hydrology and Surface Water Quality		
Exposure to flood hazards	○	◐
Exceedence of storm water drainage capacity	◐	◐
Surface water quality degradation	◐	◐
Utilities and Services		
Water supply	◐	◐
Wastewater collection and treatment	◐	◐
Stormwater collection and treatment	◐	◐
Solid waste collection and disposal	◐	◐
Natural gas and electric services	◐	◐
Child Care Services	◐	◐
Health services	◐	◐
Police services	◐	◐
Fire services	◐	◐

LEGEND:
● = Significant and not mitigable impact
◑ = Significant but mitigable impact
◐ = Less than significant impact
○ = No impact

Table ES-2
Summary of Impacts *(continued)*

Impact Issues	NAS Lemoore	NAF El Centro
Public Health and Safety		
Airspace safety	◐	◐
Explosive safety quantity distances	◐	◐
Electromagnetic radiation	○	○
Hazardous Materials and Waste		
Hazardous materials	◐	◐
Hazardous waste	◐	◐
Installation Restoration Program sites	◐	◐
Asbestos	◐	◐
Polychlorinated biphenyls	○	○
Storage tanks	◑	◑
Pesticides	○	○
Lead	◐	◐
Ordnance	◐	◐
Radon	○	○

LEGEND:
● - Significant and not mitigable impact
◑ - Significant but mitigable impact
◐ - Less than significant impact
○ - No impact



1.0 PURPOSE OF AND NEED FOR ACTION

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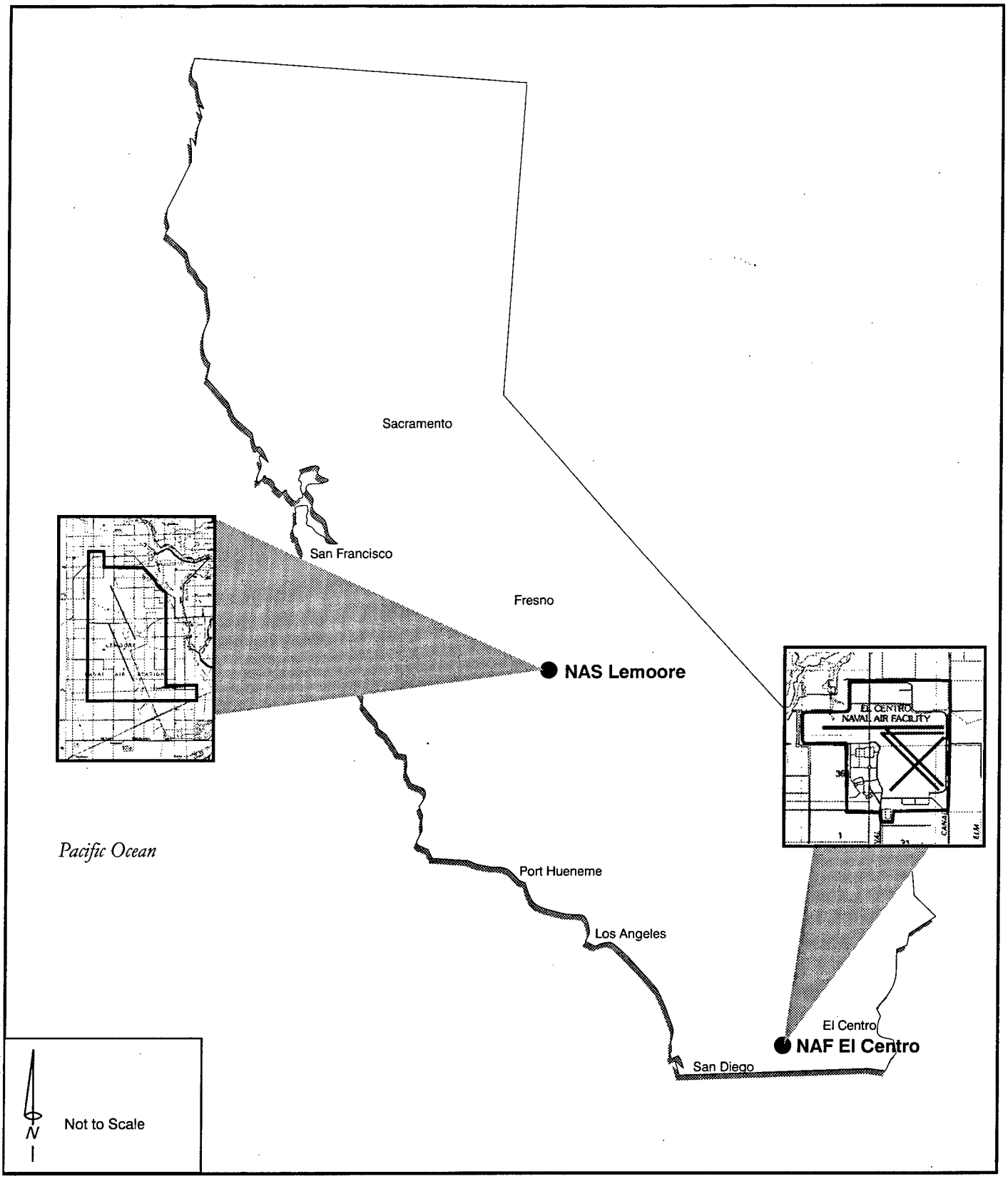
CHAPTER 1
PURPOSE OF AND NEED FOR THE PROPOSED ACTION

This environmental impact statement (EIS) evaluates the environmental impacts from developing facilities to support F/A-18E/F aircraft, military personnel, and family members at a naval air station on the West Coast of the United States. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 as amended, the Council on Environmental Quality (CEQ) implementing regulations (Title 40 Code of Federal Regulations Parts 1500-1508), and Navy guidelines (OPNAVINST [Office of the Chief of Naval Operations Instruction] 5090.1B). The federal action evaluated in this EIS is basing 164 F/A-18E/F aircraft and associated personnel, representing an increase in Pacific Fleet based aircraft. F/A-18E/F aircraft operate from an aircraft carrier as strike fighters, combining the capabilities of bombers (strikers) with those of aerial combatants (fighters). The F/A-18E is a single-seat aircraft, while the F/A-18F is a dual-seat aircraft.

Although NAWS Point Mugu was initially considered a potential candidate, subsequent comparison with site selection criteria clearly showed that the installation could not accommodate facility and operational requirements. NAWS Point Mugu was therefore eliminated from consideration in this EIS.

1.1 PURPOSE OF THE PROPOSED ACTION

The purpose of the proposed action is to identify a suitable site on the West Coast of the United States for facilities and functions for basing and operating 164 F/A-18E/F aircraft. The installations considered for the West Coast base are Naval Air Station (NAS) Lemoore and Naval Air Facility (NAF) El Centro in the State of California. NAS Lemoore is the preferred alternative evaluated in this EIS because it best meets the operational siting criteria for F/A-18E/F aircraft. The locations of the two air stations are shown on Figure 1-1.



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The alternative bases are located in two distinctively different parts of California: the Central Valley and the Imperial Valley.

Proposed West Coast Receiving Installations for the F/A-18E/F Aircraft

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: Tetra Tech 1997.

Figure 1-1

1.2 NEED FOR THE PROPOSED ACTION

The F/A-18E/F aircraft are needed to enhance strike fighter capability and replace older outdated aircraft models that cannot accommodate new weapons and weapons systems. The F/A-18E/F aircraft incorporate major operational improvements over existing aircraft that the Navy considers integral to combat capability. It is necessary for the squadron aircrew and technicians to continually train with the aircraft and for the aircraft to be operated as integral parts of the carrier airwing team with which they will deploy. It is also necessary that these aircraft be based on the West Coast to provide a balanced force structure and to be near the West Coast homeported aircraft carriers on which the aircraft deploy.

1.3 SCOPE OF ENVIRONMENTAL REVIEW

This EIS provides information and analyses regarding facility development and operations of the F/A-18E/F aircraft at the alternative installations. This EIS provides the basis for well-informed decisions prior to project implementation. Each of the following issues will be addressed for each potential receiving installation:

- Land use and airspace;
- Visual resources;
- Socioeconomics;
- Cultural resources;
- Traffic and circulation;
- Air quality;
- Noise;
- Biological resources;
- Hydrology and surface water quality;
- Utilities and services; and
- Public health and safety;
- Hazardous materials and waste.

Several resources were eliminated from consideration in the EIS because they were either not identified during the scoping process or the action of locating additional aircraft and personnel at each of the alternative sites would affect such resources only negligibly.

Geology, Topography and Soils—All proposed construction projects would require minimal grading on disturbed flat sites without topographic features. The structures would be designed to meet building codes for local and regional seismic conditions and foundation stability.

Public Use Facilities/Access—All proposed construction projects are to be located within the boundaries of naval air installations that are secured naval facilities and that are not designated for public use or access.

1.3.1 Document Organization

This EIS consists of two volumes; Volume 1 contains the main text and Volume 2 contains the technical appendices. The document's general organization is described below.

Chapter 1, Purpose of and Need for the Proposed Action, provides an overview of the purpose and need for developing facilities to support basing the F/A-18E/F aircraft on the West Coast. It also describes the DEIS content and approach and the public involvement process.

Chapter 2, Proposed Action and Alternatives, describes the proposed action, the site selection criteria, and the two West Coast basing alternatives for development of facilities to support the aircraft. The No Action Alternative and alternatives considered but rejected also are described. A comparison of facilities required at each alternative base to support the F/A-18E/F aircraft and summary of significant impacts of each alternative are provided in tabular form.

Chapter 3, Affected Environment, describes existing environmental and socioeconomic conditions at NAS Lemoore and NAF El Centro. Each technical section identifies the affected area applicable to each resource.

Chapter 4, Environmental Consequences, describes the potential environmental impacts of the proposed action for each resource aircraft operations. Impacts are categorized as significant, less than significant, or beneficial. Mitigation measures or standard operating procedures are identified for any impact determined to be significant.

Chapter 5, Cumulative Impacts, identifies impacts from implementing the proposed action in combination with other foreseeable actions at each alternative basing installation. Cumulative impacts are defined as two or more individual effects that, when considered together, are considerable or that compound or increase other environmental impacts.

Chapter 6, Other Considerations, identifies any unavoidable adverse impacts to the environment, identifies irreversible and irretrievable commitments of resources, and describes the relationship between short-term uses of the environment and maintenance and enhancement of long-term productivity. The potential disproportionate adverse impacts on children in accordance with Executive Order 13045 and on low-income or minority populations in accordance with Executive Order 12898 are also described.

Chapters 7-11 provide background information on coordinating with interested and responsible agencies, references, a list of this document's preparers, the distribution list, and an index.

Technical appendices are provided in a separate volume.

1.4 PUBLIC INVOLVEMENT PROCESS

The EIS process is designed to involve the public in the federal decision-making process. Opportunities to comment on the proposed action were provided during the formal scoping process, and comments received during this period were considered when preparing the EIS. Further opportunities for public comment will be provided during the formal review period following completion of the Draft EIS. At the beginning of the F/A-18E/F EIS process, the potential alternative receiving bases included NAWS Point Mugu. Therefore, communities surrounding this base were included in the scoping process. However, NAWS Point Mugu is no longer considered as an alternative base, and is not evaluated in this EIS (see Section 2.4 for more information on alternative bases that were considered but eliminated from detailed consideration).

Methods to involve the general public, community and environmental groups, elected officials, and federal, state, and local agencies in the EIS process have included the following:

- Creating and updating an extensive mailing list of members of the general public, community and environmental groups, elected officials, and federal, state, and local agencies;
- Publishing a notice of intent (NOI) to prepare an EIS in the Federal Register;
- Publishing notices of public meetings in local newspapers and coordinating media coverage, press releases, and feature articles; and
- Conducting public scoping meetings, one at each of the receiving bases under consideration, prior to initiating the environmental study to solicit comments and to identify issues of concern.

Additional opportunities to involve these groups in the EIS process will include the following:

- Publishing a notice of availability (NOA) of the Draft EIS in the Federal Register;
- Publishing notices of public meetings on the Draft EIS in local newspapers and coordinating media coverage, press releases, and feature articles, usually in both English and Spanish;

- Conducting two public meetings, one near each of the bases proposed for basing of the aircraft, to receive comments on the Draft EIS; and

- Providing a 45-day comment period to solicit written comments on the Draft EIS from responsible agencies and interested parties.

One goal for public involvement, under Executive Order 12898 on Environmental Justice, is to involve affected low-income and minority populations in the public participation process. To achieve this, comments were solicited from a range of associations that could be affected by or interested in the proposed action, public meetings were conducted at easily accessible locations in the local community, and public meetings were announced in both English and Spanish in local newspapers.

1.4.1 Scoping Process

The purpose of scoping is to solicit information, data and public concerns on any potential environmental or socioeconomic issues associated with the Navy's proposed action. The NOI appeared in the Federal Register on April 23, 1997, and the comment period was closed on May 23, 1997. The scoping process for the EIS included several opportunities for input from the general public, community and environmental groups, politicians, and federal, state, and local agencies. A scoping meeting was held to present the project and to solicit comments at the two alternative site locations. The scoping meeting was announced in a mailing, published in the Federal Register, and advertised in local newspapers. Each announcement included a summary of the proposed action and a brief description of possible alternatives and environmental issues to be considered in the EIS. Scoping information and concerns received during the scoping period are summarized in Appendix A.

The Navy considered comments received during the scoping process in determining the range of environmental and socioeconomic issues to be evaluated in the EIS. During the EIS scoping process, 36 people provided oral comments. In addition, 30 comment cards, letters, or e-mails containing comments were received during the scoping period. The main issues identified through the scoping process were residential noise, noise over public lands, safety, biological resources, air quality, socioeconomics, and airspace use.

1.4.2 Public Review Process

Public review is an important part of the NEPA process and provides the public and other interested parties with an opportunity to review and comment on the Navy's actions and decisions. Hearings are held during the public review period to solicit comments from the public and other interested parties on the Draft EIS. Written and oral comments received on the Draft EIS are responded to in the Final EIS. After a 30-day public comment period on the Final EIS, the Navy will prepare a record of decision (ROD).

Draft EIS

The public and interested agencies are invited to comment on the Draft EIS. A notice of availability will be published in the Federal Register, public notices will be mailed to those on the mailing list, and press releases will be furnished to local news media. A 45-day public comment period will be initiated upon publication of the NOA in the Federal Register.

Comments on the Draft EIS should be sent to the following address:

US Navy
Engineering Field Activity West
900 Commodore Drive
San Bruno, California 94066-5006
Attn: Mr. Surinder Sikand, Code 18511
Phone: (415) 244-3020
Fax: (415) 244-3206

Public hearings will be held near NAS Lemoore and NAF El Centro during the 45-day review period to formally receive oral and written comments on the Draft EIS. The location, date, and time of these meetings will be provided in a Federal Register announcement and in newspaper advertisements.

Final EIS

A Final EIS responding to and incorporating comments received on this Draft EIS will be published and made available to the public. A NOA will be published in the Federal Register and in public notices and press releases. As required by NEPA, there will be a 30-day no action review period after the NOA for the Final EIS is published. During this period, the public may comment on the adequacy of responses to comments and the Final EIS. After that time, the Navy will prepare a record of decision (ROD) detailing the decisions on project approval.

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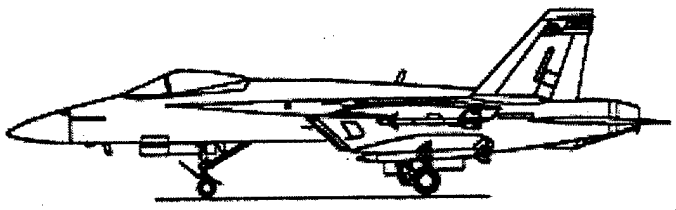

2.0 PROPOSED ACTION AND ALTERNATIVES

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CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Navy planning process and the alternatives considered in the draft environmental impact statement (DEIS). Alternatives considered but eliminated from detailed analysis, and the No Action Alternative required by the National Environmental Policy Act (NEPA) are also described. A comparison of construction and expansion requirements is provided in Table 2-7. Table 2-9 at the end of the chapter summarizes the significant impacts of the proposed action at each of the alternative bases.

Naval Air Station (NAS) Lemoore is the preferred alternative evaluated in this EIS because it best meets the operational siting criteria for F/A-18E/F aircraft described in Section 2.2 of this chapter with the least environmental consequences. Naval Air Facility (NAF) El Centro also is considered in detail because it also meets minimal criteria and could be upgraded to meet siting criteria. Although not all facility and infrastructure facility requirements are satisfied at either alternative site, both are considered because requirements could be met through reasonable facility upgrades.

2.1 PROPOSED ACTION

The proposed action evaluated in this EIS is to provide facilities and functions needed to support the basing and operation of 164 F/A-18E/F aircraft on the West Coast of the United States. In addition to increased staffing and equipment levels, the proposed action would increase flight operations at the receiving installation. The proposed action would be supported at the receiving installation by expanding or constructing new aircraft maintenance, training, and personnel support facilities. The following provides a more detailed description of the proposed action.

Aircraft—A total of 164 F/A-18E/F aircraft, representing an increase of 92 Pacific Fleet strike fighter aircraft, would be based at the receiving facility. The action would begin in 1999 and be completed by approximately 2010. A first phase of 92

F/A-18E/F aircraft would include one fleet replacement squadron (FRS) and four new F/A-18F squadrons. A second phase of 72 F/A-18E/F aircraft would replace existing strike fighter squadrons now based at NAS Lemoore.

Because of Navy policy requiring collocation of most fleet aircraft with the FRS, the FRS aircraft and fleet squadron aircraft would be based at one receiving facility. This action would result in an increase of 92 aircraft at NAS Lemoore, where the F/A-18C/D strike fighter squadrons are currently based, because 72 of the 164 aircraft would replace existing F/A-18C/D aircraft. Basing the aircraft at NAF El Centro, which does not have existing strike fighter squadrons, would result in an increase of 164 aircraft at that installation.

Aircraft Operations—An airfield operation is defined as a single takeoff, a single landing, or passage into and out of tower control in the airspace over the airfield. Airfield operations include takeoffs, landings, touch-and-go patterns, ground control approach (GCA) box patterns (a large loop pattern directed by the tower), and field carrier landing practice (FCLP). In general, the F/A-18E/F FRS and fleet squadrons fly weekdays during daytime hours, with most flight activity occurring between 7 AM and 7 PM, Monday through Friday. A significant number of FCLP patterns, which simulate aircraft carrier deck landing conditions, are conducted after 7 PM.

In addition to required operational training at the airfield, the installation must provide access to air and ground ranges for air-to-air and air-to-ground training. These ranges are not necessarily located at the airfield, but can be nearby or affiliated with other naval installations. No new training ranges are planned for this proposed action. The West Coast training ranges currently utilized are located over land and off the California coast. Ranges designated "Restricted" or "Military Operating Area (MOA)" are over land, and designated "Warning Areas" are over water. The ranges are either scheduled via a designated military or civilian controlling agency (for Restricted or Warning Areas) or utilized as common airspace with agreements between the military and the Federal Aviation Administration (FAA) (for MOAs). See Section 3.1 for more detailed area descriptions.

Personnel— Military and civilian personnel would work at the receiving facility to support the new squadrons. These personnel would be in addition to those supporting existing Continental United States (CONUS) based Pacific Fleet F/A-18 squadrons. Family members would accompany the military personnel located at the receiving facility. Personnel would begin arriving in 1999, with relocation complete by 2004 at NAS Lemoore and by 2007 at NAF El Centro.

Most new military personnel would work in aircraft and engine maintenance functions and would unload aircraft involved in combat operations. Civilian personnel, working primarily in administrative functions, would be housed in the local community. All military and civilian personnel would be located at one West

Coast facility. The number of military personnel and family members would vary by facility reflecting the number of aircraft supported by each alternative receiving installation (Tables 2-2 and 2-6).

2.2 F/A-18E/F Aircraft Siting Criteria

Alternative sites were developed by first identifying sites eligible for consideration within the purpose and need of the proposed action, then determining site screening criteria to identify suitable candidate sites and to eliminate those that were not reasonable because they could not be upgraded to meet requirements. Candidate sites that passed the screening criteria then were measured against more specific facility requirements in areas of aircraft operations, training, maintenance, supply, personnel, and housing.

2.2.1 Site Eligibility Criteria

To be considered a candidate site for the basing of the F/A-18E/F aircraft, an installation would be required to meet the eligibility criteria described below. Since these criteria directly support the purpose and need of the proposed action, installations not meeting these criteria were not considered as candidate sites.

1. All fleet F/A-18 based within the Commander-in Chief, US Pacific Fleet (CINCPACFLT) Area of Responsibility. Normal practice has been to homeport ships and aircraft within the respective fleet Commander-in-Chief's area of responsibility. This concept simplifies logistics, minimizes overhead, and meets Navy goals of minimizing the time spent by personnel away from their homes. With only two exceptions, all Navy aircraft have been homeported in this manner. Only the Navy's EA-6 and F-14 communities are based at a single site serving both Pacific and Atlantic fleets. The EA-6 community on the West Coast is only about 15 percent as large as the F/A-18 community. F-14 aircraft on the East Coast are part of a shrinking community that is expected to be deleted from the Navy's active inventory as early as 2008. These circumstances allow the small communities to be single-sited because it provides uncommon efficiency.

2. Pacific Fleet F/A-18 Based at Maximum Two Sites. Basing Pacific Fleet F/A-18 operational assets at more than two locations is unacceptable because of operational constraints and duplication of costs associated with maintaining and operating the aircraft in multiple locations. It would impede force readiness levels and decrease training effectiveness for F/A-18 aircrew and support personnel. Neither the Navy's current authorized personnel levels nor the Navy's inventory of F/A-18 spare parts and equipment would be able to adequately support such a separation. The Navy's preference is to locate the Pacific Fleet F/A-18 at one site.

3. Location of FRS with Fleet Squadrons. It is Navy policy to locate the FRS with most of the fleet squadrons it supports, and Navy preference is to base all fleet squadrons together with the FRS. To separate them would detract significantly from the mutual support between FRS and fleet squadrons that has proven to be of great value. For example, the practice of loaning aircraft or parts to provide

needed capability would become very costly and difficult if fleet squadrons were separated. Maintenance parts, equipment, and personnel do not currently exist in the Navy's inventory to fully support such a separation. Consequently, separating the FRS from the majority of operational squadrons is considered unacceptable.

2.2.2 Site Screening Criteria

Several West Coast sites were considered as candidate sites and evaluated for their ability to meet the following site screening criteria. Those sites best meeting the criteria were selected for detailed analysis in this EIS. Those sites failing to meet a critical component of the criteria were eliminated from further consideration (see Section 2.4).

Field Elevation

Home base as well as any associated OLF field elevation must be less than 1,000 feet (ft) above mean sea level (msl) to adequately replicate aircraft flight characteristics experienced at sea level when operating from aircraft carriers. It is particularly important that aircraft performance in the landing pattern be as close as possible to that experienced at the aircraft carrier. Differences in aircraft performance are insignificant below 1,000 ft msl.

Training Ranges

The maximum feasible distance to air-to-air and air-to-ground training ranges is 200 nautical miles (NM). This distance is based on fuel costs, aircraft parts usage, rate of airframe life expenditure, and length of aircrews' flying days. Ranges must be equipped with systems sufficient to support advanced F/A-18E/F tactics, and they must be of sufficient size to execute those tactics in a reasonably realistic environment.

At Least Two F/A-18 Squadrons Based at Each Installation

F/A-18 squadrons operate from aircraft carriers as part of a carrier airwing, a tactical unit composed of several separate squadrons of different type aircraft. Although they vary slightly, a typical airwing is made up of nine aircraft squadrons or detachments, two or three of which are F/A-18s. Because extensive training is required to achieve the close coordination characteristic of single combat units, an airwing's F/A-18 "sister squadrons" must be based at the same location ashore.

Airfield Tempo of Operations

The level of existing flight activity must be sufficiently managed to permit unrestricted operations of the F/A-18 aircraft based there. Both military and civilian flight activity must be considered at the airfield itself as well as in the airspace nearby. It is especially important that routine operations and FCLP operations not interfere with each other.

24-Hour Aircraft Operations

The ability to conduct 24-hour aircraft operations without restricting normal traffic flow must be available. This is critical because the strike fighters conduct a significant portion of their training at night, including up to 90 percent of the FCLP operations.

Dual Runways

Home base must have dual runways to permit continuous landings in the event the primary runway should become blocked or otherwise unusable. Intersecting runways are acceptable, as long as field carrier landing practice can be conducted concurrently with routine takeoff and landing operations. For this reason it is usually mandatory that dual runways be parallel rather than intersecting.

Field Carrier Landing Practice

The ability to conduct efficient FCLP is essential and may be accomplished in one of two ways. Preference is to conduct FCLP at the home field, concurrently with routine aircraft operations. If home field FCLP is not feasible, it would be acceptable to conduct FCLP at a sufficiently configured outlying airfield within 50 NM of the home field to reduce airframe wear, lost training time and engine use and wear.

2.2.3 Site Facility Requirements

The Navy determines specific airfield capacity and infrastructure requirements from guidelines found in the document, *Facility Planning Criteria for Navy and Marine Corps Shore Installations, NAVFAC P-80.* This publication provides planning guidance for determining the requirements for shore-based facilities needed to support Navy and Marine Corps operations. In addition, these P-80 guidelines are used to evaluate the adequacy of existing facilities, to identify facility deficiencies or excesses, and to validate construction project plans. Thus, P-80 sets general standards for constructing Navy and Marine Corps facility infrastructure.

Facilities necessary to support the F/A-18E/F aircraft relocation include aircraft operational facilities, training facilities, aircraft maintenance facilities, supply facilities, personnel support facilities, bachelor and family housing, and utilities. A description of these facilities is provided below.

Aircraft Operational Facilities

Primary Runway Length. The primary runway must be of sufficient length to allow F/A-18E/F aircraft to accelerate to takeoff speed, rotate, then abort the takeoff and stop, at maximum takeoff weight, without the use of arresting gear. This must be achievable on a wet runway and at the highest normally foreseeable density altitude experienced at the specific location. Runway length is specific to the aircraft, adjusted for altitude and temperature. The minimum primary runway length required for the alternatives in this analysis is 9,000 feet.

Secondary Runway Length. Secondary runways must be of sufficient length to allow F/A-18E/F aircraft to land safely at maximum landing weight without the use of arresting gear. This also must be achievable on a wet runway at the highest likely density altitude. The minimum length acceptable for secondary runways is 6,500 feet.

Combat Aircraft Loading Area (CALA). Facilities are required for storing and handling live weapons used by F/A-18E/F aircraft and for loading and arming the aircraft.

Separate Hangar Modules. Individual hangars may be comprised of several modules configured for particular aircraft squadron functions. Each fleet squadron requires a separate hangar module in which to house its maintenance, training, and administrative functions.

Training Facilities

Strike Fighter Weapons School. The school provides training to aircrew on mission planning, tactics, and air-launched weapons release, handling, and loading. This facility includes classrooms, administrative offices, storage areas, a library, an auditorium, and a ramp for aircraft weapons loading training, which has space for fully operational F/A-18E/F aircraft, with wings spread and carrying their allotted weapons. The school must be collocated with the FRS and most fleet replacement squadrons.

Aircraft Simulators. The complexity of the F/A-18E/F system makes it vital that sophisticated aircraft and weapons system simulators be available for use by both FRS and fleet squadron pilots.

Naval Air Maintenance Training (NAMTRA) Detachment. This activity is used to train personnel in aircraft maintenance. It contains offices for maintenance trainers, hangar space for one aircraft with support equipment, and associated classrooms. Classroom and laboratory space is required for organizational and intermediate-level engine maintenance training and servo cylinder testing. NAMTRA must be collocated with the FRS and most fleet squadrons.

Aircraft Maintenance Facilities

Organizational Maintenance. Naval aircraft maintenance is divided into three levels. Organizational level maintenance is the most basic, consisting of day-to-day upkeep and repair performed by the technicians assigned to the squadrons. It includes routine inspections and servicing, as well as removal and replacement of various aircraft components. Appropriate organizational maintenance facilities would be required at the selected site.

Intermediate Level Maintenance. More complex aircraft repairs are conducted at aircraft intermediate maintenance departments (AIMD) by more specialized technicians who repair the inoperative components that the organizational

maintenance level has removed from aircraft. Complete AIMD capabilities for F/A-18E/F aircraft would be required at the selected site.

Depot Level Maintenance would not be required at the selected site. This most complex maintenance includes major overhaul, aircraft upgrades, and repair of major airframe damage. Depot maintenance would continue to be performed at current remote locations regardless of the alternative selected in this analysis.

Supply Facilities

Supply facilities needed for the proposed action include warehouse and storage areas. Specific requirements include a general warehouse for covered bulk and bin storage, a hazardous-flammable storehouse, receiving space, packing and crating space, secure storage, and administrative space; a general storage shed for gas cylinders and vehicle construction material; and a paved, uncovered open storage area for general supply facilities.

Personnel Support Facilities

Personnel support facilities provide services and goods for personnel and family members affiliated with the proposed action. Several types of facilities are necessary to provide these services, including the following:

- Administrative offices;
- Medical facilities;
- Dining facilities for enlisted personnel and officers;
- Clubs for enlisted personnel and officers;
- Exchange;
- Commissary;
- Credit union;
- Hobby shops (crafts and automotive);
- Equipment rental center;
- Bowling center;
- Fitness center;
- Indoor playing courts;
- Outdoor recreational facilities;
- Youth center;
- Child development center;
- Religious ministry facility; and
- Counseling center

Housing

Housing must be available for military personnel associated with the proposed action. Types of military housing include bachelor enlisted quarters (BEQs), bachelor officer quarters (BOQs), and family housing. The total number of housing facilities to support the proposed action at the alternative basing installations are indicated in Tables 2-1 and 2-5. Civilian employees would be hired from nearby communities and are, therefore, not included in housing projections. Some military personnel also may choose to live off base in nonmilitary community housing.

Utilities

Utilities may be expanded or upgraded to meet additional demands generated by aircraft maintenance, operations, and new personnel support facilities. The Navy requires that project scopes include all work to produce a complete and usable facility (OPNAVINST 11010.20), which includes providing utilities and services. Utilities affected by the proposed action include water, wastewater, natural gas and electric, and stormwater. In accordance with Navy policy, utilities at the receiving facility would be designed to accommodate demands generated by aircraft and personnel associated with the proposed action.

2.3 DESCRIPTION OF ALTERNATIVES

As a result of the site screening process, two installations were identified for detailed consideration in this EIS: NAS Lemoore and NAF El Centro, California. NAS Lemoore is the preferred alternative evaluated in this DEIS.

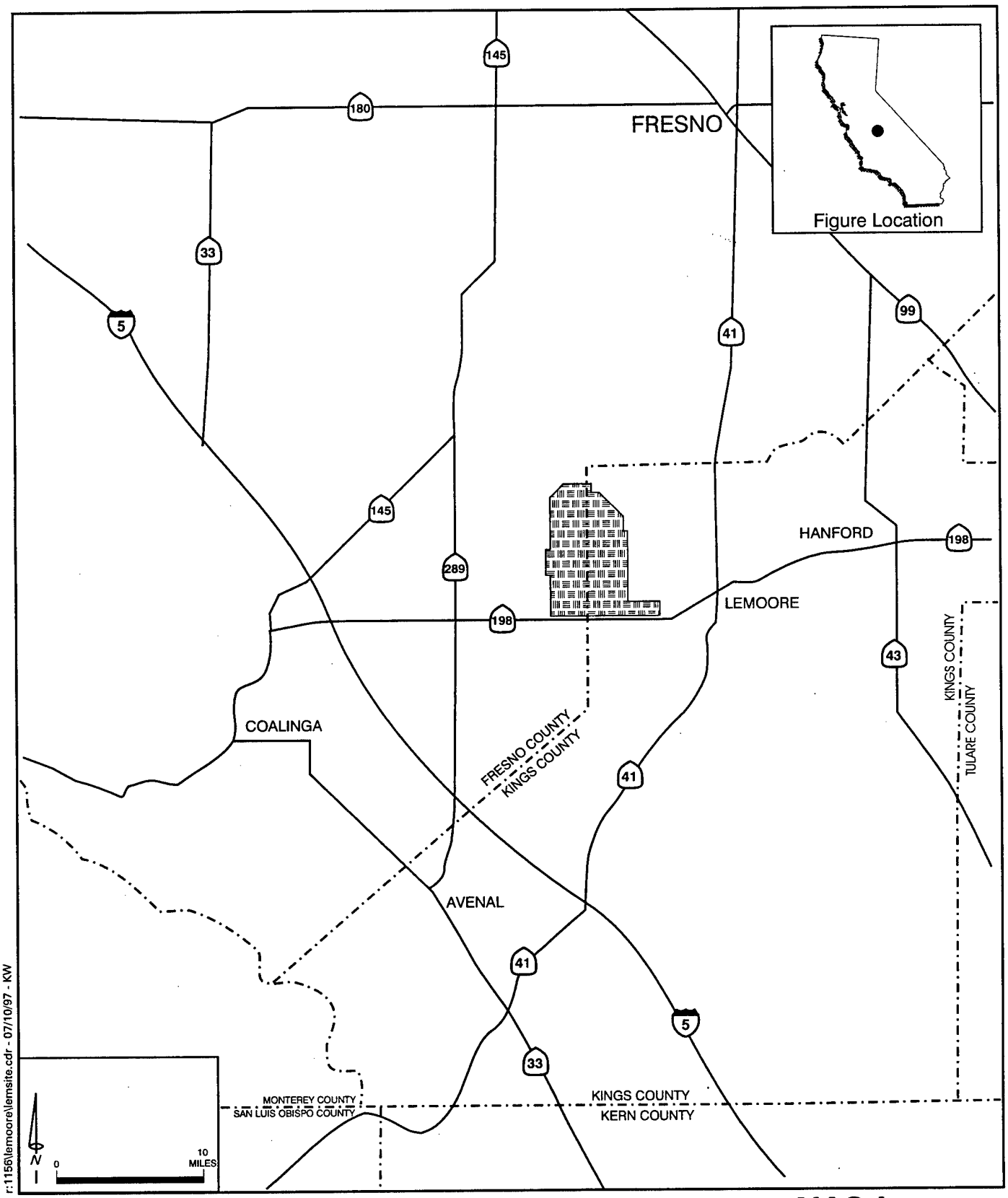
NAWS Point Mugu was initially considered a potential candidate site; however, subsequent comparison with site selection criteria clearly showed that the installation could not accommodate F/A-18E/F facility and operational requirements. NAWS Point Mugu was therefore eliminated from consideration in this EIS. Alternatives considered and rejected are described in Section 2.4 of this chapter.

2.3.1 Preferred Alternative: NAS Lemoore

NAS Lemoore contains 18,784 acres (7,601 ha) of Navy-owned land and 11,032 acres (4,467 ha) of aviation easements in the Central San Joaquin Valley, California (Figure 2-1). The 29,816-acre (12,069 ha) base is approximately 80 miles (128 km) inland from the Pacific Ocean and halfway between Los Angeles and Sacramento. The cities of Lemoore and Hanford are approximately 7 miles (11 km) and 17 miles (27 km) east of the base, respectively. The closest large urban center is Fresno, approximately 35 miles (56 km) to the northeast.

Existing Base Operations

The official mission of NAS Lemoore is to maintain and operate facilities and to provide services and material to support operations of aviation activities and units of the operating forces of the Navy and other activities or units, as designated by



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NAS Lemoore is located in Fresno and Kings County near the city of Fresno.

LEGEND:

- NAS Lemoore
- Road
- County Boundary

NAS Lemoore
Regional Location Map

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 2-1

Source: Tetra Tech 1997.

the Chief of Naval Operations (CNO). NAS Lemoore is home base for all Pacific Fleet F/A-18 aircraft, except those forward deployed units permanently based in Japan. NAS Lemoore home-based aircraft include the F/A-18C/D FRS and 10 fleet squadrons totaling 162 aircraft. The installation maintains a workforce of 6,209 people, composed of 4,518 military personnel and 1,691 civilian personnel.

NAS Lemoore airfield contains two parallel runways—14L/32R and 14R/32L. Both runways are about 13,500 feet (4,115 m) long and are at an elevation of 235 feet above msl. Annual flight activity at NAS Lemoore averages 18,773 takeoffs and landings, 29,402 touch-and-go patterns, 50,898 FCLP patterns, and 6,908 GCA box patterns (US Navy 1997c). The F/A-18C/D aircraft constitute over 80 percent of the flight activity at the airfield. Training exercises originating from NAS Lemoore are conducted in ranges in California and Nevada and in the air/sea warning areas immediately off the coast of California.

Additional Requirements for Facilities

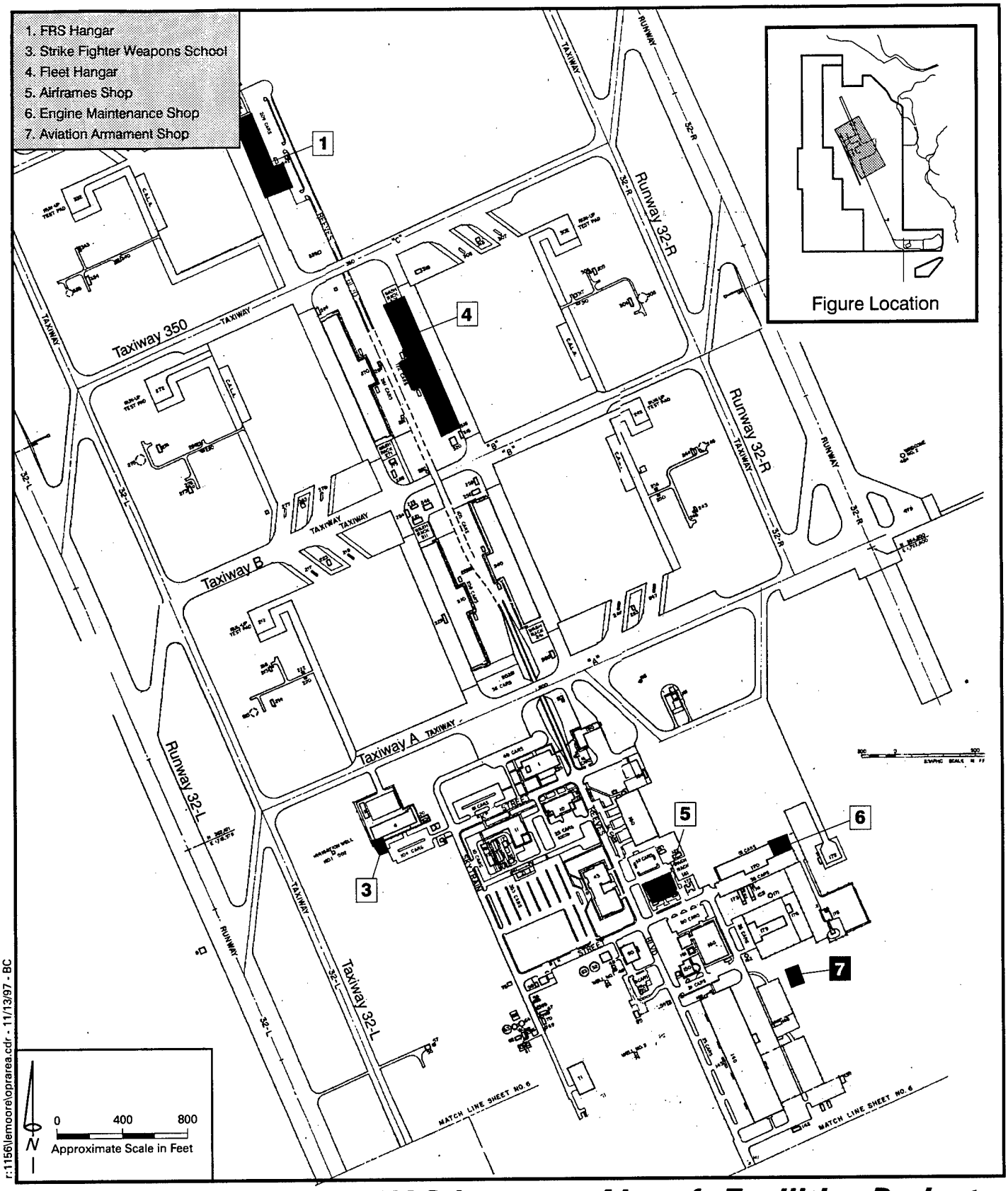
Locating the F/A-18E/F squadrons at NAS Lemoore would result in an additional 92 aircraft which would require additional operational, personnel support, and housing facilities. Construction or expansion/modification projects required for the proposed action are indicated in Table 2-1 below, followed by a description of the additional facility requirements by general category. The proposed locations for aircraft facilities, housing, and personnel support facilities at NAS Lemoore are shown on figures 2-2 and 2-3.

Table 2-1
F/A-18E/F Construction/Expansion Projects at NAS Lemoore

	F/A-18E/F Requirement	Project Size[1]	Project Type
1.	Maintenance Hangar (FRS)	78,420 SF	Modification
2.	NAMTRA	24,006 SF	Expansion
3.	Strike Fighter Weapons School	6,943 SF	Expansion
4.	Maintenance Hangar (Fleet Squadrons)	116,423 SF	Modification
5.	Airframe Shop	24,006 SF	Modification
6.	Engine Maintenance Shop	12,003 SF	Expansion
7.	Aviation Armament Shop	45,008 SF	Construction
8.	Youth Center	8,451 SF	Expansion
9.	Child Development Center	15,900 SF	Expansion
10.	Counseling Assistance Center	17,244 SF	Construction
11.	BEQ (E4 to E1) for 358 personnel	127,177 SF	Expansion
12.	Family Housing	399 units	Expansion

[1]In square feet (SF)

Source: US Navy 1997a



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NAS Lemoore has most aircraft facilities necessary for the F/A-18E/F aircraft. The aviation armament shop would be the only new facility construction.

Legend:

1 Construct New Facility

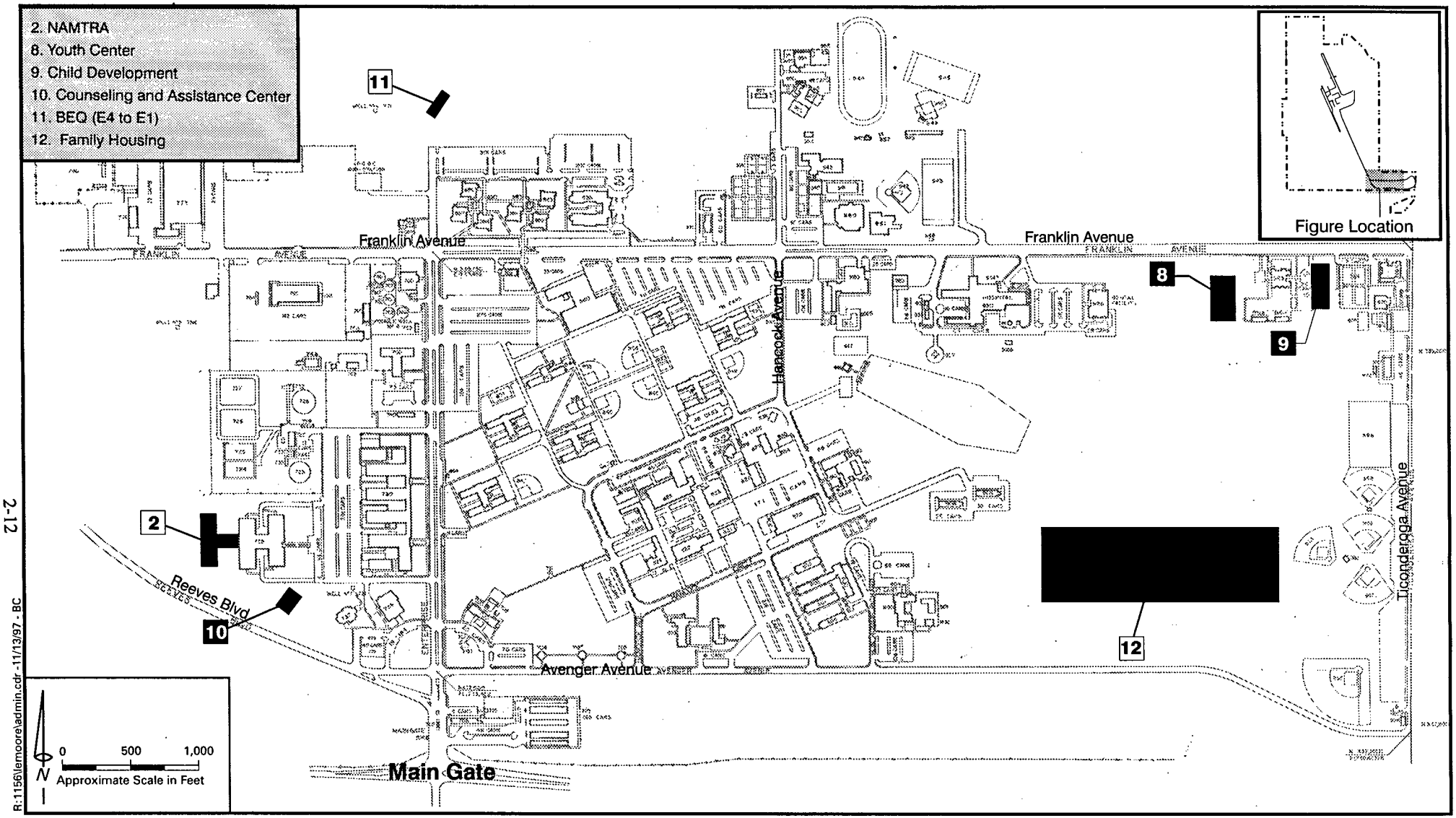
[1] Expand/Modify Existing Facility

NAS Lemoore Aircraft Facilities Projects: Operations Area

Facility Development For West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1997m

Figure 2-2



Personnel support facilities would be built as new construction while existing housing would be expanded at NAS Lemoore. The NAMTRA, an aircraft facility, would be new construction.

Legend:

- 1 Construct New Facility
- 1 Expand/Modify Existing Facility

NAS Lemoore Personnel Housing and Support Projects: Administration Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1997m

Figure 2-3

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Aircraft Facilities. Existing aircraft facilities at NAS Lemoore would be renovated or adapted to accommodate the proposed action. The only new aircraft facility required would be an aviation armament shop. Aircraft facilities needing expansion or modification include the NAMTRA, Hangar 5 (to house the FRS), the Strike Fighter Weapons School, the airframe shop, the engine maintenance shop, and Hangar 4 (to house the fleet squadrons).

Personnel Support and Housing Facilities. Relocating the F/A-18E/F military personnel and family members would require expanding existing BEQs to house an additional 358 enlisted personnel. An additional 399 units of family housing would be needed to accommodate the proposed action. Expanding of the youth center and child development center also would be required. A counseling and assistance center would have to be constructed to support the additional personnel. The numbers of relocated personnel at NAS Lemoore are shown, along with family members, in Table 2-2.

Table 2-2
F/A-18E/F Military Personnel and Family Members at NAS Lemoore

	Officer	E9-E7	E6-E1	Total
Personnel				
Single on-base (BEQ or BOQ)	95	60	603	757
Married on-base (family housing)	0	0	399	399
Married off-base	221	79	399	699
Total	*316*	*139*	*1,401*	*1,856*
Family Members				
Children K-8	166	84	841	1,091
Children 9-12	29	15	148	193
Spouses and other dependents	322	130	1,309	1,760
Total	*517*	*228*	*2,298*	*3,044*

Source: US Navy 1997b

Additional Requirements for Aircraft Operations

Locating the proposed action at NAS Lemoore would place F/A-18E/F squadrons close to all West Coast military training airspace. The 92 F/A-18E/F aircraft at NAS Lemoore would produce additional operations, as shown in Table 2-3.

F/A-18E/F aircraft located at NAS Lemoore would travel to local training ranges to perform air-to-air and air-to-ground training (Table 2-4). Range scheduling coordination among all West Coast military aviation bases and squadrons is extensive and ongoing. NAS Lemoore is closer to Restricted Area 2508 (over the Sierra Nevada mountain range) and Warning Areas 283 and 285, beginning approximately 35 miles off the central California coast.

The estimated impact of introduction of the F/A-E/F aircraft on these ranges is given in "sortie" numbers rather than "operations." A sortie is a single aircraft

Table 2-3
Projected Additional F/A-18E/F Aircraft Operations Activity at NAS Lemoore

Aircraft	Operation	Day 7 AM – 7 PM	Evening 7 PM –10 PM	Night 10 PM – 7 AM	Total
F/A-18E/F Fleet	Takeoff	3,232	375	10	3,617
	Straight-in/Full Stop Landing	495	63	27	585
	Overhead Landing	2,540	326	166	3,032
	Visual Touch-&-Go Pattern	1,854	224	104	2,182
	FCLP Pattern	5,265	3,135	1,944	10,344
	GCA Box Pattern	232	76	14	322
	ACLS	28	91	81	200
	Total	*13,646*	*4,290*	*2,346*	*20,282*
F/A-18E/F FRS	Takeoff	6,438	903	52	7,393
	Straight-in/Full Stop Landing	1,101	271	143	1,515
	Overhead Landing	4,904	496	478	5,878
	Visual Touch-&-Go Pattern	21,854	3,181	2,521	27,556
	FCLP Pattern	10,588	6,986	3,504	21,078
	GCA Box Pattern	1,394	998	332	2,724
	ACLS	146	602	236	984
	Total	*46,425*	*13,437*	*7,266*	*67,128*
	FRS AND FLEET TOTAL				*87,410*

Source: US Navy 1997c

Table 2-4
Estimated F/A-18E/F West Coast Area Training Range Sorties at NAS Lemoore

Training Area	F/A-18E/F FRS[1]	F/A-18E/F Fleet	Total Sorties
El Centro	2,090	120	2,210
Fallon Complex	1,254	1,310	2,564
R-2508 Complex	5,754	1,708	7,462
Warning Areas	0	184	184
Total	*9,098*	*3,322*	*12,420*

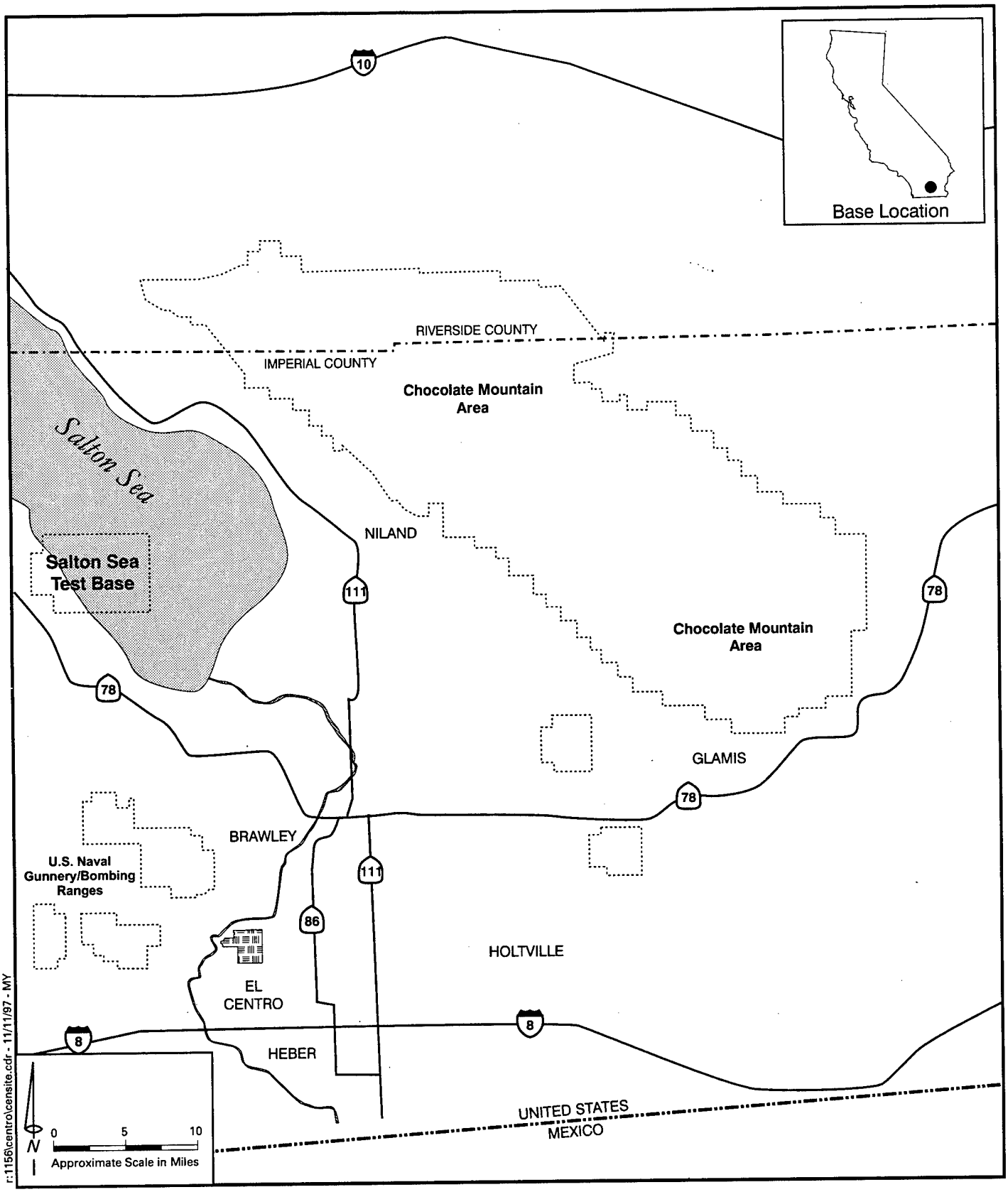
[1]Includes detachment sorties at El Centro and Fallon complexes.

Source: US Navy 1997d

flight in an area, and a better tool for estimating an impact on an aircraft range, whereas "operations" is better for estimating the impact at an air station and locality. A sortie may contain multiple operations. The potential impacts from the increase in sorties at these ranges will be mitigated by scheduling priorities, enhanced coordination between the affected military operations agencies, and usage of underutilized range areas.

2.3.2 NAF El Centro Alternative

NAF El Centro occupies approximately 2,640 acres (1,690 ha) in Imperial County, California, approximately 7 miles (11 km) west of the city of El Centro (the county seat) (Figure 2-4). The base is approximately 100 miles (193 km) east of the Pacific Ocean and 65 miles (105 km) west of Yuma, Arizona. The US international



NAF El Centro is located in Imperial County near the California/Mexico Border.

LEGEND:

- NAF El Centro
- Road
- County Boundary

NAF El Centro Regional Location Map

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 2-4

Source: Tetra Tech 1997.

border is 12 miles (19 km) to the south. A portion of the base is under an agricultural outlease program, which allows for growing commercial crops. This commercial enterprise has the added benefit of controlling dust and weeds on base.

Existing Base Operations

The primary mission of NAF El Centro is to support fleet air squadrons performing tactical air training and to provide additional support to other Department of Defense (DOD) components.

The NAF El Centro airfield, at an elevation of 45 feet below msl, has two runways that support nearby target ranges. The 9,500-foot primary runway (08/26) is intersected by the 6,800-foot secondary runway. Flight patterns to the west and north, toward the target ranges, are the most heavily used. FCLP patterns are primarily conducted on runway 08/26.

Aircraft operating at NAF El Centro train during the day and at night in various air-to-air and air-to-ground training regimes, in addition to FCLPs. NAF El Centro also receives diverted air traffic from coastal installations under adverse weather conditions, such as fog.

The base supports approximately 17,150 takeoffs and landings, 25,575 touch-and-go exercises, and 78,840 FCLP patterns each year. The F-18 is the predominant aircraft using NAF El Centro, although the base also supports squadrons of A-4s, F-14s, S-3s, T-45s, T-34s, and AV-8s. These fixed-wing aircraft constitute approximately 89 percent of flight activity at NAF El Centro. Several transient units use facilities and services at NAF El Centro throughout the year, including the Navy's flight demonstration squadron, the "Blue Angels," which conducts three months of intensive training at NAF El Centro each winter. Additionally, the S-3 aircraft based at NAS North Island use NAF El Centro to conduct FCLP and other training. The base is staffed with a permanent workforce of approximately 863 people, composed of 343 military personnel and 520 civilian employees.

Additional Requirements for Facilities

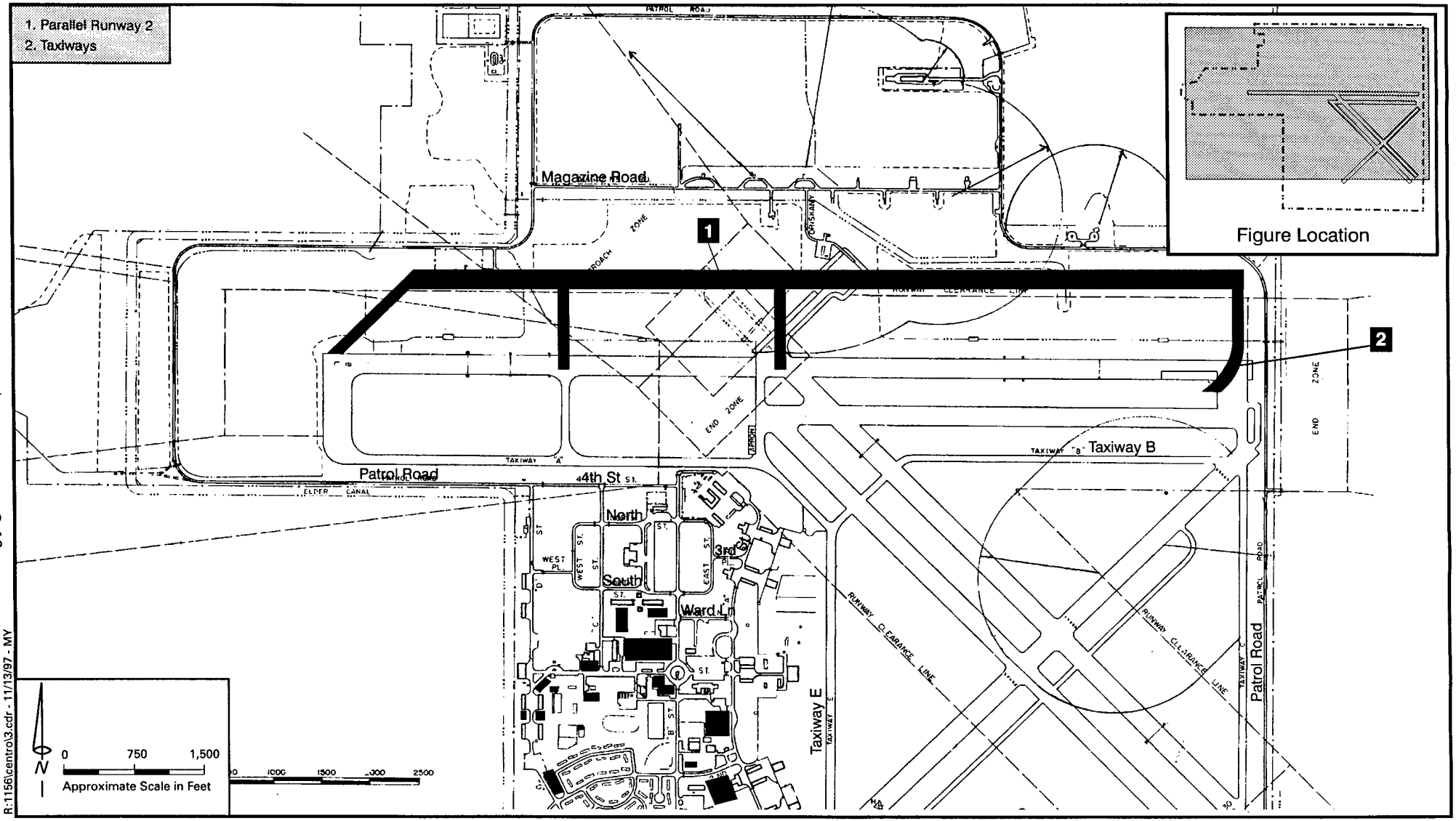
Only a few of the necessary facilities are available at NAF El Centro to support the additional 164 aircraft resulting from the proposal action. Therefore, a large amount of construction would be required to accommodate the aircraft and personnel support facility requirements. Construction or extensive renovation required for the proposed action is indicated in Table 2-5 below. The numbers of personnel that would be relocated to NAF El Centro are indicated in Table 2-6. The proposed locations for aircraft facilities, personnel support facilities, and housing at NAF El Centro are shown on figures 2-5 through 2-7. Additional flight operations for the 164 F/A-18E/F aircraft are shown in Tables 2-7 and 2-8.

Table 2-5
F/A-18E/F Construction/Expansion Projects at NAF El Centro

	F/A-18E/F Requirement	Project Size[1]	Project Type
1.	Parallel Runway 2	9,000 LF	Construction
2.	Taxiways	750 LF	Construction
3.	Maintenance Hangar (FRS)	78,420 SF	Construction
4.	NAMTRA	37,800 SF	Construction
5.	Strike Fighter Weapons School	25,235 SF	Construction
6.	Flight Simulator Facility	125,367 SF	Construction
7.	Maintenance Hangar (Fleet Squadrons)	116,429 SF	Construction
8.	External Fuel Tank Storage	1,200 SF	Construction
9.	Airframe Shop	25,930 SF	Construction
10.	Engine Maintenance Shop	62,876 SF	Construction
11.	Engine Test Cell	14,130 SF	Construction
12.	Avionics Shop	62,233 SF	Construction
13.	Aviation Armament Shop	8,400 SF	Construction
14.	Aviation Life Support System Shop	9,020 SF	Construction
15.	Battery Shop	2,825 SF	Construction
16.	Aircraft Ground Support Equipment Shop	16,850 SF	Construction
17.	Ground Support Equipment Holding Shed	20,902 SF	Construction
18.	General Warehouse Navy	651,847 SF	Construction
19.	General Storage Shed	17,500 SF	Construction
20.	Open Storage Area	94,415 SY	Expansion
21.	Administrative Offices	102,741 SF	Construction
22.	Dining Facility for Enlisted Personnel	22,543 SF	Expansion
23.	Enlisted Personnel Club	57,002 SF	Expansion
24.	Exchange	10,230 SF	Construction
25.	Commissary	80,000 SF	Construction
26.	Credit Union	8,200 SF	Expansion
27.	Hobby Shop – Crafts	14,520 SF	Expansion
28.	Hobby Shop – Automotive	9,937 SF	Expansion
29.	Equipment Rental Center	6,570 SF	Expansion
30.	Bowling Center	21,711 SF	Expansion
31.	Fitness Center	5,001 SF	Expansion
32.	Indoor Playing Courts	2,548 SF	Expansion
33.	Youth Center	17,287 SF	Construction
34.	Child Development Center	32,778 SF	Construction
35.	Religious Ministry Facility	34,892 SF	Expansion
36.	BOQ for 135 personnel	80,609 SF	Expansion
37.	BEQ (E9 to E7) for 119 personnel	37,241 SF	Expansion
38.	BEQ (E6 to E1) for 1,173 personnel	398,962 SF	Expansion
39.	Family Housing	775 Units	Expansion

[1]In Linear feet (LF), square feet (SF), and square yards (SY).

Source: US Navy 1997a



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Implementation of the proposed action at NAF El Centro would require construction of a new runway and taxiways.

LEGEND:

1 Construct New Facility

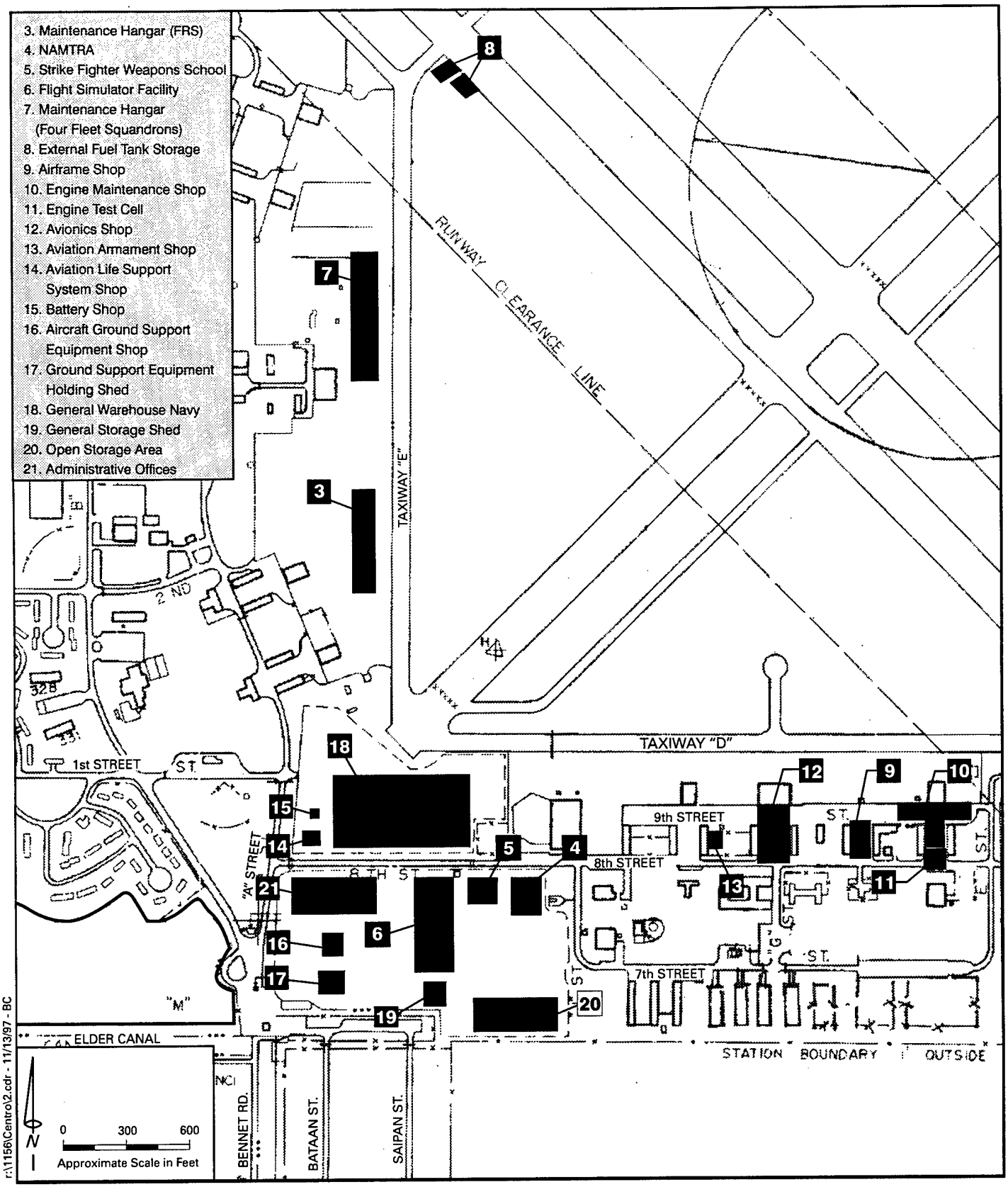
[1] Expand/Modify Existing Facility

NAF El Centro Aircraft Facilities Projects: Runway Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1997n

Figure 2-5



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Implementation of the proposed action at NAF El Centro would require construction of all necessary F/A-18E/F aircraft facilities.

Legend:

1 Construct New Facility

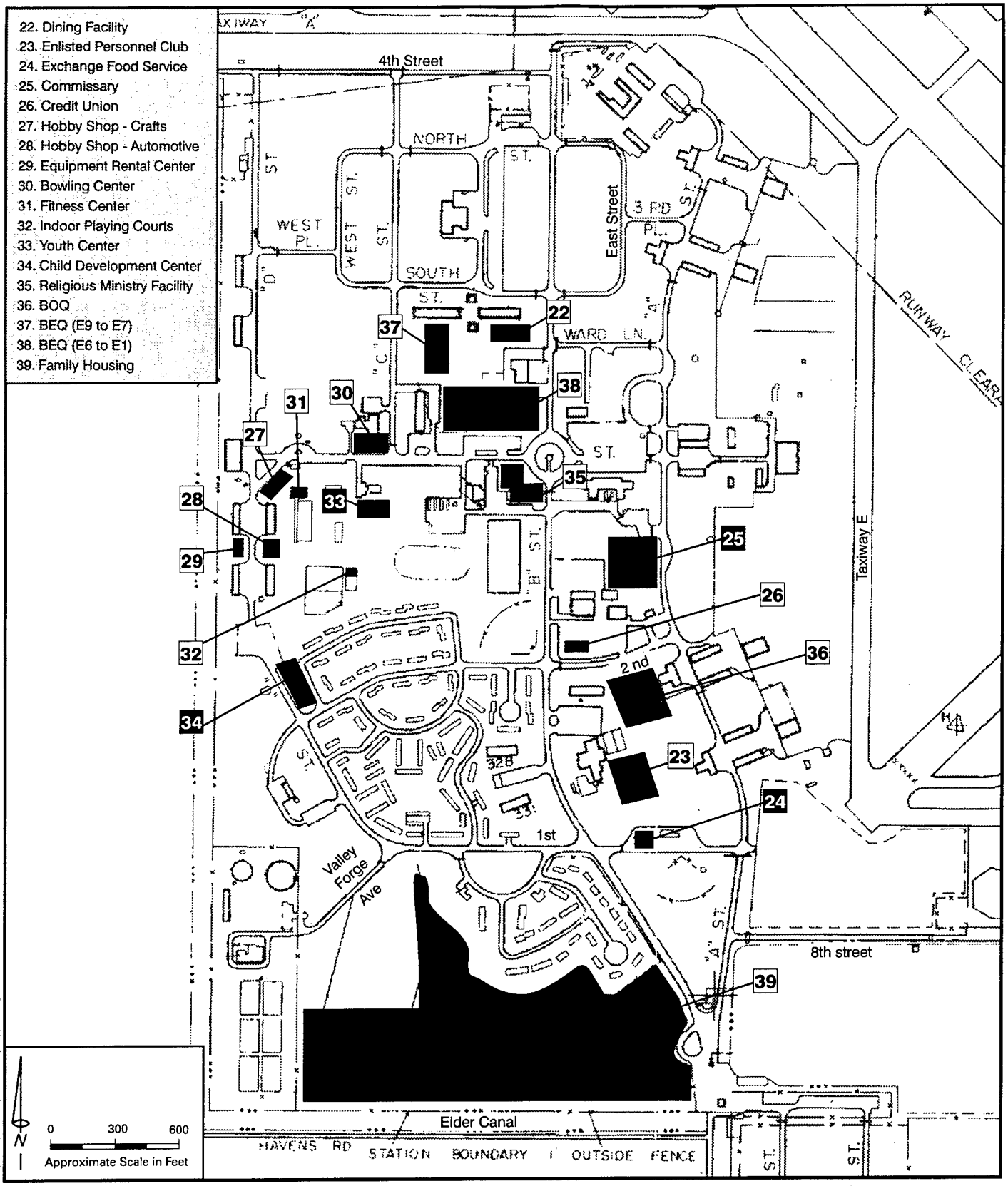
[1] Expand/Modify Existing Facility

NAF El Centro Aircraft Facilities Projects: Operations Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 2-6

Source: US Navy 1997n



Implementation of the proposed action at NAF El Centro would require expansion of most housing and personnel support functions.

Legend:

1 Construct New Facility

1 Expand/Modify Existing Facility

NAF El Centro Personnel Support Projects: Administration/Housing Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 2-7

Source: US Navy 1997n

Aircraft Facilities. The proposed action at NAF El Centro would require constructing a parallel runway at least 9,000 feet long, along with associated taxiways, so that FCLP and routine operations could be conducted concurrently. Both runways would have to be 9,000 feet long to accommodate takeoffs and landings. Because FCLP requires a left circling traffic pattern that, these parallel runways would prevent the FCLP pattern from crossing the flight path of the other runway, which would be in use for routine flight operations. Other facilities that would have to be constructed include hangars for the FRS and all fleet squadrons, a NAMTRA, a flight simulator facility, a strike fighter weapons school, a general warehouse, a general storage shed, an open storage area, an airframe shop, an engine maintenance shop, an engine test cell, an avionics shop, an aviation armament shop, an aviation life support system shop, a battery shop, an aircraft ground support equipment shop, a ground support equipment holding shed, and a general storage shed.

Personnel Support and Housing Facilities. Relocating the F/A-18E/F military personnel and their family members to NAF El Centro would require expanding the BEQs to house 1,288 enlisted personnel and the BOQ to house 134 officers. An additional 1,725 family housing units also would be needed to accommodate the proposed action. Personnel support facilities requiring construction include administrative offices, an enlisted personnel dining facility, an enlisted personnel club, an exchange, a commissary, a credit union, crafts and automotive hobby shops, an equipment rental center, a bowling center, a fitness center, indoor playing courts, outdoor recreational facilities, a youth center, a child development center, and a religious ministry facility. The numbers of relocated personnel at NAF El Centro, along with the numbers of family members, are shown in Table 2-6.

Table 2-6
F/A-18E/F Military Personnel and Family Members at NAF El Centro

	Officer	E9-E7	E6-E1	Total
Personnel				
Single on-base (BEQ or BOQ)	134	118	1,170	1,422
Married on-base (family housing)	0	0	775	775
Married off-base	313	157	775	1,246
Total	*448*	*275*	*2,720*	*3,443*
Family Members				
Children K-8	236	165	1,633	2,034
Children 9-12	42	29	288	359
Spouses and other dependents	456	257	2,540	3,253
Total	*734*	*452*	*4,461*	*5,647*

Source: US Navy 1997d

Additional Requirements for Aircraft Operations

Locating the proposed action at NAF El Centro would require constructing a parallel runway to enable FCLP operations. The installation operates at 95 percent of capacity nine months of the year. The 164 additional F/A-18E/F aircraft at NAF El Centro would perform the airfield operations described in Table 2-7.

Table 2-7
Projected Additional F/A-18E/F Aircraft Operations Activity at NAF El Centro

Aircraft	Operation	Day 7 AM – 7 PM	Evening 7 PM –10 PM	Night 10 PM – 7 AM	Total
F/A-18E/F Fleet	Takeoff	7,387	857	23	8,257
	Straight-in/Full Stop Landing	1,131	144	62	1,337
	Overhead Landing	5,806	745	379	6,930
	Visual Touch-&-Go Pattern	4,238	512	238	4,988
	FCLP Pattern	12,034	7,166	4,443	23,643
	GCA Box Pattern	530	174	32	736
	ACLS	64	208	185	457
	Total	*31,190*	*9,806*	*5,362*	*46,358*
F/A-18E/F FRS	Takeoff	6,438	903	52	7,393
	Straight-in/Full Stop Landing	1,101	271	143	1,515
	Overhead Landing	4,904	496	478	5,878
	Visual Touch-&-Go Pattern	21,854	3,181	2,521	27,556
	FCLP Pattern	10,588	6,986	3,504	21,078
	GCA Box Pattern	1,394	998	332	2,724
	ACLS	146	602	236	984
	Total	*46,425*	*13437*	*7,266*	*67,128*
	FRS AND FLEET TOTAL				*113,486*

Source: US Navy 1997c

F/A-18E/F aircraft located at NAF El Centro would travel to local training ranges to perform air-to-air and air-to-ground training (Table 2-8). Range scheduling coordination among all West Coast military aviation bases and squadrons is extensive and ongoing. Both NAS Fallon and NAF El Centro have several nearby Restricted Areas (described as complexes in Table 2-8).

Table 2-8
Estimated F/A-18E/F West Coast Area Training Range Sorties at NAF El Centro

Training Area	F/A-18E/F FRS[1]	F/A-18E/F Fleet	Total Sorties
El Centro	1,904	550	2,454
Fallon Complex	1,440	760	2,200
R-2508 Complex	3,927	870	4,797
W291/R-2301/*	1,827	1,142	2,969
Total	*9,098*	*3,322*	*12,420*

* Other available training areas not currently utilized by NAS Lemoore-based squadrons.

[1]Includes detachment sorties at Fallon complex.

Source: US Navy 1997d

The estimated impact of introduction of the F/A-18E/F aircraft on these ranges is given in sortie numbers rather than operations. A sortie is a single aircraft flight in an area and a better tool for estimating an impact on an aircraft range. A sortie

may contain multiple operations. The potential impacts from the increase in sorties at these ranges will be mitigated by scheduling priorities, enhanced coordination among the affected military operations agencies, and usage of underutilized range areas.

2.3.3 No Action Alternative

Under the No Action Alternative, no new or expanded facilities would be built at any potential receiving site nor would there be any increased functional capacity at any site. A receiving site would provide adequate facilities and functionality as it exists today. However, because all eligible receiving sites would require facilities to be constructed or modified, the No Action Alternative would not be viable. Consequently, the No Action Alternative is eliminated from consideration; no detailed analysis of the impacts will be conducted.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED

Several installations were considered as potential basing sites for the F/A-18E/F squadrons. However, following a detailed analysis of the operational and facility requirements for accomplishing the proposed action at these installations, those sites were eliminated from further consideration. NAWS Point Mugu was initially considered a potential candidate site; however, subsequent comparison with site selection criteria clearly showed that the installation could not accommodate F/A-18E/F facility and operational requirements.

Table 2-9 shows the capabilities of the considered installations to meet the F/A-18E/F squadrons operational criteria. As indicated by the table, each site failed to meet at least one critical operational criteria. The specific reasons for eliminating these sites from further consideration are provided below.

Table 2-9
F/A-18E/F Operational Criteria

Installation	Field Elevation	Training Ranges	Capacity 2 Squadrons	Tempo Operations	24-Hour Operations	Dual Runway	FCLP
NAS Whidbey Island	✓	-.-	✓	✓	✓	-.-	✓
NAS Fallon	-.-	✓	-.-	-.-	✓	✓	✓
NAWS China Lake	-.-	✓	✓	-.-	✓	✓	-.-
NAWS Point Mugu	✓	✓	✓	-.-	✓	-.-	-.-
NAS North Island	✓	✓	-.-	-.-	✓	-.-	-.-
MCAS Miramar	✓	✓	-.-	-.-	✓	✓	✓
MCAS Yuma	✓	✓	-.-	-.-	✓	✓	-.-

✓ meets criteria
-.- did not meet operational criteria
Source: US Navy 1997e

2.4.1 NAS Whidbey Island, WA

NAS Whidbey Island is too far from adequate training ranges. It would be fiscally and operationally infeasible to upgrade or build new ranges to meet the training requirements of the F/A-18E/F FRS and fleet squadrons.

2.4.2 NAS Fallon, NV

NAS Fallon's field elevation of nearly 4,000 feet above msl is too high to meet aircraft performance requirements for FCLPs. The air station is also at capacity during the high tempo operations of airwing detachments, precluding the possibility of concurrent F/A-18E/F FRS and fleet squadron operations.

2.4.3 NAWS China Lake, CA

NAW China Lake's field elevation of over 2,283-ft msl is to high to meet aircraft performance requirements for FCLPs. The high tempo and stringent Research Development Testing and Evaluating (RDT&E) schedule based here also preclude the possibility of concurrent F/A-18E/F FRS and fleet squadron operations.

2.4.4 NAWS Point Mugu, CA

NAWS Point Mugu's nearest outlying field for FCLPs is too far and operationally inefficient to meet training requirement. Building a second parallel runway (similar to that proposed at NAF El Centro) would be infeasible due to land acquisition problems. NAS Point Mugu's location in relation to adequate air-to-ground training ranges also would require transiting the congested Los Angeles International Airport airways, a significant operational constraint.

2.4.5 NAS North Island, CA

NAS North Island's current operations, proximity to San Diego's commercial airport, and airfield layout preclude the required additional operations of the F/A-18E/F FRS and fleet squadrons. Specifically, FCLPs cannot be conducted at the base and there is no outlying field within 50 nautical miles of the facility.

2.4.6 MCAS Miramar, CA

Current high tempo operations of the USMC F/A-18 squadrons preclude the required additional operations of the F/A-18E/F FRS and fleet squadrons.

2.4.7 MCAS Yuma, AZ

Current high tempo operations of this joint military (USMC)/civilian airfield including the nearby training ranges, precludes the required additional F/A-18E/F operations of the FRS and fleet squadrons.

2.5 COMPARISON OF ALTERNATIVES

The following tables compare the construction and regulatory requirements and significant impacts and mitigations occurring at each alternative siting facility. Table 2-10 compares the construction requirements at each base; Table 2-11 indicates the permits and regulatory considerations required for implementing the proposed action at each alternative base; Table 2-12 summarizes the significant impacts and mitigations identified for the proposed action at each alternative base.

Table 2-10
Comparison of F/A-18E/F Facilities Construction Requirements

F/A-18E/F Requirement	NAS Lemoore	NAF El Centro
Operational Facilities		
Parallel Runway 1	☐	☐
Parallel Runway 2	☐	■
Taxiways	☐	■
Combat Aircraft Loading Area	☐	◧
Training Facilities		
Maintenance Hangar (FRS)	◫	■
NAMTRA	◧	■
Strike Fighter Weapons School	◧	■
Flight Simulator Facility	☐	■
Organizational Maintenance Facilities		
Maintenance Hangar (Fleet Squadrons)	◫	■
Intermediate Maintenance Facilities		
Airframe Shop	◫	■
Engine Maintenance Shop	◧	■
Engine Test Cell	☐	■
Power Check Pad	☐	☐
Avionics Shop	☐	■
Aviation Armament Shop	■	■
Aviation Life Support System Shop	☐	■
Battery Shop	☐	■
Aircraft Ground Support Equipment Shop	☐	■
Ground Support Equipment Holding Shed	☐	■
Supply Facilities		
General Warehouse Navy	☐	■
General Storage Shed	☐	■
Open Storage Area	☐	◧
External Fuel Tank Storage	☐	■
Personnel Support Facilities		
Administrative Offices	☐	■
Dining Facility for Enlisted Personnel	☐	◧
Enlisted Personnel Club	☐	◧
Dental Office/Clinic	☐	☐
Library	☐	☐

Legend:

■ Construction required
◧ Facility expansion required
◫ Facility modification required
☐ Existing facilities adequate

Table 2-10
Comparison of F/A-18E/F Facilities Construction Requirements *(continued)*

F/A-18E/F Requirement	NAS Lemoore	NAF El Centro
Personnel Support Facilities (cont)		
Exchange	☐	■
Commissary	☐	■
Credit Union	☐	◧
Hobby Shop - Crafts	☐	◧
Hobby Shop - Automotive	☐	◧
Equipment Rental Center	☐	◧
Bowling Center	☐	◧
Fitness Center	☐	◧
Indoor Playing Courts	☐	◧
Morale, Welfare and Recreation Facilities	☐	◧
Youth Center	◧	■
Child Development Center	◧	■
Counseling Assistance Center	■	☐
Religious Ministry Facility	☐	◧
Housing		
BOQ	☐	◧
BEQ (E6 to E5)	☐	◧
BEQ (E4 to E1)	◧	◧
Officer Family Housing	☐	◧
Enlisted Family Housing (E9 to E7)	☐	◧
Enlisted Family Housing (E6 to E1)	◧	◧
Utilities		
Wastewater Treatment	☐	☐
Water	☐	☐
Natural Gas/Electricity	☐	◧
Stormwater	☐	☐

Legend:

■ Construction required
◧ Facility expansion required
◫ Facility modification required
☐ Existing facilities adequate

Table 2-11
Potentially Required Permits and Agency Consultation

Permit/Consultation	Agency	NAS Lemoore Action Needed	NAF El Centro Action Needed
Clean Air Act (CAA) Conformity Determination	US Environmental Protection Agency, California Air Resources Board, local Air Pollution Control District (APCD)	San Joaquin Valley Unified APCD. Emissions are above de minimis levels for all nonattainment pollutants. Need conformity determination.	Imperial County APCD. Emissions are above de minimis levels for all nonattainment pollutants. Need conformity determination.
Stationary Air Emission Source Permits	Appropriate local APCD	Any boilers for new buildings may require permits. Depending on their size, backup generators, compressors, degreasing tanks, or related equipment may require permits.	A permit may be necessary for the new fuel handling facilities and jet engine test cell. Any boilers for new buildings may require permits. Depending on their size, backup generators, compressors, degreasing tanks, or related equipment may require permits.
CWA, Section 401/402	Regional Water Quality Control Board (RWQCB)	Obtain RWQCB stormwater permits prior to construction.	Obtain RWQCB stormwater permits prior to construction.
CWA, Section 402	Regional Water Quality Control Board (RWQCB)	Existing NPDES permit restrictions for wastewater discharge would not be exceeded.	Modification of existing NPDES permit restrictions for wastewater would be required.

Table 2-12
Summary of Significant Environmental Impacts and Mitigations

Resource Category	Alternative Basing Sites	
	NAS LEMOORE	NAF EL CENTRO
Land Use and Airspace	No significant impacts.	*Impact 1. Consistency with AICUZ Land Use Compatibility Guidelines: Noise.* A significant but mitigable impact would occur at NAF El Centro from locating administration, personnel support, and housing facilities in an 85-dB CNEL noise contour. These uses are identified as clearly incompatible with this noise level. *Mitigation 1.* Do not locate the noise-sensitive facilities within the boundaries of NAF El Centro. Identify areas off-base with compatible noise environments for location of these facilities. Work with local agencies and the communities to implement development plans for these facilities. Should the action be located at NAF El Centro, off-base property would be procured for development of these facilities. *Impact 2.* A significant but mitigable impact would occur at NAF El Centro from locating F/A-18E/F facilities within the helicopter imaginary surface restrictions. The proposed general warehouse, aviation life support system shop and battery shop would be located in this area. The general warehouse could exceed the 150 foot (46 meters) height restriction for the helicopter imaginary surface at the end of Runway 3. *Mitigation 2.* The Navy would modify the approach-departure path of the helicopter pad to avoid new structures. Implementing this mitigation would reduce impacts to a less than significant level.
Visual Resources	No significant impacts	No significant impacts
Socioeconomics	*Impact 1: Schools.* A significant but mitigable impact to schools would occur due to the action at NAS Lemoore, but would be mitigated by federal payments to the school districts. Because area schools are either near or over capacity additional students generated by the proposed action could exceed existing capacity. The F/A-18E/F personnel at NAS Lemoore would add 788 students to area schools in 2004.	No significant impacts

Table 2-12
Summary of Significant Environmental Impacts and Mitigations *(continued)*

Resource Category	Alternative Basing Sites	
	NAS LEMOORE	**NAF EL CENTRO**
	Mitigation 1. School districts may be eligible for compensation for the addition of federally connected students by impact aid, which is intended to compensate local school districts for burdens placed on their resources by federal activity. School districts must apply for impact aid and funds are paid directly by the Department of Education (US Department of Education 1995). Implementing this mitigation would reduce this impact to a less than significant level.	
Cultural Resources	No significant impacts	No significant impacts
Traffic and Circulation	*Impact 1.* A significant but mitigable impact would occur at the signalized intersection of Grangeville Road and SR-41 during the PM peak hour, where levels of service would change from LOS B to LOS E. Eastbound project traffic coming from the operations gate would be the primary contributor of traffic to the intersection. *Mitigation 1.* Increase the signal cycle length during the PM peak hour. With the change in cycle length from 80 to 90 seconds, the intersection of Grangeville Road/SR-41 would operate at LOS C during the PM peak hour. Implementing this mitigation would reduce the impact to a less than significant level.	*Impact 1.* A significant but mitigable impact would occur at the unsignalized intersection of Bennett Road and Evan Hewes Highway, where levels of service would change from LOS A to LOS F during the AM and PM peak hours. Impacts at this intersection would result from the westbound right turn movement from Evan Hewes onto the base and the southbound left turn movement onto Evan Hewes from the base. *Mitigation 1.* Install a signal at the intersection of Bennett Road and Evan Hewes Highway. The improvement would improve levels of service at this intersection to LOS B and C during the AM and PM peak hours, respectively. The intersection would meet Caltrans peak-hour signal warrants. Implementing this mitigation would reduce the impact to a less than significant level. *Impact 2.* A significant but mitigable impact would occur at the unsignalized intersection of Forrester Road and Evan Hewes Highway, where levels of service would change from LOS A to LOS F during the AM and PM peak hours. *Mitigation 2.* Install a signal at the intersection of Forrester Road and Evan Hewes Highway. This would improve intersection operation to LOS C and B during the AM and PM peak hours, respectively. The intersection would meet Caltrans peak-hour signal warrants. Implementing this mitigation would reduce the impact to a less than significant level.

Table 2-12
Summary of Significant Environmental Impacts and Mitigations *(continued)*

Resource Category	Alternative Basing Sites	
	NAS LEMOORE	NAF EL CENTRO
Air Quality	*Impact 1: Clean Air Act Conformity.* Significant but mitigable increases in the emissions of ozone and PM_{10} precursors would occur from implementing the proposed action at NAS Lemoore. Emission sources under Navy control would result in incremental increases in nitrogen oxides, reactive organic compounds and PM_{10} that exceed the relevant de minimis thresholds for the San Joaquin Valley. Consequently, a conformity determination is required. Aircraft operations would be the largest source of long term emissions associated with the proposed action. Emissions associated with aircraft operations would come from actual flight activity plus in-frame engine run-up tests performed after engine maintenance. Additional emissions would come from the use of aircraft support equipment. Airfield facilities constructed at NAS Lemoore would include fixed point utility systems, thus minimizing the use of ground support equipment. No expansion of aviation fuel handling facilities is anticipated, although annual aviation fuel use would be about 4 million gallons per year. Because JP-5 fuel has a very low volatility, resulting emission quantities would be small. Conformity-related ozone precursor emissions would be 306 tons (278 metric tons) per year of reactive organic compound and 307 tons (278 metric tons) per year of nitrogen oxides. PM_{10} emissions would increase by 164 tons (148 metric tons) per year. These emission quantities exceed the relevant de minimis thresholds for San Joaquin Valley. The closure of Castle Air Force Base eliminated a significant source of aircraft and other mobile source emissions in the San Joaquin Valley. A portion of those eliminated emissions were transferred to NAS Lemoore for use in meeting CAA conformity requirements. The transferred emission quantities do not fully offset conformity-related emission of reactive organic compounds and PM_{10}, but do exceed the estimated increase in conformity-related nitrogen oxide emissions.	*Impact 1: Clean Air Act Conformity.* Significant but mitigatable increases in the emissions of ozone and PM_{10} precursors would occur from implementing the proposed action at NAF El Centro. Emission sources under Navy control would result in incremental increases in reactive organic compounds, nitrogen oxides, and PM_{10} that exceed the relevant de minimis thresholds for the Salton Sea Air Basin. Consequently, a conformity determination is required. Aircraft operations would be the largest source of long term emissions associated with this alternative. Emissions associated with aircraft operations would come from actual flight activity plus in-frame engine run-ups performed after engine maintenance. Additional emissions would come from the use of aircraft support equipment and miscellaneous engine-powered portable or stationary equipment used for aircraft and engine maintenance. Airfield facilities at NAF El Centro include fixed point utility systems, thus minimizing the use of ground support equipment. Base-related vehicle travel would be an additional source of long term emissions. Conformity-related ozone precursor emissions would be 419 tons (377 metric tons) per year of reactive organic compounds and 385 tons (325 metric tons) per year of nitrogen oxides. PM_{10} emisions would increase by 226 tons (205 metric tons) per year. These emission quantities exceed the de minimis thresholds for the Salton Sea Air Basin. CAA conformity rules require that additional conformity offsets be arranged or that relevant SIP documents be revised to account for the added emissions before the F/A-18E/F action can be approved at NAF El Centro. A formal CAA conformity determination would be required to demonstrate that net emission increases have been addressed as required by the EPA conformity rule.

Table 2-12
Summary of Significant Environmental Impacts and Mitigations *(continued)*

Resource Category	Alternative Basing Sites: NAS LEMOORE	Alternative Basing Sites: NAF EL CENTRO
	Mitigation 1a: To compensate for the increase in ozone precursor emissions at NAS Lemoore, negotiate an additional transfer of conformity-related emission reductions generated by the closure of Castle Air Force Base.	*Mitigation 1a:* To compensate for the net increase in ozone and PM_{10} precursor emissions, formally request that the Imperial County Air Pollution Control District modify the ozone and PM_{10} SIPs to account for increased aircraft operations at NAF EL Centro.
	Mitigation 1b: To compensate for the increase in PM_{10} emissions at NAS Lemoore, obtain concurrence from the San Joaquin Valley Unified Air Pollution Control District to use interpollutant offsets of reactive organic compounds and/or nitrogen oxides as precursors to PM_{10}. The Navy would negotiate an additional transfer of conformity-related emission reductions generated by the closure of Castle Air Force Base.	*Mitigation 1b:* As an alternative to Mitigation 1a, obtain emission offsets from sources in the Salton Sea Air Basin to compensate for the net emissions increase at NAF El Centro.
	Mitigation 1c: As an alternative to Mitigation 2a and Mitigation 2b, formally request the San Joaquin Valley Unified APCD to modify the ozone and PM_{10} SIPs to account for increased aircraft operations at NAS Lemoore.	
	Impact 2: Increased Emissions. Significant but mitigable air quality impacts would result from emissions generated by activity associated with basing F/A-18E/F aircraft at NAS Lemoore. Emission sources operating under air quality permits include on-base service stations, engine and airframe maintenance facilities (paint, solvent, and abrasive blasting equipment), central boilers for hangars and BEQ facilities, and engine test cells. Important indirect emission sources not under Navy control include household vehicle travel for non-work purposes and natural gas use by off-base households.	*Impact 2: Increased Emissions.* Significant but mitigatable air quality impacts would result from emissions generated by activity associated with basing F/A-18 E/F aircraft at NAF El Centro. Construction of required facilities would create temporary sources of air pollutant emissions. Aircraft operations, aircraft maintenance, and vehicle travel by added military and civilian personnel would be the major sources of long-term emissions. Emissions associated with aircraft operation would come from actual flight activity plus in-frame engine run-up tests performed after engine maintenance.
	Modifications to existing maintenance facilities may require new or amended air quality permits. New central boilers and the new engine test cell would require air quality permits. Some new or replacement equipment (such as standby generators, compressors, etc.) might require new permits from the San Joaquin Unified Air Pollution Control District. Requirements for permits or permit modifications are not in themselves significant impacts.	Aircraft operations would be the largest source of long term emissions associated with this alternative. Emissions associated with aircraft operations would come from actual flight activity plus in-frame engine run-ups performed after engine maintenance. Additional emissions would come from the use of aircraft support equipment and miscellaneous engine-powered portable or stationary equipment used for aircraft and engine maintenance. Engine test cell operations and chemicals used for aircraft and engine maintenance would also be meaningful emission sources. Base-related vehicle travel plus other household travel associatied with added personnel would be the second largest source of emissions associated with this alternative.
	Overall emissions of ozone and PM_{10} precursors associated with the F/A-18E/F action are estimated to be 333 tons (304 metric tons) per year of reactive organize compounds, 359 tons (328 metric tons) per year of nitrogen oxides, and 226 tons (211 metric	

Table 2-12
Summary of Significant Environmental Impacts and Mitigations *(continued)*

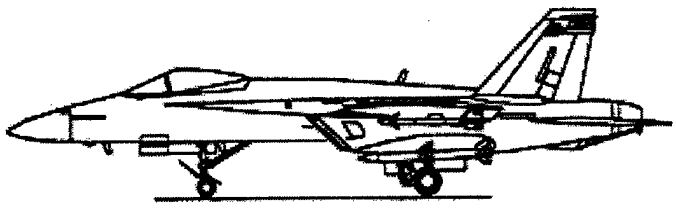
Resource Category	Alternative Basing Sites: NAS LEMOORE	Alternative Basing Sites: NAF EL CENTRO
	tons) per year of PM_{10}. These emission increases exceed the relevant conformity de minimis levels and represent a significant impact in a nonattainment area.	The aircraft engine test cell would require an air quality permit from the Imperial County Air Pollution Control District (APCD). Boilers used for space heating and water heating in hangars, housing facilities, office buildings, and personnel support facilities would also require air quality permits from the APCD. Expanded fuel storage and handling facilites might also require a permit from the APCD, although these facilities might be exempted because the volatility of jet fuel is very low. Any gasoline service station operated by NAF El Centro would also require an air quality permit. Ozone precursor emissions would be 471 tons (427 metric tons) per year of reactive organic compounds and 468 tons (424 metric tons) per year of nitrogen oxides. PM_{10} emisions would increase by 347 tons (315 metric tons) per year. These emission quantities exceed the de minimis thresholds for the Salton Sea Air Basin, and thus would represent a significant impact.
	Mitigation 2a: To compensate for the increase in ozone precursor emissions at NAS Lemoore, negotiate an additional transfer of conformity-related emission reductions generated by the closure of Castle Air Force Base.	*Mitigation 2a:* Same as Mitigation 1a.
	Mitigation 2b: To compensate for the increase in PM_{10} emissions at NAS Lemoore, obtain concurrence from the San Joaquin Valley Unified Air Pollution Control District to use interpollutant offsets of reactive organic compounds and/or nitrogen oxides as precursors to PM_{10}. The Navy would negotiate an additional transfer of conformity-related emission reductions generated by the closure of Castle Air Force Base.	*Mitigation 2b:* Same as Mitigation 1b
	Mitigation 2c: As an alternative to Mitigation 1a and Mitigation 1b, formally request the San Joaquin Valley Unified APCD to modify the ozone and PM_{10} SIPs to account for increased aircraft operations at NAS Lemoore.	

Table 2-12
Summary of Significant Environmental Impacts and Mitigations *(continued)*

	Alternative Basing Sites	
Resource Category	**NAS LEMOORE**	**NAF EL CENTRO**
Noise	No significant impacts.	*Impact 1. Additional Aircraft Operational Noise.* A significant and not mitigable noise impact would result from increased flight operations associated with basing of F/A-18E/F aircraft at NAF El Centro. The 65-dB CNEL contour would encompass significant off-base areas. The City of Imperial would be encompassed by the 65- dB CNEL contour, and the community of Seeley and at least two of the three schools in Imperial would be impacted by CNEL values above 65 dB.
Biological Resources	No significant impacts.	*Impact 1: Special Status Species.* A significant but mitigable impact would occur to the western burrowing owl, a California and federal species of concern, at NAF El Centro. Western burrowing owls were observed during a July 29, 1997 site visit at the intersection of taxiway D and taxiway E, and at an area north of the main runway. These areas are adjacent to the proposed site for construction of the maintenance hangar (FRS), maintenance hangar (fleet squadrons), aviation life support system shop, battery shop, and parallel runway and associated taxiway. Increased activity may cause western burrowing owl to abandon these areas. *Mitigation 1.* Conduct a pre-construction survey within the disturbed habitat to ensure that no burrowing owls are nesting in the area and to determine if the site is burrowing owl habitat. If owls are nesting, move the nests to a new area with artificial nest burrows in place. Implementing these mitigation measures would reduce the impact to a less-than-significant level. No Section 7 consultation would be required under the Endangered Species Act.
Hydrology and Surface Water Quality	No significant impacts.	No significant impacts.
Utilities and Services	No significant impacts	No significant impacts.
Public Health and Safety	No significant impacts	No significant impacts.

Table 2-12
Summary of Significant Environmental Impacts and Mitigations *(continued)*

Resource Category	Alternative Basing Sites: NAS LEMOORE	Alternative Basing Sites: NAF EL CENTRO
Hazardous Materials and Waste	*Impact 1.* A significant but mitigable impact would occur at NAS Lemoore from storage tanks. NAS Lemoore presently has a base-wide program for jet fuel transportation and storage, as well as refueling facilities for naval aircraft using JP-5 fuel. The tank capacity at NAS Lemoore is not adequate to meet current and anticipated fuel requirements for the F/A-18E/F aircraft. The existing external fuel tank storage racks are not well suited for use with the larger (480-gallon [1,817-l] verses 330-gallon [1,249-l]) external fuel tanks utilized by the F/A-18E/F. Plans and programs for managing the additional fuel storage would be necessary. New operation requirements and services also would be necessary and the potential for exposure of the public or environment to hazardous substances would be a concern. *Mitigation 1.* Construction of external fuel tank racks would be necessary for secure storage of the 480-gallon (1,817-l) external fuel tanks used by the F/A-18E/F. The base implements plans and programs for fuel storage, but an amendment to these plans and programs would be necessary to include this additional area. Operational requirements and services for fuel storage at the base also would be amended to include the additional area. Following the regulatory requirements for proper installation and monitoring of the additional fuel storage area will decrease the potential exposure of the public or environment to hazardous substances. Implementing this mitigation would reduce the impact to a less-than-significant level.	*Impact 1.* A significant but mitigable impact would occur at NAF El Centro from storage tanks. Construction of an aircraft direct fueling station may be necessary to accommodate the 33,301,139 gallons (126,058,130-l) per year requirement for ten F/A-18E/F squadrons and one FRS. The existing external fuel tank storage racks are not well suited for use with the larger (480-gallon [1,817-l] verses 330-gallon [1,249-l]) external fuel) tanks utilized by the F/A-18E/F. Plans and programs for managing the additional fuel storage would be necessary. New operation requirements and services also would be necessary, and the potential for exposure of the public or environment to hazardous substances would be a concern. *Mitigation 1.* Construction of external fuel tank storage racks would be necessary for secure storage of the 480-gallon (1,817-l) drop tanks, along with the construction of an aircraft direct fueling station. The base implements plans and programs for fuel storage, but an amendment to these plans and programs would be necessary to include these additional areas. Operational requirements and services for fuel storage at the base also would be amended to include the additional area. Following the regulatory requirements for proper installation and monitoring of the external fuel tank storage area will decrease the probability of potential exposure of the public or environment to hazardous substances. Implementing this mitigation would reduce the impact to a less-than-significant level.



3.0 AFFECTED ENVIRONMENT

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CHAPTER 3
AFFECTED ENVIRONMENT

This chapter contains a description of the existing environmental and socioeconomic conditions at Naval Air Station (NAS) Lemoore and Naval Air Facility (NAF) El Centro. The information contained in this chapter will serve as baseline data to identify and evaluate any environmental impacts that could result from F/A-18E/F facility development and aircraft operations. Information is presented for the current year where this information is available or from documents prepared in previous years.

The setting discussion for each resource area identifies an affected geographic area in which impacts for a particular resource would most likely occur. The existing environment is described for land use and airspace, visual resources, socioeconomics, cultural resources, traffic and circulation, air quality, noise, biological resources, hydrology/surface water quality, utilities and public services, public health and safety, and hazardous materials and wastes.

3.1 LAND USE AND AIRSPACE

This section describes surrounding and on-base land uses at each alternative base. Because the proposed action would add aircraft operations at the receiving base, airspace and ground facilities are part of the affected area. Airspace designations and land use and airspace compatibility guidelines and recommendations related to noise and safety are described.

Definition of Resource

Land Use Designations

Land use designations encompass undeveloped and developed land on-base and in the immediate surrounding area. Undeveloped land commonly is classified as open space, while developed land uses range from residential and commercial to recreational and agricultural. Land use is regulated by military, regional, and local plans and policies that identify the type and extent of uses allowed in specific areas.

Air Space Designations

Airspace also is designated to accommodate certain types of uses, including federal airways, military training routes (MTRs), restricted use airspace, military operations areas (MOAs), and air traffic control authorized airspace (ATCAA). Airspace designations throughout the United States are controlled by the Federal Aviation Administration (FAA) and are applicable to all aircraft. No changes in the FAA airspace designations are proposed as part of this action.

Federal Airways. Federal airways are corridors for civilian air traffic. These airways are designated with a V or a J and a number. V denotes victor corridors that cover up to 18,000 feet (5,486 m) above msl, while J is for jet corridors that cover over 18,000 feet (5,486 m) above msl.

Military Training Routes. MTRs are military airways, often low altitude routes, used for access to or from MOAs or for cross-country flight practice. MTRs are shown by a visual route (VR) or instrument route (IR) designation. Visual routes are flown by maintaining a visual reference to the ground at all times with periodic instrument checks of altitude, engine status, and other aircraft conditions. Regulations governing visual flight are called visual flight rules (VFR). Instrument routes are flown using instrument flight rules (IFR), which enable the pilot to fly without visual reference to the ground.

Restricted Use Airspace. Restricted use airspace is used for military flight training and is not usually accessed by civilian or commercial aircraft for safety reasons.

Military Operations Area. MOAs accommodate aircraft maneuvering in airspace adjacent to the restricted areas and are broader and higher than the restricted areas. MOAs can extend up to 18,000 feet (5,486 m) above msl but not beyond. Nonhazardous military training activities, such as air combat maneuvers, air intercepts, and aerobatics, are conducted in the MOAs. Civilian aircraft flying by VFR can use the airspace within MOAs at any time, including when military training activities are being conducted. Aircraft using IFR, such as commercial carriers, are not allowed access to MOAs, unless cleared by air traffic control.

Air Traffic Control Assigned Airspace. ATCAAs are similar to MOAs in that they accommodate aircraft maneuvering in airspace adjacent to the restricted areas and are broader and higher than the restricted areas. ATCAAs afford military aircraft the opportunity for flight above 18,000 feet (5,486 m) msl, under direct control by an FAA air route traffic control center (ARTCC). All aircraft in an ATCAA must fly by IFR. ATCAAs are made available when their use will not interfere with other air traffic in that airspace. Most ATCAA military air activity is the same as MOA air activity, with the exception of air-to-air combat training, which usually is not permissible in an ATCAA.

Regulatory Considerations

Land use on military bases is planned and documented in base master plans as a guide for future growth. One of the primary land use issues addressed in naval air facility master plans is ensuring the protection of aircraft operations at an airfield or in a special use airspace. Land surrounding military bases is regulated by local and regional land use planning requirements.

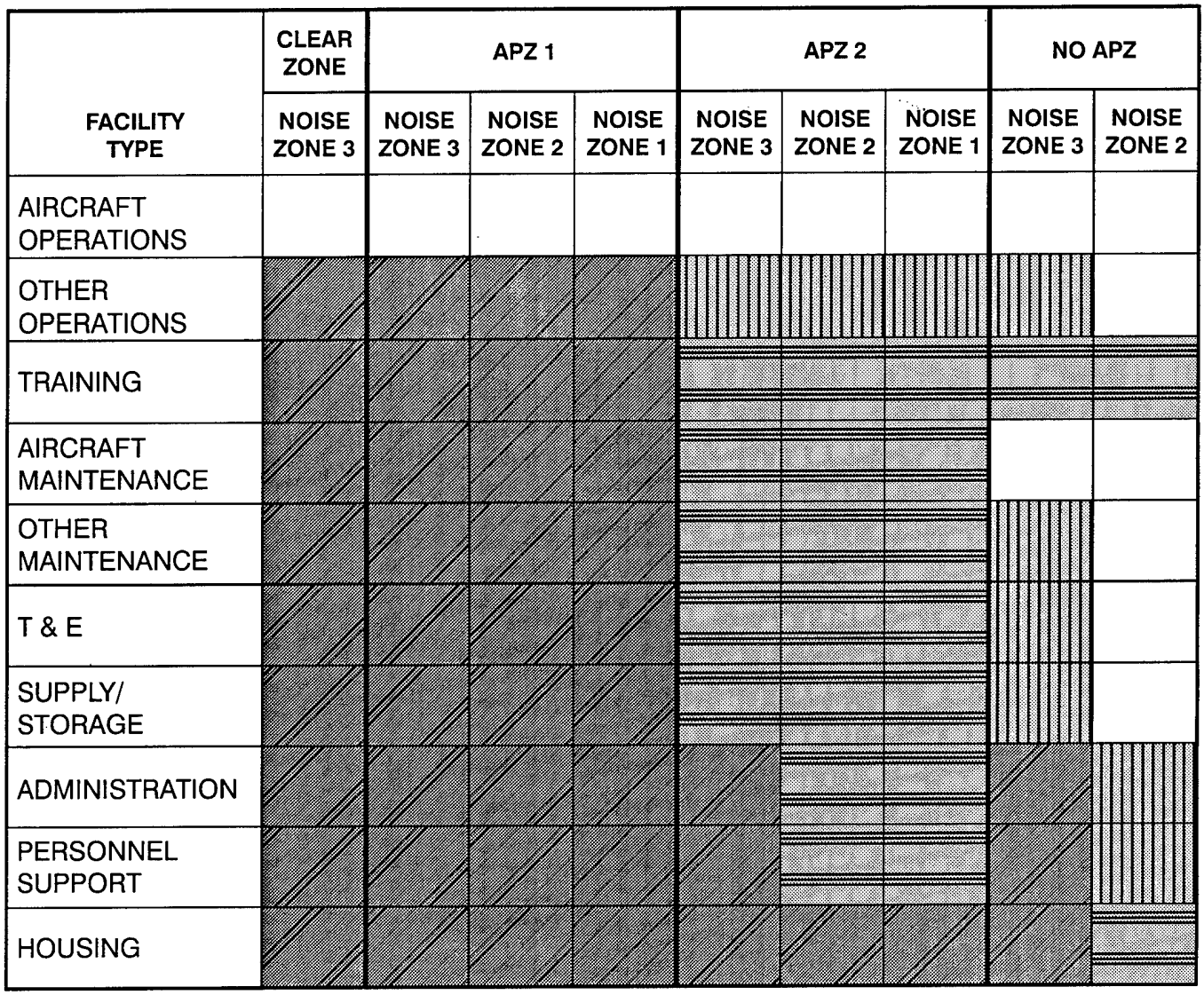
Master Plans. A master plan is used in the short term to site construction projects but also serves as a guide for achieving long-term development objectives. Both of the Navy bases evaluated in this environmental impact statement (EIS) have a master plan that identifies land uses and recommends construction projects to achieve development objectives. The recommendations help to optimize the use of Navy resources and allow increases in operational capabilities.

Air Installation Compatibility Use Zones Program (AICUZ). The AICUZ program is a component of military base master plans. Its purpose is to prevent incompatible development in areas of high noise, in areas that would expose the public to potential health and safety hazards associated with aircraft operations, and in areas that would jeopardize pilot safety and the operational capability of the air installation. The AICUZ establishes guidelines and provides recommendations for land use planning and policies that affect military installations and surrounding communities. The Navy requires that an AICUZ program address noise levels and accident potential zones (APZs), which then form the basis for on-base land use compatibility.

The AICUZ program identifies land uses that would be compatible with certain noise levels, accident potential, and flight clearance requirements associated with military airfield operations (Figure 3-1). Community noise equivalent levels (CNELs), shown as noise contour lines on AICUZ maps, prescribe what kinds of land uses may occur at certain noise levels. Additional considerations associated with noise are discussed in Section 3.7 of this EIS.

APZs identify areas that would most likely be affected by an accident. The purpose of defining APZs is to restrict surrounding land uses to protect persons, pilots, and property on the ground. Three types of APZs are identified—the Clear Zone, APZ I, and APZ II. The dimensions and applications of these zones are described below.

- *The Clear Zone* lies immediately beyond the end of the runway and outward along the extended runway centerline for a distance of 3,000 feet (914 m). The fan-shaped zone is 1,500 feet (457 m) wide at the end of the runway and 2,284 feet (696 m) wide 3,000 feet (914 m) from the end of the runway. The Clear Zone should have no obstructions since it has the highest probability of being affected by accidents.



Noise Zone 1 = < 65 CNEL

Noise Zone 2 = 65-75 CNEL

Noise Zone 3 = > 75 CNEL

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The AICUZ identifies the land uses compatible with noise zones and accident potential zones (APZs).

LEGEND:

- Clearly Compatible
- Normally Compatible
- Normally Incompatible
- Clearly Incompatible

Source: OPNAVINST 11010.36A, Air Installations Compatible Use Zones (AICUZ) Program April 1988.

Land Use Compatibility with AICUZ Zones

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 3-1

- *Accident Potential Zone I* is the rectangular area beyond the Clear Zone that possesses a significant potential for accidents. This zone normally is provided under flight paths that experience 5,000 or more annual operations. Typically, APZ I is 3,000 feet (914 m) wide by 5,000 feet (1,524 m) long and is curved to conform to the shape of the flight paths. The accident potential would be less in this zone than in the Clear Zone.
- *Accident Potential Zone II* extends beyond APZ I and has a lower potential for accidents. APZ II normally is provided under a flight path whenever an APZ I is required. Dimensions of APZ II are usually 3,000 feet (914 m) wide by 7,000 feet (2,133 m) long, and it is curved to conform to the shape of the flight paths (US Navy 1993b).

Imaginary Surfaces. Another land use compatibility issue associated with airfield operations is the proximity of structures to imaginary surfaces. An imaginary surface is the slope or angle at which an aircraft departs or arrives from an airfield. Imaginary surfaces are another way to describe clearances for air navigation. Federal Aviation Regulations specify a series of imaginary height restriction surfaces surrounding an airport to prevent conflicts with aircraft approach and departure paths.

The FAA considers any terrain or engineered objects that extend above the imaginary surface an obstruction. All obstructions are reviewed by the FAA to determine if they represent a hazard to air navigation. The imaginary surface should not be penetrated and all new development should not extend into the imaginary surfaces. Imaginary surfaces can affect on-base and regional land use planning. Specific imaginary surfaces for airfields are defined below (US Navy 1993b).

- *The Primary Surface* is centered on the runway. It is 1,500 feet (457 m) wide and extends 200 feet (61 m) beyond each end of the runway. Unless required for safe navigation, nothing within the primary surface is acceptable above the runway elevation.
- *The Approach-departure Clearance Surface* flares outward and upward from the primary surface. The surface extends horizontally and vertically at a 50:1 slope until it is 500 feet (152 m) above the airfield. At this point it extends horizontally to a point 50,000 feet (15,240 m) from its beginning. At its beginning, the approach-departure clearance surface is 1,500 feet (457 m) wide. It broadens uniformly at approximately 7.5 degrees to an outer width of 16,000 feet (4,877 m).
- *The Inner Horizontal Surface* is an oval plane 150 feet (46 m) above the airfield, with an outer edge 7,500 feet (2,287 m) from the runway.
- *The Conical Surface* extends horizontally and vertically at a 20:1 slope from the outer edge of the inner horizontal surface. The conical

surface stretches 500 feet (152 m) vertically above the airfield and 7,000 feet (2,134 m) horizontally from the outer edge of the inner horizontal surface.

- *The Outer Horizontal Surface* begins at the outer edge of the conical surface, 500 feet (152 m) above the airfield, and extends horizontally for 30,000 feet (9,146 m).
- *The Transitional Surface* is an inclined plane that connects the primary surface and the approach-departure surface. The slope ratio for this surface is 7:1, horizontal to vertical, and falls in upward and outward right angles to the runway centerline and the extended centerline. If any objects penetrate these surfaces, a waiver must be obtained from Naval Air System Command (NAVAIR). These restrictions and regulations are considered during construction activities and military installation planning.

3.1.1 NAS Lemoore Alternative

Affected Area

The affected area for land use includes the base and immediately surrounding area. The affected area for airspace use includes any military airspace associated with the base and land uses below imaginary surface restrictions. Imaginary surface restrictions associated with airbase aircraft operations can extend up to 10 miles (16 km) from the base's airfield.

Setting

NAS Lemoore is in the central portion of the San Joaquin Valley, approximately 80 miles (129 km) east of the Pacific Ocean in Fresno and Kings counties. Approximately 15,744 acres (6,372 ha) of Navy-owned land are within Kings County and 3,040 acres (1,230 ha) are within Fresno County. Fresno and Kings counties administer and regulate land uses within their respective boundaries. As a federal property, NAS Lemoore is not within the jurisdiction of either of these counties. When NAS Lemoore was first developed, the counties zoned approximately 108 square miles (180 km^2) of land surrounding the base as agriculture to prevent encroachment of residential development and other land uses that could pose a conflict to the base's mission (US Navy 1994d). In addition, the Navy holds flight easements over 11,020 acres (4,460 ha) of land in both counties.

The closest urban center is Fresno, 35 miles (56 km) north of NAS Lemoore in Fresno County. Other nearby cities in Kings County include Lemoore, 7 miles (11 km) to the east, Hanford, 17 miles (27 km) to the east, and Stratford, 6 miles (9 km) to the southeast (US Navy 1993b).

Regional Land Uses

The primary land use surrounding the base is agriculture, with common crops being cotton, safflower, tomatoes, and various types of hay (Figure 3-2). Off-base land within approximately 4 miles (6 km) of the base airfield is zoned by both Fresno and Kings counties as agriculture for farms with a minimum of 40 acres (16 ha). Off-base land between 4 and 10 miles (6 to 16 km) of the base airfield is zoned by both counties as agriculture for farms with a minimum of 20 acres (8 ha).

On-base Land Uses

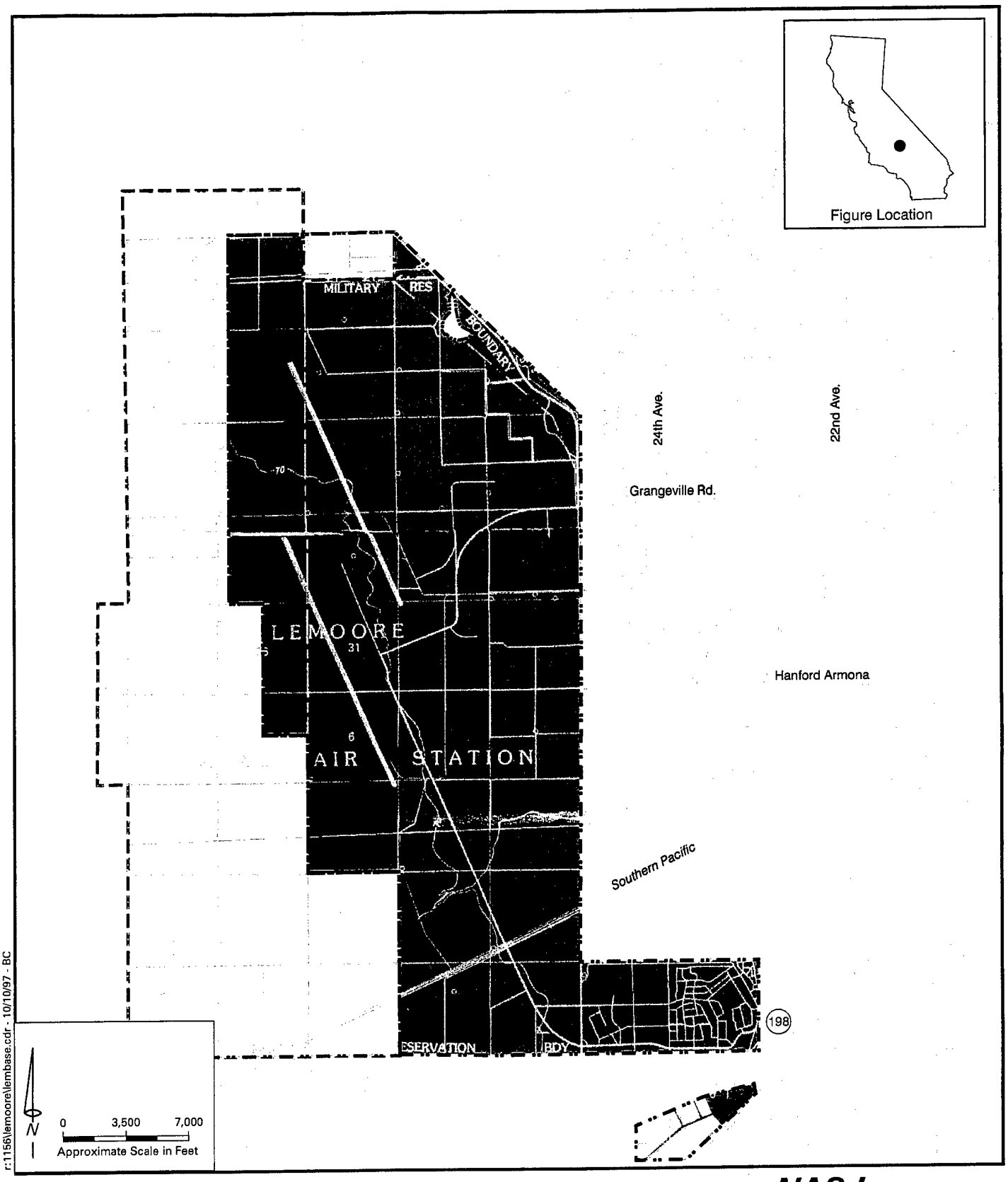
Land uses at NAS Lemoore include developed and undeveloped land. Developed areas are used primarily for operations, administration, and housing. The operations area is in the central part of the base and includes training/operations, public works, maintenance, administration and supply facilities. The landing field at NAS Lemoore consists of two runways, 14R/32L and 14L/32R, which are both 13,500 feet (4,114 m) long. The operations area is bordered by open space.

The administration/housing area is at the southern end of the base and is separated from the operational area by approximately 3 to 4 miles (5 to 6 km). It provides a range of facilities supporting the base operations and training functions. Housing and personnel support facilities and recreational facilitates are the largest area of land use, with some training operations and administration facilities also located in this area. Supplemental base land is outleased for agricultural purposes. Existing land uses and the proposed location of the F/A-18E/F facilities at NAS Lemoore are shown on Figures 3-3 and 3-4.

Airspace Designations

The NAS Lemoore airfield is within the control area boundary of the Oakland ARTCC. NAS Lemoore maintains a radar air traffic control facility (RATCF) that controls aircraft traversing the NAS Lemoore airspace. The RATCF extends from ground surface to 15,000 feet (4,572 m) above msl in the Alpha area and from ground surface to 10,000 feet (3,048 m) above msl in the Bravo area. Neighboring RATCFs include the City of Fresno Airport and Castle Air Force Base (now closed). There are other smaller commercial and private airports in the area. The southern border of the NAS Lemoore RATCF is also the border between the Oakland ARTCC and Los Angeles ARTCC. NAS Lemoore coordinates air traffic with the Oakland and Los Angeles ARTCCs and neighboring air traffic control facilities (US Navy 1994d).

Figure 3-5 shows the airspace environment surrounding NAS Lemoore. There is no military airspace associated with NAS Lemoore. Current flight operations require NAS Lemoore aircraft to use the MOA above Fort Hunter Liggett on the coast, the R-2508 Airspace Complex restricted airspace. Several federal airways are located in the area. Commercial jet corridors connecting northwestern and southern California are some of the busiest flight corridors in the country. Local carriers to Bakersfield and Fresno routinely descend through the NAS Lemoore RATCF (US Navy 1994d).



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NAS Lemoore is located in a primarily agricultural region.

LEGEND:

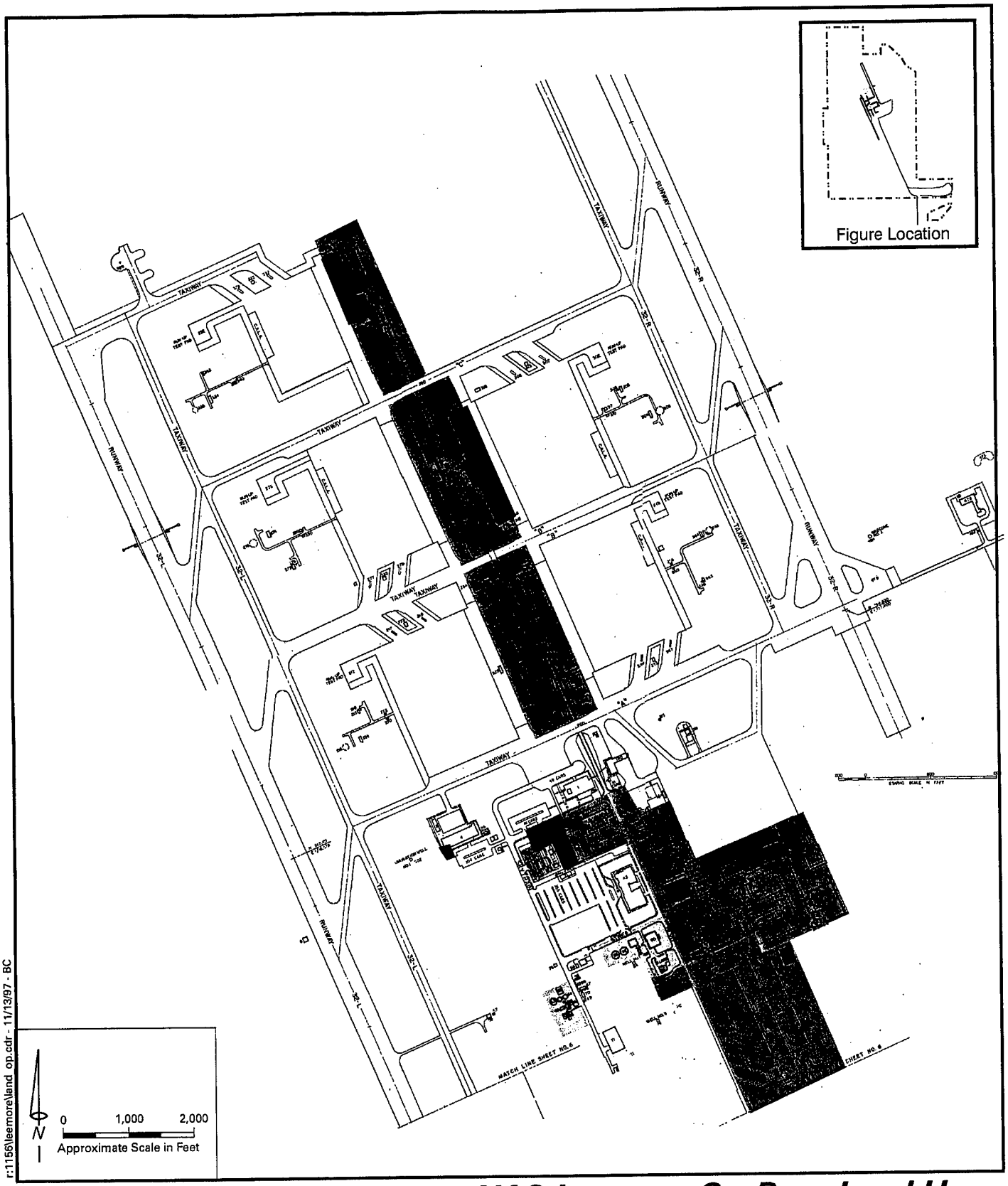
- Open Space/Agriculture
- Military (Navy Property)
- Military (Private Property - Navy Easement)

NAS Lemoore: Regional Land Uses

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 3-2

Source: US Navy 1992.



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Land use areas identified in the Master Plan are indicative of existing land uses.

LEGEND:

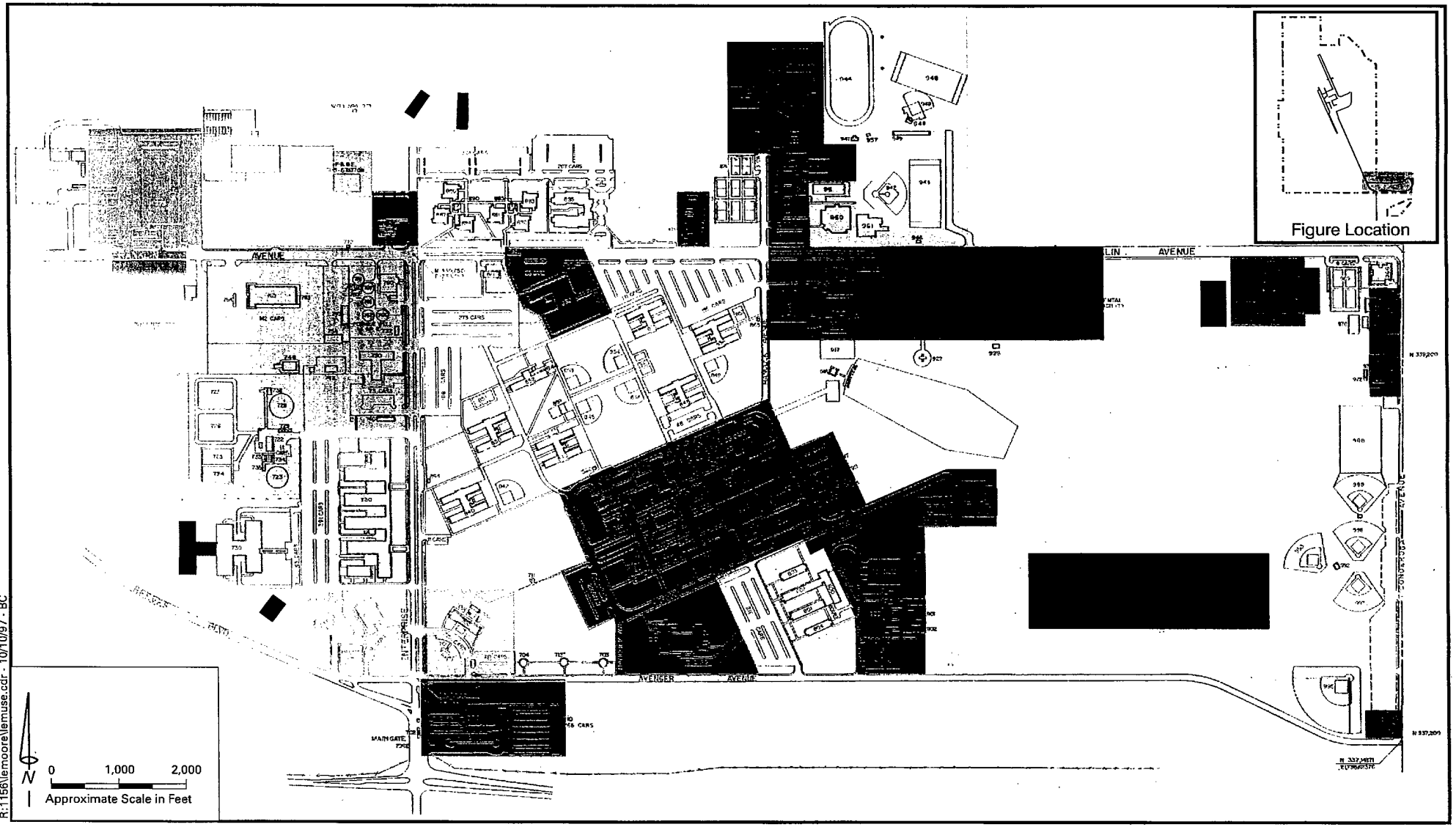
- Administration
- Maintenance
- Medical
- Open Space/Agriculture
- Personnel Support
- Public Works
- Supply
- Training/Operations
- Construction/Expansion Projects

NAS Lemoore On-Base Land Uses: Operations Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1992.

Figure 3-3



Land use areas identified in the Master Plan are indicative of existing land uses.

LEGEND:

- Administration
- BOQ/BEQ/Family Housing
- Medical
- Personnel Support
- Public Works
- Recreation
- Supply
- Training/Operations
- Construction/Expansion Projects

NAS Lemoore On-Base Land Uses: Administration Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1992.

Figure 3-4

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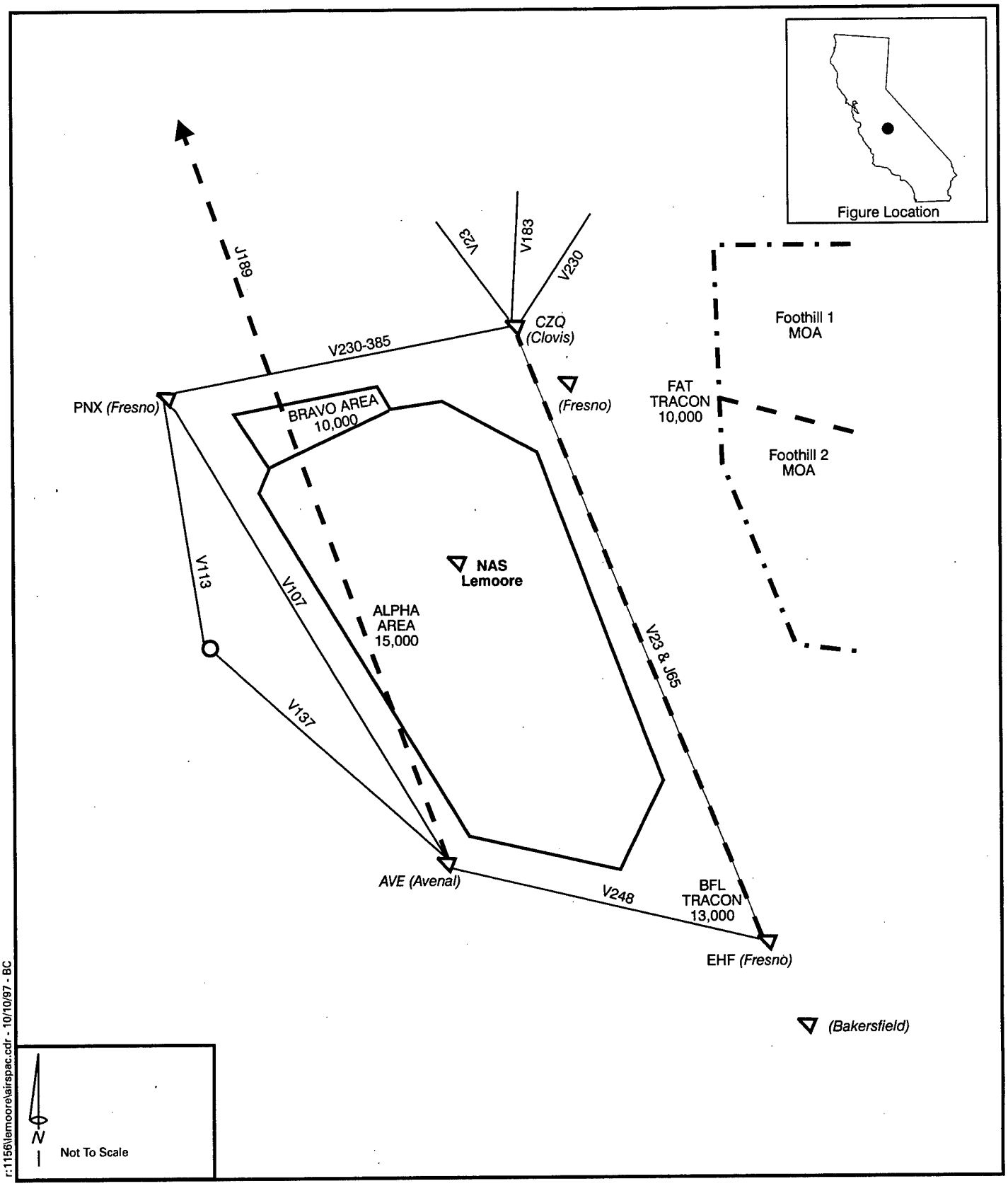

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There is no dedicated military airspace above NAS Lemoore.

LEGEND:

- NLC TRACON (NAS Lemoore Control)
- Military Operations Area (MOA)
- 18,000 feet MSL and above
- 17,999 feet MSL and below
- J Jet
- V Victor

NAS Lemoore Airspace Use

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1994d.

Figure 3-5

Regional APZs, Noise Contours, and Imaginary Surfaces

APZ, noise, and imaginary surface restrictions are established in the 1993 NAS Lemoore AICUZ. The APZ boundaries and the extent of the outer horizontal imaginary surface are shown on Figure 3-6. Figure 3-7 shows noise contours in the immediate area. Agriculture, the predominant surrounding land use, is allowable within the Clear Zone and in areas where noise levels are above 85-decibels (dB) (US Navy 1993b). The western portion of the city of Lemoore is below the outer horizontal imaginary surface.

On-base APZs, Noise Contours, and Imaginary Surfaces

Two underground fuel storage tanks are located in APZ I. These tanks have been constructed to make them compatible with APZ requirements (US Navy 1993b).

On-base land uses at NAS Lemoore are compatible with the AICUZ noise restrictions, except for some residential uses within the 65-dB CNEL noise contour, and some administration offices within the 70-dB CNEL noise contour (Figure 3-7). The NAS Lemoore AICUZ recommends insulating buildings to attenuate noise impacts.

There are a number of imaginary surfaces associated with NAS Lemoore that restrict or limit structure height for safety purposes. There are currently no violations of imaginary surface restrictions at NAS Lemoore other than those necessary for safe air navigation (US Navy 1993b).

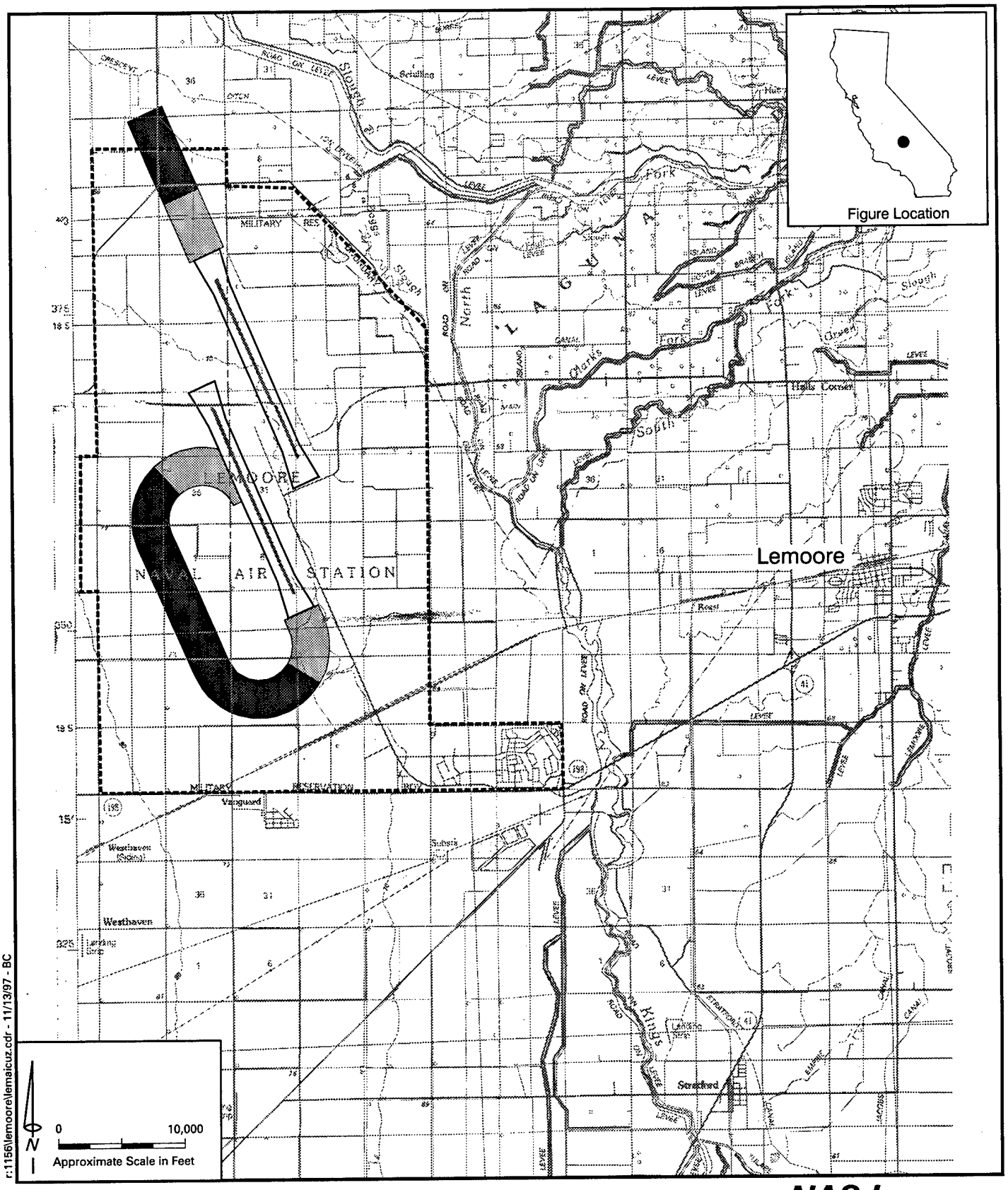
3.1.2 NAF El Centro Alternative

Affected Area

The affected area for land use includes the base and immediately surrounding area. The affected area for airspace use includes any military airspace associated with the base and land uses below imaginary surface restrictions. Imaginary surface restrictions associated with airbase aircraft operations can extend up to 10 miles (16 km) from the base's airfield.

Setting

NAF El Centro is composed of 2,640 acres (942 ha) located in the southeastern part of California in Imperial County. The Navy holds most of the acreage in fee simple title with a portion granted in easements. A portion of the base is also leased for agricultural use. The base is approximately 120 miles (193 km) east of San Diego and 65 miles (93 km) west of Yuma, Arizona. The closest population centers are the City of El Centro, 7 miles (11 km) to the southeast, Imperial, 6 miles (9 km) to the east, and Seeley, 1 mile (1.6 km) to the south (US Navy 1990a). The naval air facility is 12 miles (19 km) from the Mexican border.



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The city of Lemoore is outside the APZ and imaginary surfaces.

LEGEND:

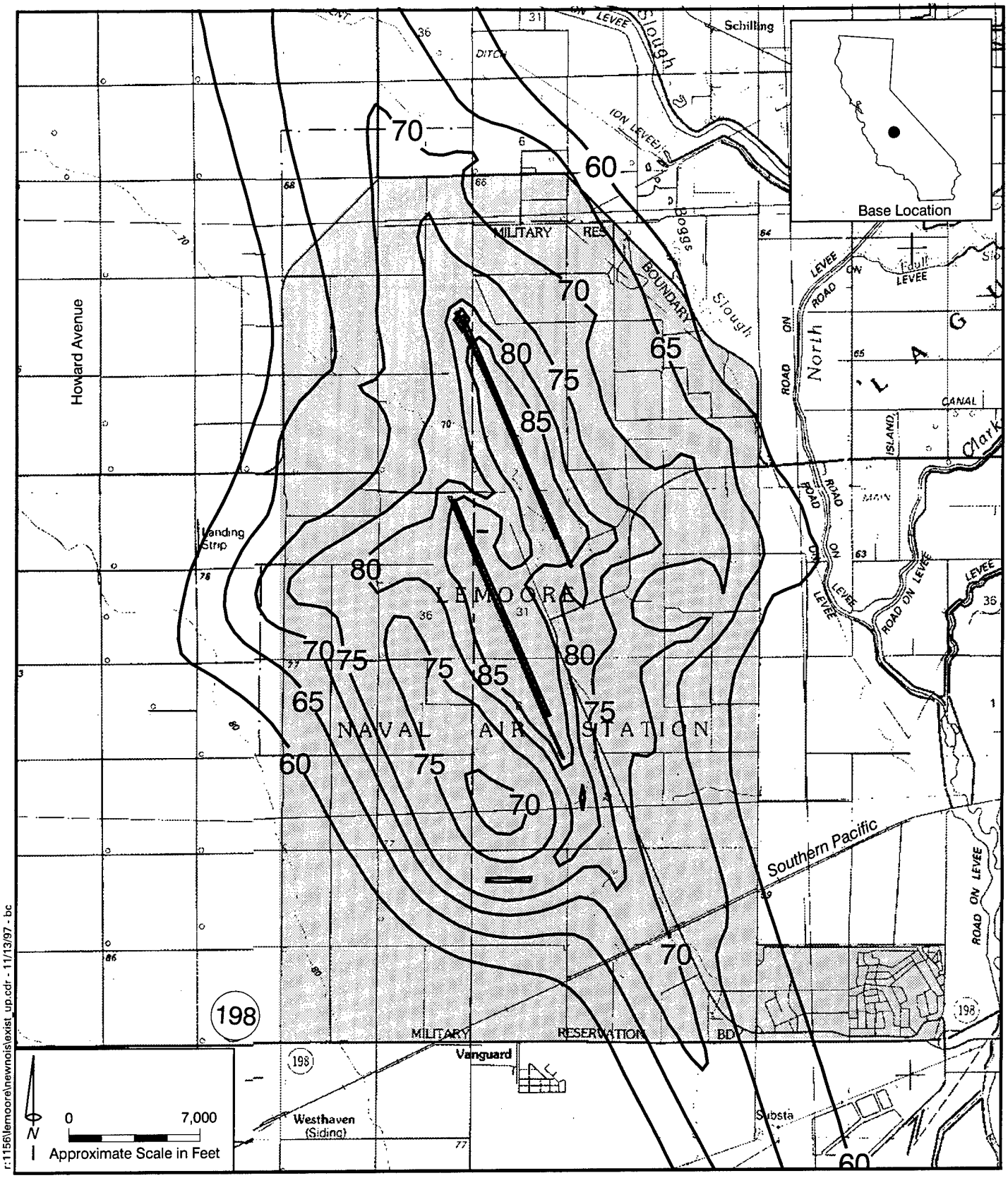
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II
- NAS Lemoore

NAS Lemoore Existing Accident Potential Zones

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: Wyle 1997

Figure 3-6



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The 65-dB CNEL contour extends off base along major approach and departure flight paths.

LEGEND:

— 75 — Community Noise Equivalent Level (CNEL) in decibels (dB)

NAS Lemoore

NAS Lemoore
Existing Noise Contours

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 3-7

Source: Wyle 1997.

Regional Land Uses

NAF El Centro generally is surrounded by unincorporated land in Imperial County. Regional land uses surrounding the base are almost entirely agricultural, as shown on Figure 3-8, and are zoned as general agriculture by Imperial County. Residential units in the vicinity are primarily rural farmhouses, and the closest residential community is the town of Seeley, about 1 mile (1.6 km) to the south. The Imperial County Airport is approximately 5 miles (8 km) east of NAF El Centro.

On-base Land Uses

Training/operations uses make up the major land use area at NAF El Centro. Other developed areas border the training/operations area to the south, while open space is to the west, north, and east. Other land uses supporting aircraft and training activities at the base include on-base housing, medical facilities, maintenance, and public works facilities. Personnel support uses, such as the commissary and gymnasium, along with recreation areas, are close to the housing facilities. A portion of the base is leased under an agricultural outlease program, which allows for growing commercial crops (US Navy 1990a). Existing land uses and the proposed location of F/A-18E/F facilities are shown on Figure 3-9.

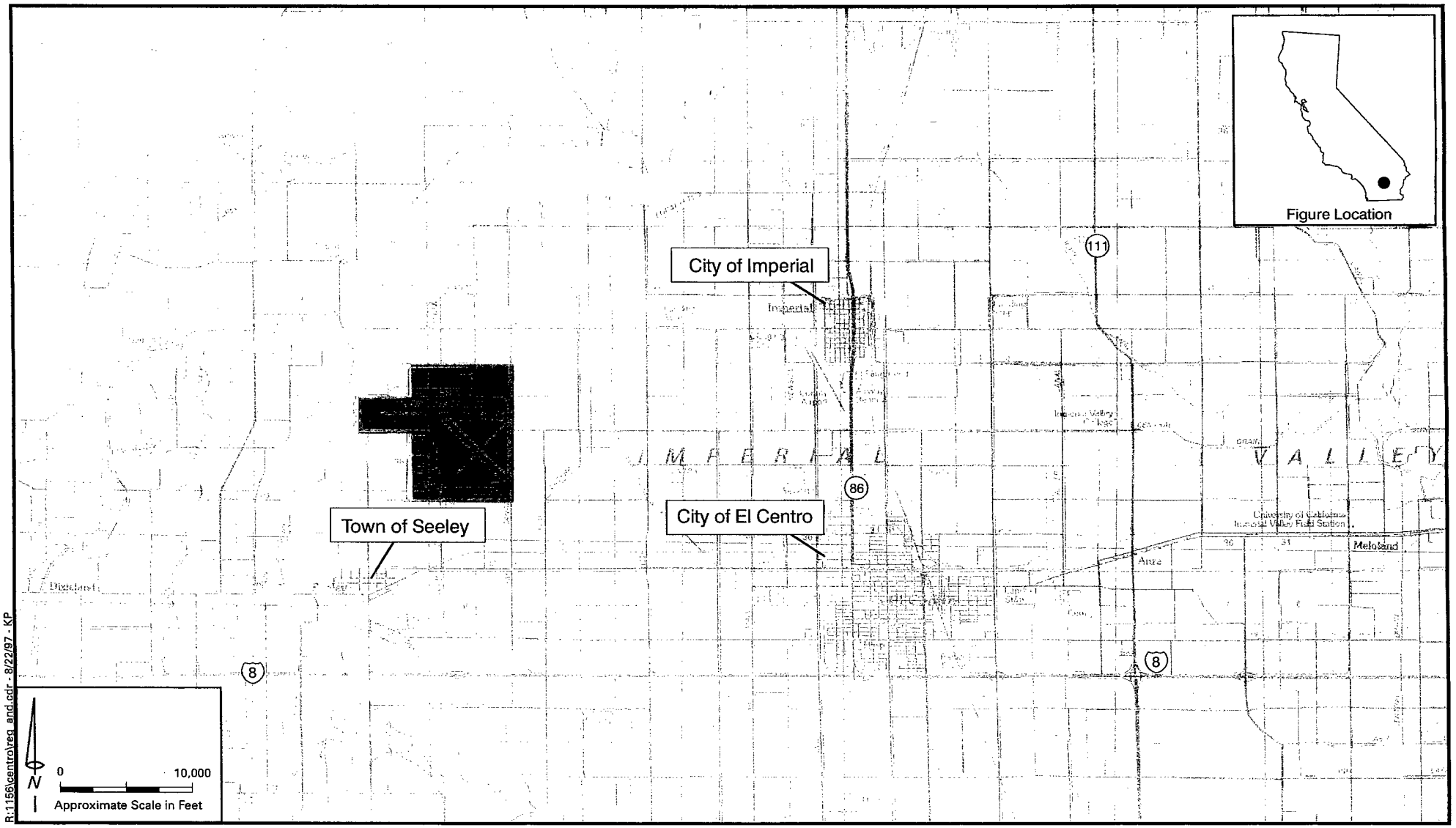
The landing field at NAF El Centro consists of runways 8/26 and 12/30. Runway 8/26 is 9,500 feet (2,896 m) long, and Runway 12/30 is 6,823 feet (2,080 m) long. Runway 8/26 is the primary runway and is used for most takeoffs and landings, and Runway 12/30 is the secondary runway. Helicopters use half of closed runway 3/21 (converted to a helipad), while the CALA uses the other half (Sewester 1997).

Airspace Designations

The NAF El Centro airfield is within the control area boundary of the Los Angeles ARTCC. When restricted airspace, MOAs, or MTRs are in use, the FAA transfers control of this airspace to the military. When not in use, the Los Angeles ARTCC has jurisdiction over flights in the area (US Navy 1990b).

Figure 3-10 shows the airspace environment surrounding NAF El Centro. Nearby restricted areas include R-2510, which is in the Kane MOA, and R-2512, R-2507N, and R-207S, which are in the Abel MOA. Federal airways in the area provide access to San Diego, Los Angeles, and Yuma. There are several MTRs in the airspace above NAF El Centro (US Navy 1990b).

An airport control zone is normally a 5-mile (8-km) radius circle centered on the airport. However, because the airfields at NAF El Centro and Imperial County Airport are 5 miles (8 km) apart, their control zones overlap. A history of cooperation and coordination between the two airports has resulted in well-defined airspace boundaries and control procedures to make the best of the overlapping airport control zones (US Navy 1990b).



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Most land around NAF El Centro is used for agriculture.

LEGEND:

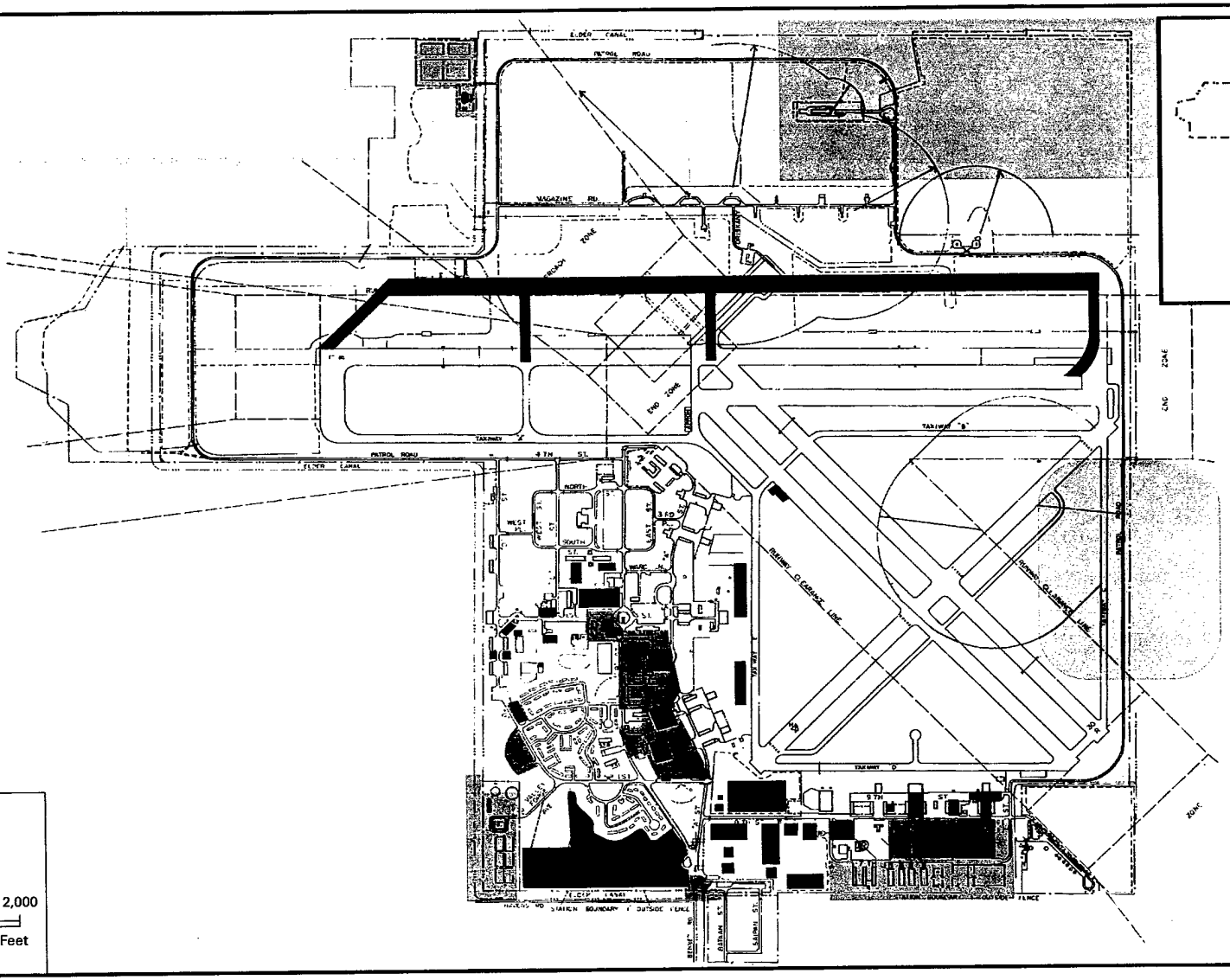
- City/Town
- Military (Navy Property)
- Open Space/Agriculture
- Recreation

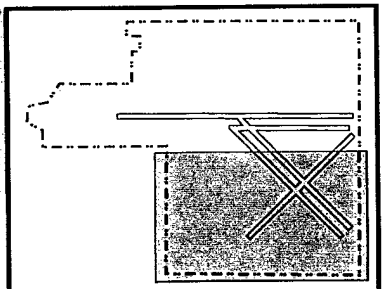
Source: US Navy 1988a.

NAF El Centro Regional Land Uses

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 3-8





Land use areas identified in the Master Plan are indicative of existing land uses.

LEGEND:

- Administration
- BOQ/BEQ/Family Housing
- Maintenance
- Medical
- Open Space/Agriculture
- Ordnance
- Personnel Support
- Public Works
- Recreation
- Supply
- Training/Operations
- Construction/Expansion Projects

Source: US Navy 1990a.

NAF El Centro On-Base Land Uses

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 3-9

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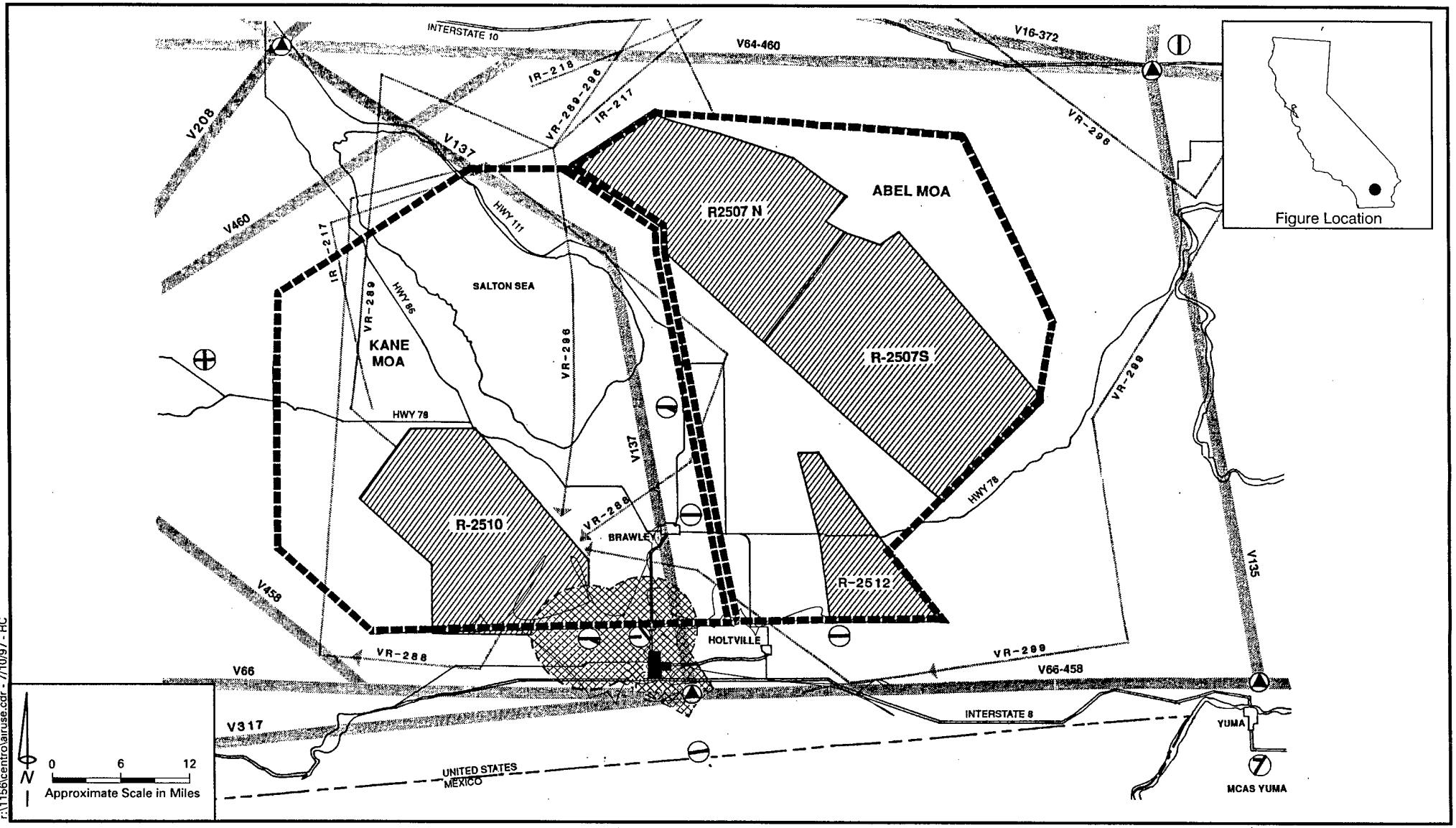

NAF El Centro is located in an airport control zone near areas of restricted airspace.

LEGEND:

- Federal Airway
- Military Training Routes
- Military Operations Area
- Airport Control Zones
- Airport Location (Runway orientation in dark line)
- Radio Aid to Navigation
- Restricted Airspace
- NAF El Centro

NAF El Centro Airspace Use

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1988a; 1990b.

Figure 3-10

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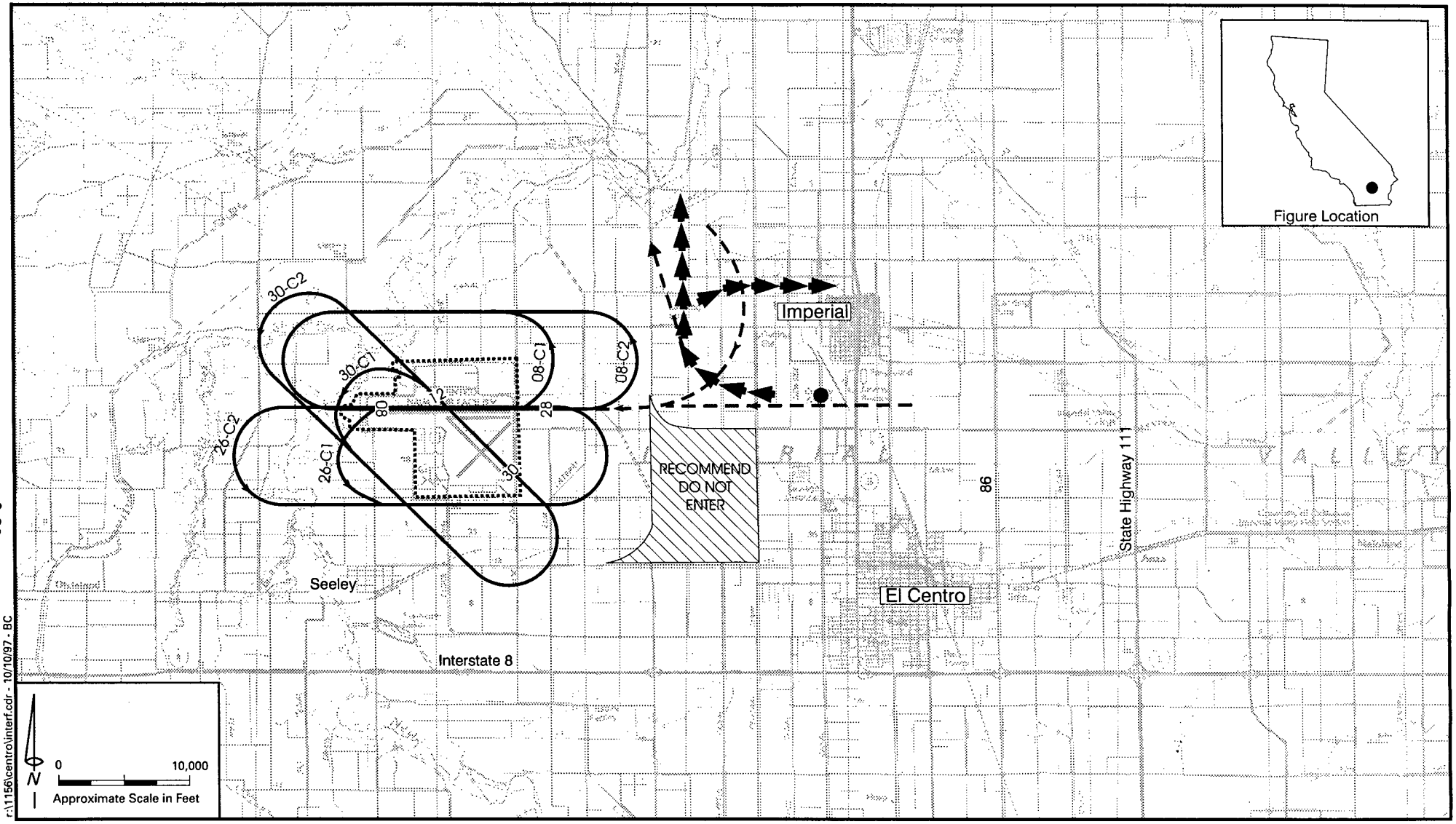
Figure 3-11 shows the airport traffic pattern interface between NAF El Centro and Imperial County Airport. Imperial County Runway 8/26 is on the same alignment as NAF El Centro Runway 8/26. Along with the overlapping control zones, operation of these runways requires special procedures for approaches and departures. An arbitrary low-altitude airport traffic boundary line has been established midway between NAF El Centro and the Imperial County Airport. Pilots of military aircraft who approach NAF El Centro Runway 8/26 from the north must hold their altitude above 3,000 feet (914 m) over the Imperial County Airport and then descend rapidly to 1,500 feet (457 m) to enter the circling approach (US Navy 1990b).

The airport traffic boundary line also requires the Navy to shorten its standard field carrier landing practice (FCLP) pattern at the east approach to Runway 8/26. Normally the FCLP pattern would be lengthened on the runway approach if several aircraft were flying the pattern. Instead, the FCLP pattern is lengthened on the Runway 8/26 departure end to comply with the airport traffic boundary line (US Navy 1990b).

Additionally, civilian aircraft that depart from Imperial County Airport must avoid flying into the NAF El Centro airport control zone. NAF El Centro has agreed to provide advisory service, to the extent possible, for Imperial County Airport traffic. The FAA has recommended the following flight safety procedures at the Imperial County Airport to reduce the risk to aircraft safety:

- Traffic patterns for Runway 26 should be established as right-hand traffic, traffic patterns for Runway 8 should be established as left-hand traffic, and traffic pattern altitude should be established at 800 feet (244 m) for both patterns.
- Departure procedures for Runway 26 should be established restricting all turns to be right turns only after takeoff. All aircraft departing Runway 26 should be required to fly a minimum heading of 310 degrees after takeoff. A traffic pattern indicator should be installed indicating right traffic for runway 26.
- The Imperial County Airport manager should conduct pilot briefings for fixed-base operators and should provide briefing sheets for all pilots using Imperial County Airport. The briefing should explain in detail the procedures to be used for Runway 8/26.
- All special operating procedures should be published in the Airport Facility Directory. Signs should be erected in conspicuous places on Imperial County Airport grounds advising pilots of the location of NAF El Centro and that special procedures are recommended (US Navy 1990b).



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Coordination between NAF El Centro and the Imperial County airport is necessary during flight operations.

LEGEND:

- NAF El Centro Low Altitude Flight Track
- NAF El Centro High Altitude Flight Track
- 26-C1 NAF El Centro Flight Track Number
- Low Altitude Clearance Area
- NAF El Centro Low Altitude Flight Track
- Imperial County Airport Minimum Departure Heading - 310 Degrees
- NAF El Centro Boundary
- Imperial County Airport

Source: US Navy 1988a; 1990b.

NAF El Centro and Imperial County Airport Traffic Interface

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 3-11

Regional APZs, Noise Contours, and Imaginary Surfaces

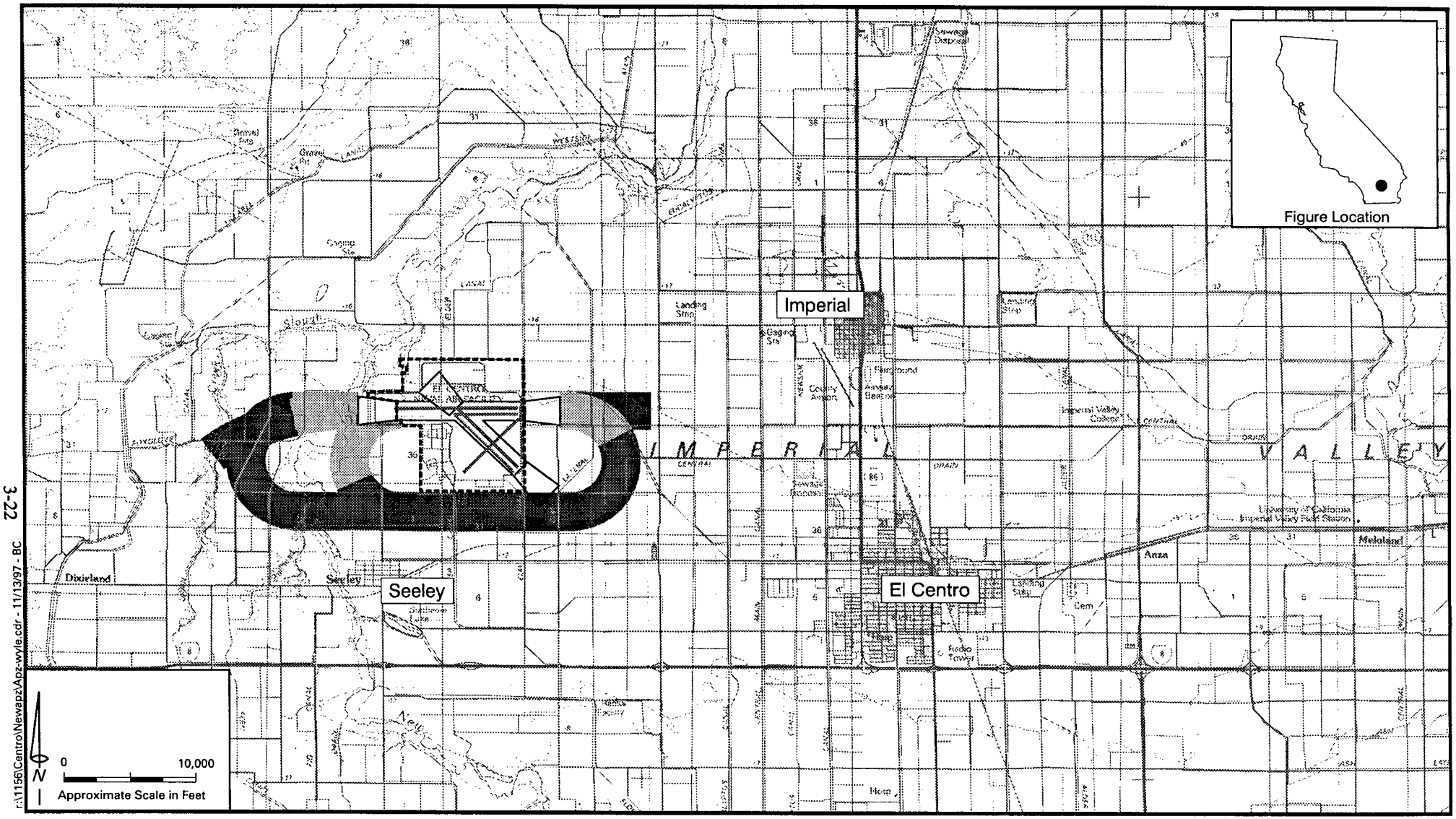
APZ, noise, and imaginary surface restrictions are established in the 1990 El Centro AICUZ. APZ boundaries and imaginary surfaces are shown on Figure 3-12. Figure 3-13 shows noise contours in the vicinity of NAF El Centro. Regional land uses within APZs or high noise levels are predominantly agriculture and recreation, both of which are allowable uses. The town of Seeley and a portion of the city of Imperial are located within the 65-dB CNEL.

Currently, no off-base structures are known to penetrate the imaginary surfaces; however, the Imperial County Airport is under the approach-departure clearance surface, and portions of the cities of Imperial and El Centro are below the approach-departure clearance surface or the outer horizontal imaginary surface. The community of Seeley is below the conical surface (US Navy 1990b).

On-base APZs, Noise Contours, and Imaginary Surfaces

All existing, on-base facilities are outside of established APZs (Figure 3-12). Most of NAF El Centro is within the 80- to 85-dB CNEL noise contour (Figure 3-13). Land uses not compatible with these noise levels include the medical and dental clinic, administration facilities, housing, and personnel support facilities. Because relocating these facilities would be impractical, the NAF El Centro AICUZ recommends insulating the buildings to attenuate noise impacts (US Navy 1990b).

NAF El Centro has imaginary surfaces for helicopters that are different from those associated with planes (Figure 3-14) (US Navy 1988a). Currently no structures, other than those necessary for safe aircraft operation, violate imaginary surface restrictions (US Navy 1990b).



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El Centro and Imperial are outside NAF El Centro's APZ and imaginary surfaces.

LEGEND:

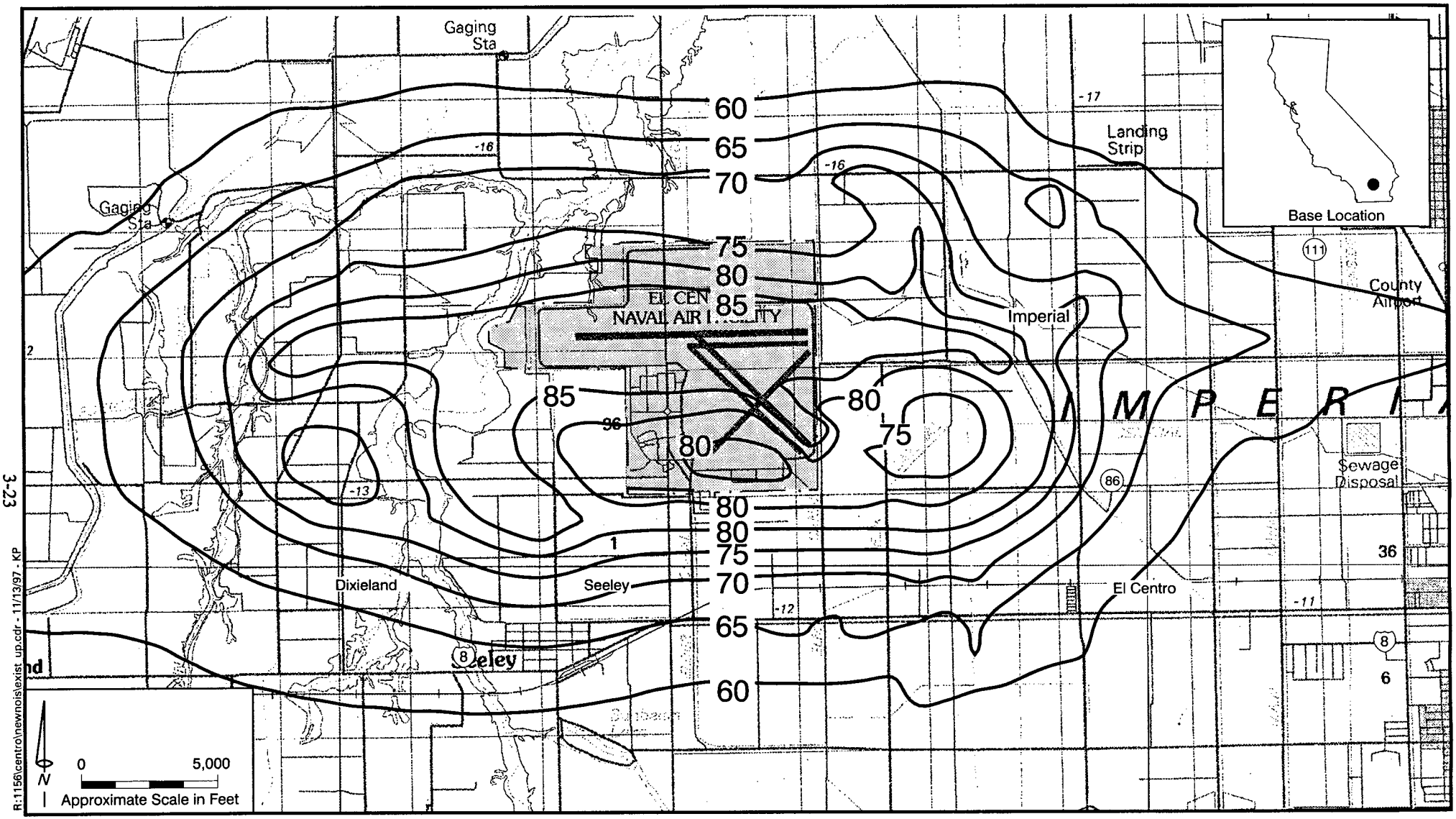
- Clear Zone and Setback
- Accident Potential Zone I
- Accident Potential Zone II
- NAF El Centro Boundary

NAF El Centro
Existing Accident Potential Zones

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: Wyle 1997

Figure 3-12



On-base noise contours are between 80-dB and 85-dB CNEL.

LEGEND:

— 75 — Community Noise Equivalent Level (CNEL) in decibels (dB)

NAF El Centro

NAF El Centro
Existing Noise Contours

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: Wyle 1997

Figure 3-13

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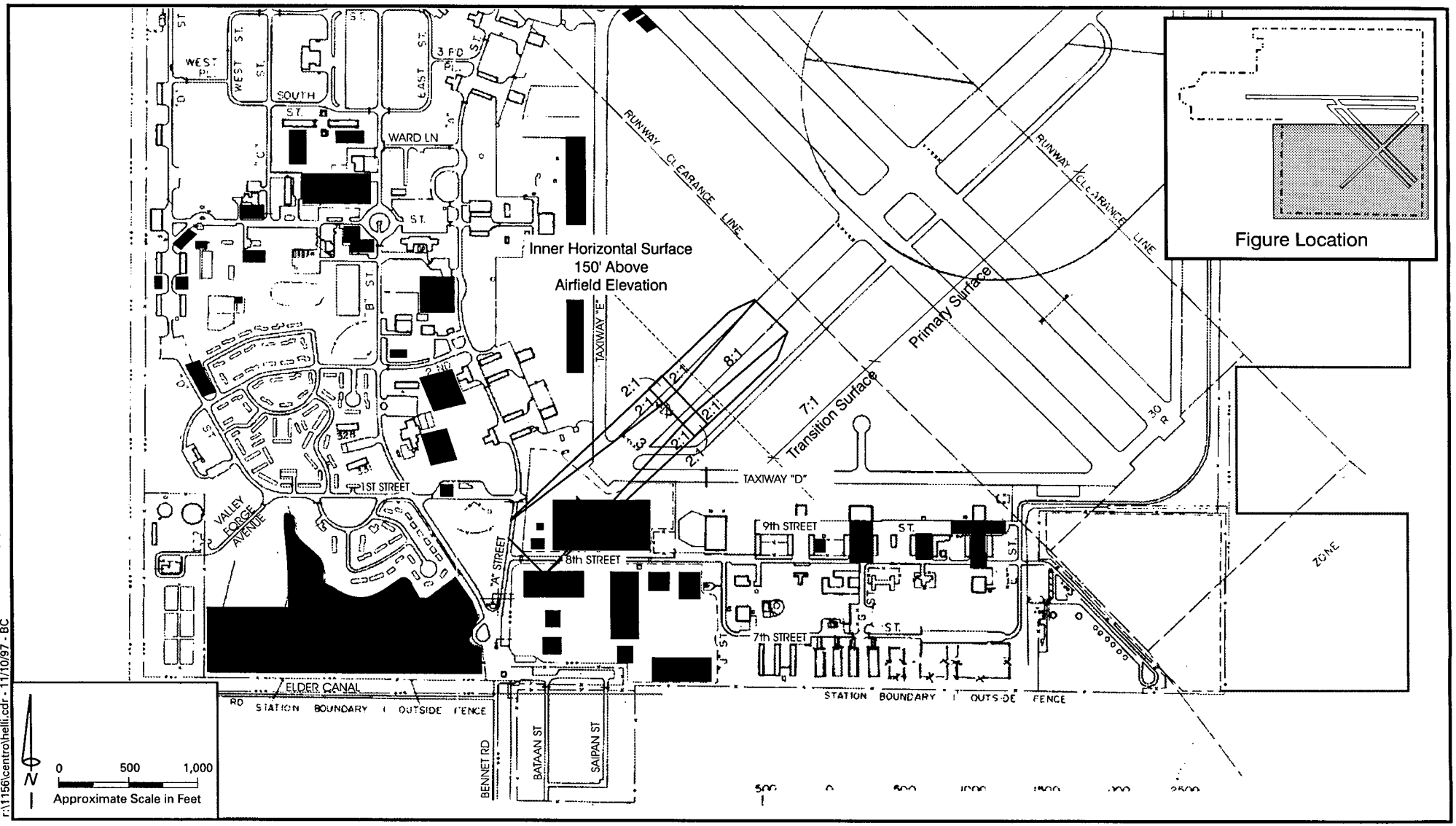

The imaginary helicopter surface occupies an area proposed for future construction.

LEGEND:

Construction/Expansion Projects

NAF El Centro
Imaginary Helicopter Surface

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1990b.

Figure 3-14

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3.2 VISUAL RESOURCES

Definition of Resource

Visual resources are defined as the natural and engineered features that constitute aesthetic qualities and values of an area. These features contribute to the overall impression that an observer receives when viewing an area. Landforms, water surfaces, vegetation, and structures are considered distinctive elements of an area's visual character.

The visual importance or sensitivity associated with the visual resources of an area determines whether a change in character would be considered a significant effect. Visual sensitivity is determined by the overall visual character and quality of an area, the number of viewers with access to the resources, and the duration of the view.

High visual sensitivity areas with high visual quality have views that are rare, unique, or in other ways special, such as in remote or pristine environments or in areas of historic significance with unique architecture. High-sensitivity views would include landscapes that consist of structures, landforms, vegetative patterns, water bodies, or rock formations of unusual or outstanding quality. High visual sensitivity localities also would include natural coastlines, streams, river corridors, designated historic districts, and designated scenic vistas.

Medium visual sensitivity areas with moderate visual quality are more developed than those areas of high sensitivity. Human influence is more apparent in these areas, and the presence of motorized vehicles and other evidence of modern civilization are common. These landscapes generally have built and natural features containing varieties in form, line, color, and texture but tend to be more common than high visual sensitivity areas.

Low visual sensitivity areas with low visual quality tend to have minimal landscape features and common building types, with little change in form, line, color, and texture. Low sensitivity views include typical urban or suburban areas, agricultural and farming areas, industrial or commercial developments, and other areas that do not contain unique or historic resources typical of medium or high visual sensitivity areas.

Observers typically are considered sensitive visual receptors when perceptible changes in visual character contrast and detract from a scenic natural or built landscape. Certain activities tend to heighten viewer awareness of scenic resources, while others tend to distract. For example, people who are camping, picnicking, or driving along a recognized scenic roadway are more likely to notice changes in the surrounding character than commuters traveling at high speeds on an interstate highway.

Regulatory Considerations

The Navy identifies the visual character or quality of each base in base exterior and architecture plans (BEAPs). The BEAPs for the alternative base locations contain design guidelines for all development, replacement, repair, and maintenance projects. The BEAPs recommend architectural guidelines, color palettes, furnishings, signage, and lighting that are consistent with the aesthetic values or themes of the natural and engineered environment.

The visual character of each project site was identified through observations and a review of visual resources documented in the BEAPs and master plans for each alternative base. The BEAP determines local regulatory considerations for each installation.

3.2.1 NAS Lemoore Alternative

Affected Area

The affected area for visual resources includes a generalized viewshed extending from each base to a maximum of 5 miles but is limited in places by terrain and structures.

Regulatory Considerations

Design guidelines in the NAS Lemoore BEAP are implemented for future development on the base. The BEAP recommends implementing a coordinated color scheme for new building exteriors using natural colors that complement the surrounding desert landscape, such as shades of red, brown, and gray, and planting trees to provide an overall sense of order, structure, and direction for the base (US Navy 1989).

Visual Character

The topography at NAS Lemoore is relatively flat with no visual relief. On-base elevations range from a low of 210 feet (64 m) above msl at the southwest corner of the base to 265 feet (81 m) above msl in the northeast/southeast corners. NAS Lemoore is in an agriculturally-dominated region of the San Joaquin Valley and maintains extensive fields in active cultivation. The operations area at NAS Lemoore is separated from the administration and housing complex by nearly 5 miles (8.1 km). The lands between the operations and administration areas are agricultural outleases planted with row crops, particularly cotton. These two areas are visually distinct from one another but are surrounded by similar landscapes. The operations area is industrial in appearance due to the presence of hangar complexes, training facilities, maintenance areas, and other support structures. The southerly administrative area is suburban in character, with landscaped areas, smaller structures, and a variety of recreational amenities and housing facilities. Planted trees serve as windbreaks in landscaped portions of NAS Lemoore. Dominant visual elements include base structures, such as aircraft hangars, the control tower, housing structures, offices, and other buildings.

Existing Views

Short- and long-range views from the base include agriculture and the foothills of the Coastal Range to the west and Sierra Nevada mountains to the north and east. No scenic highways, national parks, or state parks are near the base. The closest public views of on-base functions and structures are from SR-198 along the southern edge of the base. Due to the limited topographic relief, off-base views are restricted to the control tower, taller buildings, and perimeter structures. The base facilities cannot be seen from Interstate 5, which is over 20 miles (32.2 km) west of the base. From the Main Gate, the landscaped entryway, flag circle, and administration buildings are visible. Perimeter landscaping along the highway conceals much of the housing and recreation areas from freeway view.

3.2.2 NAF El Centro Alternative

Affected Area

The affected area for visual resources includes a generalized viewshed extending from each base to a maximum of 5 miles but is limited in places by terrain and structures.

Regulatory Considerations

The BEAP theme at NAF El Centro is "rural desert." The design guidelines recommend color palettes, furnishings, signage, and lighting consistent with the theme established for each on-base district (US Navy 1988b).

Visual Character

The topography at NAF El Centro is flat with no visual relief. Elevations vary from 52 feet (15.8 m) to 42 feet (12.8 m) below msl. The area surrounding the base is under cultivation by farmers to whom the land is leased by NAF El Centro. The agricultural production areas feature low-lying herbaceous growth and regularly spaced open irrigation channels.

Existing Views

Short-range views from the base are of the agriculturally dominated landscape. Long-range views from the base include the eastern slopes of the Peninsular Range to the west, Chocolate Mountains to the northeast, and Mount Signal to the south, near the international border. There are no scenic highways near NAF El Centro. Generally, the operational functions are in the southeastern corner of the base, and family housing is in the southwestern corner. Administrative, recreational, and personnel support facilities are directly north of family housing. The closest point from which public views of on-base functions and structures are available is from the Main Gate on Bennett Drive at the southern edge of the base. From this gate, views are limited to the landscaped entry and perimeter buildings, including hangars and engineering support buildings. The central parachute tower is visible from longer distances because of its height and limited topographic relief.

3.3 SOCIOECONOMICS

This section describes recent socioeconomic trends in the region surrounding the two alternative bases. To ensure data comparability between the two bases, the same sources of data were used when available.

Definition of Resource

Socioeconomics includes data on population, employment, income, housing, business volume, net government revenues, schools, and recreation and community facilities. Population includes the number of residents in the area and the recent change in population growth. Employment data includes labor sectors, labor force, and statistics on unemployment. Income information is provided as an annual total by county and as per capita income. Housing includes numbers of multifamily units, single-family homes, and mobile homes and their vacancy rate. Business volume is defined as local business activity or sales and is the sum of retail and wholesale trade sales, service receipts, and value added by manufacturing. Government revenues are total financing sources. School enrollment and capacity, along with recreation and community facilities, include facilities in the project area that could be affected by the proposed action.

Regulatory Considerations

Schools. California legislation, passed in July 1996, provides schools with incentive funding to reduce class size (thereby increasing the number of classrooms and teachers) in the primary grades. Each participating school must reduce class size to 20 students or less, first in grade one, then in grade two, and then in either kindergarten or grade three, at a school's discretion. By law the program is an ongoing part of participating districts' revenues and is part of a larger effort to improve instruction and student performance (Education Data Partnership 1997). The Improving America's Schools Act of 1994 mandates the US Department of Education to appropriate funds to schools attended by military family members. This funding can be applied for by local school districts on a per-child basis. Once received, these funds can be used at the district's discretion for supplementing operating costs or facilitating construction projects.

Under Section 8003 of this Act school districts receive funding for students whose parents work and live on federal property and for students whose parents are in the uniformed service and live off station. School districts, however, may not receive funding or the funding may be at a reduced amount for civilian students whose parents work at federal facilities but who reside off station. The exact funding amounts and subsequent impacts of the new legislation are uncertain.

Section 8006 of the Act allows additional federal funding for schools that experience a sudden and substantial increase in attendance of military family members. A school district can qualify for this funding if the number of incoming military children is at least 10 percent or 100 more than the number of children in average daily attendance of the preceding school year.

Some school districts also receive Department of Defense (DOD) funding under Title II of Public Law 102-368 and Section 386 of Public Law 102-484 (DOD Authorization Bill). For a school district to receive this funding, its enrollment must be 30 percent military family members. The Department of Education supplies federal funds to the school board based on the number of students whose parents work and live on federal property (US Navy 1994d).

3.3.1 NAS Lemoore Alternative

Affected Area

The affected area for NAS Lemoore includes Kings and Fresno counties. The affected area was selected based on the assumption that most base personnel commute to work from and spend dollars in one or both of the two counties.

Kings County is surrounded by Fresno County to the north and west, Tulare County to the east, Kern County to the south, and Monterey County to the west. Four incorporated cities, Avenal, Corocoran, Hanford (the county seat), and Lemoore, are in Kings County (Crown Economic Development Corporation 1997).

Fresno County is surrounded by Kings County and Tulare County to the south, Madera County, Mono County, and Merced County to the north, San Benito County and Monterey County to the west, and Inyo County to the east. The 12 incorporated cities in Fresno County are Clovis, Coalinga, Firebaugh, Fowler, Fresno (the county seat), Huron, Kerman, Kingsburg, Mendota, Reedley, Sanger, and Selma (Fresno County 1997).

Population

The population in the affected area totaled approximately 839,800 in 1994, representing an increase of 8.5 percent from the 1990 population (Table 3-1). Each county had similar population growth rates—Kings County was 8.2 percent and Fresno County was 8.6 percent. In 1994, the population density was 79 persons per square mile (205 persons per km^2) in Kings County and 122 per square mile (316 persons per km^2) in Fresno County.

Table 3-1
Population (1,000s), Kings and Fresno Counties

	Kings County	Fresno County	Total
1990	101.8	671.9	773.7
1992	106.8	706.0	812.8
1994	110.1	729.7	839.8
Change 1990 to 1994 (percent)	8.2	8.6	8.5

Sources: US Bureau of Economic Analysis 1996a, 1996b, 1996e, 1996f.

Employment

Between 1990 and 1994 total employment in Kings and Fresno counties increased by 4.8 percent (Table 3-2). The greatest increase at 30.9 percent was in the agricultural services sector; however, this was offset by decreases in mining (22.5 percent) and construction (10.5 percent). Military employment decreased 4.5 percent in Kings and Fresno counties from 1990 to 1994.

Table 3-2
Sector Employment, Kings and Fresno Counties

Sector	1990	1992	1994	Percent Change 1990 to 1994
Farm	35,565	32,108	34,358	-3.4
Nonfarm	351,329	355,833	371,146	5.6
Private	284,169	288,360	300,240	5.7
Agricultural Services	28,766	28,891	37,655	30.9
Mining	901	930	698	-22.5
Construction	20,454	18,285	18,311	-10.5
Manufacturing	31,156	29,500	30,428	-2.3
Transportation and Public Utilities	15,529	15,662	15,500	-0.2
Wholesale Trade	17,261	17,414	16,932	-1.9
Retail Trade	61,835	60,931	63,072	2.0
Finance, Insurance, and Real Estate	24,317	24,656	24,195	-0.5
Services	83,950	92,091	93,449	11.3
Government and Government Enterprises	67,160	67,473	70,906	5.6
Federal, Civilian	12,105	12,149	12,149	0.4
Military	7,039	6,895	6,720	-4.5
State and Local	48,016	48,429	52,037	8.4
Total	*386,894*	*387,941*	*405,504*	*4.8*

Sources: US Bureau of Economic Analysis 1996c, 1996d, 1996g, 1996h.

In 1994, the civilian labor force for Kings County totaled 42,056; 5,741 people were unemployed (Table 3-3). The unemployment rate was 13.7 percent for 1994, up 3.5 percent from 1990. In Fresno County, the civilian labor force equaled 366,223 in 1994, and 49,670 persons were unemployed (13.6 percent unemployment rate). The combined unemployment rate for the affected area was 13.6 percent.

The major employers in Kings County are Kings County schools, Corcoran State Prison, and Kings County. NAS Lemoore is the eighth-largest employer in the county (Crown Economic Development Corporation 1997). Major employers in Fresno County are Fresno County, NAS Lemoore, and Fresno Unified School District (The Business Journal 1997).

Table 3-3
Labor Force and Unemployment, Kings and Fresno Counties

	Labor Force	Unemployed	Unemployment Rate (percent)
Kings County			
1990	38,176	3,882	10.2
1992	39,408	5,904	15.0
1994	42,056	5,741	13.7
Fresno County			
1990	330,999	34,447	10.4
1992	355,324	51,948	14.6
1994	366,223	49,670	13.6
Total			
1990	369,175	38,329	10.4
1992	394,732	57,852	14.7
1994	408,279	55,411	13.6

Sources: US Bureau of Labor Statistics 1996a, 1996b.

The four main sources of civilian employment at NAS Lemoore are federal civil service positions, nonfederal civil service positions, contractors and subcontractors, and McDonalds Restaurant. Approximately 780 people are employed in federal civil service at the base. Nonfederal civil service (nonappropriated funds) includes the Navy Exchange and the Department of Morale, Welfare, and Recreation. The Navy Exchange employs roughly 176 personnel, and the Department of Morale, Welfare, and Recreation employs about 136. The base McDonalds presently employs approximately 40 people. NAS Lemoore supports a workforce of 4,518 military and 1,691 civilian personnel for a total workforce of 6,209.

Income

In 1994, the per capita personal income for the affected area was $16,918, an increase of 7.7 percent over the 1990 income. In Kings County the average per capita income was $13,622 in 1994. In Fresno County, the per capita personal income was $17,406 in 1994. The average income for military personnel is $37,230, while civilian personnel at NAS Lemoore receive an average of $30,861. Table 3-4 lists the income in the affected area.

Housing

The affected area had 270,713 housing units in 1994 (Table 3-5). There were 32,966 units in Kings County, and 237,747 units in Fresno County. In each county, the composition of housing units is roughly 73 percent single-family units, 21 percent multi family units, and 5 percent mobile homes. Kings County has a slightly lower percentage of multifamily units and a higher percentage of mobile homes. The vacancy rate ranges between 4.9 percent in Fresno County and 6.1 percent in Kings County, for a combined vacancy rate of 5.1 percent in 1994.

Table 3-4
Income by Place of Residence, Kings and Fresno Counties

	Total Personal Income ($1,000s)	Per Capita Income
Kings County		
1990	$1,286,215	$12,631
1992	$1,408,748	$13,186
1994	$1,499,612	$13,622
Fresno County		
1990	$10,864,187	$16,170
1992	$11,898,823	$16,855
1994	$12,701,465	$17,406
Total		
1990	$12,150,402	$15,704
1992	$13,168,980	$16,198
1994	$14,201,077	$16,918

Sources: US Bureau of Economic Analysis 1996a, 1996b, 1996e, 1996f.

Table 3-5
Housing Stock and Vacancy Rates, Kings and Fresno Counties

	Single-family Units	Multifamily Units	Mobile Homes	Total Housing Units	Vacant	Percent Vacant
Kings County						
1990	22,506	6,314	2,023	30,843	1,761	5.7
1992	23,300	6,437	2,110	31,847	1,818	5.7
1994	24,277	6,495	2,194	32,966	2,016	6.1
Fresno County						
1990	167,412	48,865	12,201	228,478	11,180	4.9
1992	170,583	50,873	12,220	233,676	11,430	4.9
1994	173,263	52,237	12,247	237,747	11,764	4.9
Total						
1990	189,918	55,179	14,224	259,321	12,941	5.0
1992	193,883	57,310	14,330	265,523	13,248	5.0
1994	197,540	58,732	14,441	270,713	13,780	5.1

Source: California Department of Finance 1990.

Housing at NAS Lemoore is available to all pay grades. There are 1,589 family housing units, consisting of 90 officer and 1,499 enlisted units. The waiting list varies depending on the size of the family and pay grade. Certain areas of housing are being renovated, and plans are being finalized to build new houses. The bachelor enlisted quarters (BEQ) has 3,057 beds, and bachelor officer quarters (BOQ) has 165 rooms (SITES 1997).

Business Volume

Business volume is defined as local business activity or sales and is the sum of retail and wholesale trade sales, service receipts, and value added by manufacturing. Business volume in Kings and Fresno Counties (Table 3-6) has risen from almost $7 million in 1990 to a little over $8 million in 1994.

Table 3-6
Business Volume ($1,000s), Kings and Fresno Counties

Sector	1990	1992	1994
Manufacturing	$853,059	$852,705	$937,603
Transportation and Public Utilities	$505,107	$557,771	$576,243
Wholesale Trade	$518,452	$556,483	$562,149
Retail Trade	$1,019,866	$983,333	$1,073,880
Finance, Insurance, and Real Estate	$380,532	$481,599	$491,374
Services	$1,785,265	$2,090,256	$2,287,695
Government and Government Enterprises	$1,769,542	$1,991,525	$2,179,121
Total	**$6,831,823**	**$7,513,672**	**$8,108,065**

Sources: US Bureau of Economic Analysis 1996a, 1996b, 1996e, 1996f.

Net Government Revenues

Net government revenues are total financing sources and transfers in (less total financing uses) and transfers out. Net government revenues in Kings County (Table 3-7) have fluctuated through the past few years from a low of approximately negative $1,412,000 to a high of $1,532,000. In Fresno County, the highs and lows have been sharper—a low of negative $5,845,000 to a high of $14,973,758 in fiscal year 1990/1991.

Table 3-7
Net Government Revenues, Kings and Fresno Counties

	Fiscal Years		
	1990/1991	1992/1993	1994/1995
Kings County			
Sources	$84,955,639	$90,926,174	$98,213,648
Uses	$86,367,957	$89,394,025	$98,440,899
Net Revenues	($1,412,318)	$1,532,149	($227,251)
Fresno County			
Sources	$610,450,607	$676,938,979	$734,626,849
Uses	$595,476,849	$682,784,235	$732,131,119
Net Revenues	$14,973,758	($5,845,256)	$2,495,730

Sources: California State Controller 1993, 1995, 1997.

Schools

Kings County has 14 school districts, and Fresno County has 35 school districts (California County Office of Education 1996a, 1996b). The six school districts near NAS Lemoore are: Lemoore are grouped into Lemoore Union School District, Lemoore Union Elementary School District, Hanford Joint Union High School District, Hanford Elementary School District, Central Union School District, and Island Union School District.

Lemoore Union High School District consists of Lemoore High School and Lemoore Continuation School. High school age children residing on-base are bused to Lemoore High School (SITES 1997). The current enrollment is

approximately 1,700 students, which is near the maximum capacity. There is a project planned to increase the district capacity, but currently there is no funding for the proposed project (Mayer 1997).

Lemoore Union Elementary School District has 2,815 students enrolled in classes. Several portable classrooms have been added to each school site. Students from on and off the base attend schools within the district (Richwine 1997).

Hanford Joint Union High School District consists of one school with two campuses within the city of Hanford. Currently, the enrollment is approximately 2,700 students, which is 200 students over the maximum capacity. No expansion plans are in process because a recent bond measure that would have provided the district with funds to increase the number of classrooms did not pass. However, the district is considering a bond issue to be placed before the public in March 1998. This bond would allow for expanding the campus (Martinez 1997).

Hanford Elementary School District is made up of seven elementary schools (grades K-6) and two junior high schools (grades 7-8), with 4,960 students enrolled in the fall of the 1996-97 school year. The district is leasing an additional 18 portable classrooms for the 1997-98 school year (Simas 1997).

Central Union School District consists of four elementary schools, including the two schools on the base, and two smaller schools in rural areas. Currently, the two schools on-base have 1,926 students, but they have had as many as 2,600 students. The maximum student population is estimated at approximately 3,000 students. There are no plans for expansion at this time. Occasionally, children who live off the base may attend one of the schools on the base (Akers or Neutra Elementary Schools) via an interdistrict transfer. Elementary school children living off the base, however, usually attend schools in the Lemoore Union Elementary School District (Boogard 1997).

Recreational and Community Facilities

NAS Lemoore's craft center provides recreational services for all personnel. The craft center has a discount ticket center for attractions in California, and houses an outdoor adventure center where outdoor equipment can be rented and assistance in planning weekend trips to go skiing, white water rafting, and hiking is provided.

NAS Lemoore has a variety of recreation activities available to personnel. Outdoor facilities include a running track, football and baseball fields, tennis and basketball courts, a miniature golf course, and picnic areas. Indoor facilities include a gym, bowling alley, volleyball court, swimming pool, and weight room. There are various wildlife and recreation areas nearby, including the federal and state parks in the Sierra Nevada mountains, and the coastal open space parks along the Pacific Coast. Most off-base opportunities are within a two-hour drive from the base (US Navy 1994d).

Religious services are provided by the NAS Lemoore Chaplain's Office and include Catholic masses and Protestant services. Many other denominations provide services in the surrounding communities, including a Jewish Temple in Visalia.

3.3.2 NAF El Centro Alternative

Affected Area

The affected area for NAF El Centro is Imperial County. The affected area was selected based on the assumption that most base personnel commute to work from and spend dollars in Imperial County. Imperial County is bounded by Riverside County to the north, San Diego County to the west, Mexico to the south, and Arizona to the east. The seven incorporated cities in Imperial County are Brawley, Calexico, Calipatria, El Centro (the county seat), Holtville, Imperial, and Westmoreland (Valley of Imperial Development Alliance 1994).

Population

The population in Imperial County totaled approximately 137,100 persons in 1994, which represents a 23.5 percent increase over the 1990 population (Table 3-8). Population density in 1994 was approximately 39 people per square mile (101 people per km^2).

Table 3-8
Population, Imperial County

	Population (1,000s)	Percent Change from 1990
1990	111.0	0.0
1992	128.7	15.9
1994	137.1	23.5

Sources: US Bureau of Economic Analysis 1996i, 1996j.

Employment

Employment by sector for Imperial County is detailed in Table 3-9. Substantial percentage changes from 1990 to 1994 occurred throughout the sectors, illustrating an economy in flux. Decreases included mining (34.9 percent), agricultural services (13.3 percent), and wholesale trade (13.1 percent). Increases included state and local government (29.7 percent), transportation and public utilities (28.5 percent), manufacturing (27.7 percent), retail trade (22.1 percent), finance, insurance, and real estate (11.4 percent), and services (10.6 percent). Military sector employment increased by 1.1 percent.

Table 3-9
Sectors Employment, Imperial County

Sectors	1990	1992	1994	Percent Change 1990 to 1994
Farm	5,038	4,293	4,978	-1.2
Nonfarm	47,858	48,369	52,373	9.4
Private	37,758	36,883	39,677	5.1
Agricultural Services	10,269	7,648	8,904	-13.3
Mining	748	741	487	-34.9
Construction	2,101	2,051	2,037	-3.0
Manufacturing	1,616	1,687	2,064	27.7
Transportation and Public Utilities	1,826	2,032	2,347	28.5
Wholesale Trade	2,424	2,274	2,107	-13.1
Retail Trade	8,296	9,342	10,132	22.1
Finance, Insurance, and Real Estate	1,806	1,836	2,011	11.4
Services	8,672	9,272	9,588	10.6
Government and Government Enterprises	10,100	11,486	12,696	25.7
Federal, Civilian	1,143	1,208	1,241	8.6
Military	567	618	573	1.1
State and Local	8,390	9,660	10,882	29.7
Total	**52,896**	**52,662**	**57,351**	**8.4**

Source: US Bureau of Economic Analysis 1996k, 1996l.

The total civilian labor force in 1994 for Imperial County was 57,467 (Table 3-10). There is a 24.9 percent unemployment rate in this affected area. According to the US Bureau of the Census (1994), Imperial County has the tenth highest unemployment rate in the nation and is the only California county that appears on the national list of the top 25 counties with the highest unemployment rate.

Table 3-10
Labor Force and Unemployment, Imperial County

	Labor Force	Unemployed	Unemployment Rate (percent)
1990	48,026	10,228	21.3
1992	54,220	15,313	28.2
1994	57,467	14,317	24.9

Source: US Bureau of Labor Statistics 1996c.

Sources for civilian employment at NAF El Centro include federal civil service positions, nonfederal civil service positions, and contractors and subcontractors.

The base is staffed with a permanent workforce of approximately 863 people (343 military and 520 civilian personnel). Top Imperial County employers in descending order include the Centinela State Prison, County of Imperial, Imperial Irrigation District, and NAF El Centro (Valley of Imperial Development Alliance 1994).

Income

In 1994 the per capita income for Imperial County was $14,302 (Table 3-11). Although between 1990 and 1994, total personal income in the county increased by 15.7 percent, the population change was such that per capita income actually decreased 6.2 percent. This decrease may be a result of competition for limited jobs and resulting lower wages.

Table 3-11
Income by Place of Residence, Imperial County

	Total Personal Income ($1,000s)	Per Capita Income
1990	$1,693,858	$15,255
1992	$1,800,184	$13,986
1994	$1,960,178	$14,302

Sources: US Bureau of Economic Analysis 1996i, 1996j.

Housing

There were 40,323 housing units in Imperial County in 1994, 3,982 of which were vacant, constituting a 9.9 percent vacancy rate (Table 3-12). Over half the housing units are single-family, approximately one quarter are multifamily units, and the rest are mobile homes.

Table 3-12
Housing Stock and Vacancy Rate, Imperial County

	1990	1992	1994
Single Units	21,749	22,627	24,011
Multifamily Units	7,987	8,799	9,121
Mobile Homes	6,823	7,131	7,191
Total Housing Units	36,559	38,557	40,323
Vacant	3,717	3,882	3,982
Percent Vacant	10.2	10.1	9.9

Source: California Department of Finance 1990.

The family housing area at NAF El Centro contains 172 single-family houses of which 170 are used for family housing and two are used for a child development center. There are 24 officers units and 146 enlisted units. Approximately 10 housing units are vacant throughout the year. BOQ and BEQ units are in separate complexes dispersed throughout the southern portion of the base. Transient

BOQs are housed in three units. Transient BEQs are housed in five units, and permanent BEQs are in three units. Most of the quarters are wood-frame structures (US Navy 1988a; Scott 1997).

Business Volume

Business volume is defined as local business activity or sales and is the sum of retail and wholesale trade sales, service receipts, and value added by manufacturing. Business volume in Imperial County dipped slightly in 1992 but has remained at approximately $1 million (Table 3-13).

Table 3-13
Business Volume ($1,000s), Imperial County

Sector	1990	1992	1994
Manufacturing	$35,602	$41,788	$55,054
Transportation and Public Utilities	$52,547	$66,640	$84,303
Wholesale Trade	$60,006	$64,839	$66,161
Retail Trade	$126,907	$147,623	$170,152
Finance, Insurance, and Real Estate	$380,532	$18,972	$31,040
Services	$172,435	$200,719	$215,164
Government and Government Enterprises	$282,107	$365,847	$422,873
Total	**$1,110,136**	**$906,428**	**$1,044,747**

Sources: US Bureau of Economic Analysis 1996i, 1996j.

Net Government Revenues

Net government revenues are total financing sources, transfers in (less total financing uses), and transfers out. Net government revenues in Imperial County have shifted from a low of approximately negative $344,000 to a high of $4,495,000 (Table 3-14).

Table 3-14
Net Government Revenues, Imperial County

	Fiscal Years		
	1990/1991	1992/1993	1994/1995
Sources	$102,090,654	$113,881,660	$124,124,779
Uses	$99,152,211	$109,386,268	$124,468,581
Net Revenues	$2,938,443	$4,495,392	($343,802)

Sources: California State Controller 1993, 1995, 1997.

Schools

Imperial County is served by 16 school districts, consisting of nine grades K-8, two grades 9-12, and five grades K-12 school districts (California County Offices of Education 1996b). The school districts serving NAF El Centro are Seeley Union

School District, Central Union High School District, and El Centro School District.

Seeley Union School District is composed of one K-8 school, Seeley Elementary School, which is located approximately 1.5 miles from the southern boundary of the base. All children living on the base attend this school unless parents request a move to another district. Current enrollment is 480 students with a maximum of 620. Expansion plans for the district include portable classrooms, which are on order (Anderson 1997).

Central Union High School District is made up of two comprehensive high schools and one alternative high school. Current enrollment is 3,411 students, which is below capacity. The district recently opened the second high school in February 1996, and there are no plans to expand (Preciado 1997).

El Centro Elementary School District is composed of 10 schools providing grades K-8 education. Lincoln Elementary School is located approximately 5 miles from the western border of the base. At present, there are 6,469 students enrolled in the district, which could accommodate up to 6,600 students. A new school was completed in August 1996, and one school will be expanded in the future. No students attending the El Centro School district reside at NAF El Centro (Taylor 1997).

Recreational and Community Facilities

Outdoor recreation areas at NAF El Centro include two tennis courts, two pools, a skeet range, a baseball diamond, a softball field, a football field, shuffleboard courts, handball/racquetball courts, a picnic area, and some grass play areas near the baseball field. Indoor recreation areas include a bowling alley, hobby/arts and crafts shop, auto hobby shop, youth center, theater building, enlisted club, officers club, racquetball court, weight room, and aerobics facility. The aerobics area and gymnasium recently were expanded and modernized (Sewester 1997a).

Recreation areas surrounding NAF El Centro include mountains and desert parks in San Diego County, sand dunes to the north and east, the Colorado River in Yuma, Arizona, and Mexico to the south. All areas are easily accessible, and transportation can be provided by the base (Sewester 1997). NAF El Centro also has a full-time chaplain on base.

3.4 CULTURAL RESOURCES

Definition of Resource

Cultural resources include prehistoric resources, traditional cultural properties, and historic resources. Prehistoric resources are physical properties resulting from human activities that predate written records and that are generally identified as isolated finds or sites. Prehistoric resources can include village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials.

Traditional cultural properties are sites, locations, or features that are eligible for inclusion in the National Register of Historic Places (NRHP) because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. Examples include:

- A location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world;
- A neighborhood that is the traditional home of a particular cultural group and that reflects its beliefs and practices;
- A location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice; and
- A location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historical identity (Parker and King 1992).

Historic resources consist of physical properties, structures, or built items resulting from human activities that post-date written record. Historic resources can include archeological remains and architectural structures. Historic archeological site types include townsites, homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with early military use of the land. Historic architectural resources can include houses, cabins, barns, lighthouses, local structures, such as churches, post offices, and meeting halls, and early military structures, such as hangars, administration buildings, barracks, officers' quarters, warehouses, and guardhouses.

Additional cultural resources may include some properties that are less than 50 years old that may be listed on the NRHP if they are of exceptional importance in our nation's history, or if they are integral parts of districts that are eligible for the NRHP. On Department of Defense (DOD) facilities, these resources typically include properties associated with World War II or the Cold War.

Regulatory Considerations

Cultural resources are protected primarily through the National Historic Preservation Act (NHPA) of 1966, the Archeological and Historic Preservation Act of 1974, the Archeological Resources Protection Act of 1979, and their implementing regulations, Protection of Historic Properties (36 CFR 800). Section 106 of the NHPA (16 USC 470), as amended (PL 89-515), and its implementing regulations (36 CFR Part 800.9 [a] and [b]), require federal agencies to consider the effects of their actions on properties listed, or eligible for listing, in the NRHP. Criteria for inclusion in the NRHP (36 CFR § 60.4) are as follows:

- Association with events that have made a significant contribution to the broad patterns of our history;
- Association with the lives of persons significant to our past;
- Resources that embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master or that possess high artistic values or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Resources that have yielded or may be likely to yield information important in prehistory or history.

In addition to historic significance, a property must have integrity to be eligible for the NRHP. Integrity is the property's ability to convey its demonstrated historical significance. Seven individual elements compose integrity—location, design, setting, materials, workmanship, feeling, and association.

Area of Potential Effect

To assess the effects of an undertaking on cultural resources, the area of potential effect (APE) must be defined. The regulations define the APE as the geographic area within which the undertaking may cause changes in the character or use of historic properties, if any such properties exist (36 CFR 800.2[c]). It is important that the APE include the full range of possible impacts, both those that will be direct results of the project and those that could be indirect consequences.

3.4.1 NAS Lemoore Alternative

Affected Area

The affected area for cultural resources includes the entire facility. The APE is limited to those areas where construction and building modification would occur as a result of basing the F/A-18E/F aircraft and personnel at NAS Lemoore. Prehistoric, ethnohistoric, and historic background discussions for NAS Lemoore are provided in Appendix C.

Cultural Resources Studies

Literature Review. Two record searches recently have been conducted at the Southern San Joaquin Valley Information Center. The first was conducted in 1993 in support of the EIS for the base realignment of NAS Lemoore. The second was conducted in 1997 in support of a cultural resources inventory of 88 acres (36 ha) at NAS Lemoore. Resources examined consisted of archeological site records, inventory and excavation reports, and properties listed on NRHP, California Historical Landmarks, California Inventory of Historic Resources, and California Points of Historical Interest (Gallegos and Associates 1997, Uribe and Associates 1994).

Previous Studies. Five archeological surveys, composed of 430 acres (174 ha), have been conducted on NAS Lemoore (Office of Environmental Quality 1983; Sutton 1989; Yohe 1991; Woodward-Clyde 1993; Gallegos and Associates 1997). In addition, a historic and archeological resources protection plan has been prepared for NAS Lemoore (Milliken and Mikesell 1997). This document describes high-sensitivity and low-sensitivity zones on NAS Lemoore for cultural resources. The station has four high-sensitivity zones, totaling 760 acres (308 ha), for surface archeological sites. The remaining 17,611 acres (7,132 ha) of the installation are considered a low-sensitivity zone for surface sites (Milliken and Mikesell 1997). Three of the sites for proposed F/A-18E/F facilities have been surveyed for cultural resources and the remaining areas are located within the low-sensitivity zone for surface archeological sites.

Known Resources

Prehistoric Sites. Sixteen prehistoric sites have been recorded within a 5-mile (8-km) radius of the APE and include lithic concentrations, habitation/occupation sites, and human burials. However, no prehistoric sites have been recorded within NAS Lemoore (US Navy 1994d). The majority of NAS Lemoore, 17,611 acres (7,132 ha) of the total 18,371-acre (7,440 ha) installation, has been identified as a low-sensitivity zone for surface prehistoric archeological sites. The entire NAS Lemoore APE falls within this low-sensitivity zone where prehistoric archeological sites are not likely to exist.

Traditional Cultural Properties. In 1994, in an attempt to identify Native American traditional cultural properties on NAS Lemoore, the Navy contacted all Native American groups with historical ties to the San Joaquin Valley, as identified by the California Native American Heritage Commission. The contacted groups included the Tule River Indian Tribe, Santa Rosa Indian Community, Central Valley and Mountain Reinterment Association, Big Sandy Rancheria of Mono Indians, Cold Springs Rancheria of Mono Indians, and the Table Mountain Rancheria. These groups were provided an opportunity to comment on noise levels associated with NAS Lemoore and the much larger proposed Lemoore Military Flight Operating Area (Wall 1994a). None of the contacted groups raised any concerns regarding properties of traditional religious or cultural importance on NAS Lemoore (Milliken and Mikesell 1997).

No traditional cultural properties or other Native American resources have been identified at NAS Lemoore. No Native American groups or representatives have raised concerns concerning aircraft and other mission operations at NAS Lemoore.

Historic Archeological Sites. Historic archeological sites in the vicinity of NAS Lemoore include homesites/farmstead locations, historic refuse concentrations, and granite quarries and associated construction refuse from quarrying activities (US Navy 1994d). However, no historic archeological sites have been identified within the APE. The entire APE falls within the low-sensitivity zone where historic archeological sites are not expected to exist.

Historic Architectural Resources. No historic structures that would qualify for listing on the National Register of Historic Places have been identified on NAS Lemoore. The installation was constructed between 1957 and 1961; therefore, there are no standing structures on NAS Lemoore that are 50 years old or older. However, the Neutra Elementary School in the Family Housing Area has the potential for inclusion in the NRHP. Although the school was built in the late 1950s, its design is based on plans drafted in the 1920s by well-known Los Angeles architect, Richard Neutra. Neutra won an architectural design competition with these plans and established a new approach for school design in the nation. The potential for the school's NRHP-eligibility has been established through Thomas Hines, the principal biographer of Neutra, who believes that the school "will qualify for inclusion in the National Register, if not today, when it reaches 50 years of age" (Wall 1994b). The Historic and Archeological Resources Protection Plan for the Years 1997 to 2002 for NAS Lemoore recommends that Neutra Elementary School should be managed as though it were eligible for the NRHP until a formal determination is made (Milliken and Mikesell 1997).

NAS Lemoore was established during the Cold War era (from 1946 to 1989); however, the facilities and structures do not qualify for inclusion in the NRHP under a Cold War context because they do not meet the "exceptionally significant" criterion for properties that are less than 50 years old. NAS Lemoore does not appear to have made an exceptional contribution to the national Cold War program but rather functioned as part of the vast support complex. The mission and accomplishments at NAS Lemoore during the Cold War era were routine, rather than exceptional; therefore, the structures and facilities on the installation are unlikely to be eligible for the NRHP as Cold War properties (Milliken and Mikesell 1997).

Buildings and structures to be expanded or modified for the F/A-18E/F siting at NAS Lemoore consist of two maintenance hangars (Buildings 300 and 330), the Strike Fighter Weapons School (Building 104), the airframe shop (Building 188), the engine maintenance shop (Building 170), and the avionics shop (Building 160). These facilities do not qualify for inclusion in the NRHP as historic structures or as Cold War properties.

Subsurface deposits. Prehistoric archeological sites if they exist on the Los Gatos alluvial fan upon which NAS Lemoore sits would be found at depths of 9.8 feet (3 m) or more. It is doubtful that archeological sites would be found in the first 4 to 6 feet (1-2 m) below grade because of the agricultural practice known as "raking" which broke up and mixed the alkali soils that accumulated on the surface with the first 4 to 6 feet (1-2 m) of underlying soil. Raking was and continues to be employed every year or two to permit continued use of the land for irrigated agriculture (Wall 1997).

Due to the relative lack of historic archaeological sites on NAS Lemoore and the extent of raking and tilling of the land in the last 100 years, the potential for intact subsurface historic deposits to exist is considered low.

3.4.2 NAF El Centro Alternative

Affected Area

The affected area for cultural resources includes the entire facility. The APE is limited to those areas where construction and building modification would occur as a result of using the F/A-18E/F aircraft and personnel at NAF El Centro. Prehistoric, ethnohistoric, and historic background discussions for NAF El Centro are provided in Appendix C.

Cultural Resources Studies

Literature Review. Archival research, including a review of the Navy Plan Files was completed as part of a cultural resources survey of NAF El Centro (Apple et al. 1994). A records and literature search also was conducted with the Southeast Information Center in support of the EIS for the proposed closure of NAF El Centro (US Navy 1990a).

Previous Studies. An intensive pedestrian survey of the main NAF El Centro installation was completed in 1994 (Apple et al. 1994). Also in 1994, an architectural survey of all existing pre-1946 structures within the main NAF El Centro installation was conducted (Apple et al. 1994).

Known Resources

Prehistoric Sites. One prehistoric site, a lithic scatter, has been identified on NAF El Centro. This site is not considered eligible for the NRHP (Apple et al. 1994).

Traditional Cultural Properties. Procedures for Native American consultation have been specified for the discovery of Native American burial remains or items of cultural patrimony, and several Native American groups have been identified with cultural affiliations to NAF El Centro (Apple et al. 1994).

No traditional cultural properties or other Native American resources have been identified at NAF El Centro. No concerns have been raised by Native American

groups or representatives concerning flight and other mission operations at NAF El Centro.

Historic Archeological Sites. Seven historic archeological sites have been recorded on NAF El Centro and consist of a foundation and associated debris (4-IMP-6451H), an early to mid-1900s trash dump with 1940s military debris (4-IMP-6989H), and five scatters of historic domestic debris dating from the 1920s to the 1940s (Apple et al. 1994). The potential for subsurface deposits on two historic sites (4-IMP-6451H and 4-IMP-6989H) was good, and these sites were considered potentially eligible for the NRHP. The remaining five refuse scatters are considered not likely to be eligible for the NRHP (Apple et al. 1994).

Sites 4-IMP-6451H and 4-IMP-6989H were evaluated for eligibility to the NRHP in 1996 (Dolan and Allen 1996). Both sites were highly disturbed and lacked physical integrity. These two sites did not contain sufficient archeological information to satisfy any of the four NRHP criteria and were recommended not eligible for the NRHP (Dolan and Allen 1996).

Historic Architectural Resources. An architectural inventory of NAF El Centro resulted in the identification and evaluation of 113 historic buildings and structures on the installation. All of these were constructed between 1942 and 1945 during World War II.

None of these structures were recommended as eligible for the NRHP because they lack integrity, architectural or engineering distinction, or association with important persons or events. Structural alterations, destruction of older buildings, and construction of facilities at NAF EL Centro have occurred to a degree that has compromised the integrity of the structures and the facility as a whole so that it no longer represents the distinct characteristics of a type, period, or method of construction and does not retain any sense of time and place reflective of its role during World War II. Although the airbase is strongly associated with the Navy Blue Angels, this association is recent, beginning in 1967 (Apple et al. 1994).

Buildings or structures to be expanded or modified for the F/A-18E/F siting at NAF El Centro include a runway, the combat aircraft loading area, and the open storage area. These facilities do not have building numbers. The runway and the combat aircraft loading area, originally pre-1946 structures, have both been replaced with newer configurations and lack original integrity. Therefore, they are not considered eligible for the NRHP (Apple et al. 1994). The combat aircraft loading area is a modern facility and is not eligible for the NRHP.

Subsurface Deposits. Subsurface deposits were considered likely for two historic sites on NAF El Centro; however, formal evaluation of these sites determined that they were not eligible for the NRHP (Dolan and Allen 1996). Subsurface prehistoric or historic deposits may exist on NAF El Centro; however, given the low frequency of archeological sites in the general vicinity and the elevation of the

base below the ancient shoreline of Lake Cahuilla, the potential for subsurface deposits is considered low (US Navy 1987a).

3.5 TRAFFIC AND CIRCULATION

This section describes traffic and circulation at each alternative base and includes the existing street system, intersection operating conditions, and roadway operating conditions for each base and the surrounding areas.

Definition of Resource

Traffic and circulation refers to the movement of vehicles on local and regional street networks. The local street network is described as a hierarchy of streets classified by function. For example, arterial streets are typically four or more lanes that connect limited access highways to the local collector streets, which "collect" traffic from the local neighborhood-serving streets.

Operating conditions and the adequacy of the existing and future roadway system are described in terms of the level of service (LOS). The LOS measure for intersections and roadways is an indicator of a roadway's ability to accommodate vehicular movement. LOS describes operational conditions as influenced by speed, travel time, freedom to maneuver, safety, driving comfort, and convenience. LOS measures range from good conditions (LOS A) through gridlock conditions (LOS F). LOS A reflects free, unobstructed flow conditions, while LOS D indicates unstable traffic flow and significant travel delays during the peak travel hours. The LOS for intersections is based on the delay at the intersection, while the LOS for roadway segments is based on the volume-to-capacity (V/C) ratio. The LOS ranges are defined in Table 3-15 for intersections and in Table 3-16 for street segments.

Table 3-15
Intersections Level of Service Definitions

Level of Service (LOS)	Expected Delay	Signalized Intersection Vehicle Delay (Seconds)	Unsignalized Intersection Vehicle Delay (Seconds)
A	Little or no delay	≤ 5.0	≤ 5.0
B	Short traffic delays	5.1 - 15.0	5.0 - 10.0
C	Average traffic delays	15.1 - 25.0	10.1 - 20.0
D	Long traffic delays	25.1 - 40.0	20.1 - 30.0
E	Very long traffic delays	40.1 - 60.0	30.1 - 45.0
F	Extreme delays potentially affecting other traffic movements in the intersection	> 60.0	> 45.0

Source: Transportation Research Board 1994.

Table 3-16
Street Segments Level of Service Definitions

LOS	Volume-to-Capacity (V/C)
A	≤ 30.1
B	30.1 - 50.0
C	50.1 - 75.0
D	75.1 - 90.0
E	90.1 – 100
F	> 100

Source: US Navy 1994d.

Peak hours correspond to the periods of the day with the highest traffic volumes on the street network. The morning (or AM) peak hour reflects the morning commute to work. For this analysis, the AM peak hour is assumed to be between 7:00 and 8:00 in the morning. The evening (or PM) peak hour reflects the commute from work to home. For this analysis, the PM peak hour is assumed to be between 4:00 and 5:00 in the afternoon. Traffic generated during AM and PM peak hours has the greatest potential to affect intersection and roadway LOS.

For the traffic analysis, 1999 was used as the realignment year for each alternative site. The 1999 projected traffic volumes were developed by applying a two percent per year growth factor to 1996 traffic volumes. For the purposes of this analysis, "projected" refers to a 1999 condition, while "existing" refers to existing 1996 conditions. The level of service analysis and the volumes shown in this section are 1999 projected conditions.

Regulatory Considerations

US Department of Transportation. The Federal Highway Administration is the agency of the Department of Transportation responsible for the federally funded roadway system, including the interstate highway network and portions of the primary state highway network.

California Department of Transportation (Caltrans). Caltrans is responsible for planning, designing, constructing, and maintaining all state highways. Caltrans jurisdictional interest would extend to improvements to roadways at the interchange ramps serving area freeways. Any federally funded transportation improvements would be subject to review by Caltrans staff and the California Transportation Commission.

3.5.1 NAS Lemoore Alternative

Affected Area

The affected area for the traffic analysis includes State Route 198 and State Route 41 near NAS Lemoore, as well as several local access routes. Local access to NAS Lemoore, includes Grangeville Road, which provides direct access to the

Operations Gate from the cities of Hanford and Lemoore, Avenal Cutoff Road from I-5, and Jackson Avenue from State Route 41. Major intersections near NAS Lemoore along these roadways are included in the traffic analysis. The affected area was determined based on the location of NAS Lemoore and circulation patterns of traffic accessing the site on the surrounding transportation system. The affected area does not include roadways and intersections on base.

Road Network

NAS Lemoore is accessed by traveling eastbound on State Route 198 from Interstate 5 (I-5) near Coalinga or westbound on State Route 198 from Highway 99 through the cities of Hanford and Lemoore. The main gate for NAS Lemoore takes direct access from a signalized intersection at State Route 198. A description of key roadway network components is presented below.

State Route 198 (SR-198). SR-198 is generally a four-lane, east-west highway that connects I-5 and Highway 99 and provides direct access to Lemoore, Hanford, and other communities. In the immediate vicinity of the naval base, SR-198 is four lanes between the main gate and SR-41 and two lanes west of the main gate.

State Route 41 (SR-41). SR-41 is generally a four-lane, north-south highway providing access to Lemoore in the base vicinity and direct access to Fresno, 35 miles (56 km) to the north. SR-41 forms a full diamond interchange at SR-198 and is signalized at Grangeville Boulevard. Caltrans plans to begin widening 2.8 miles (4.5 km) of SR-41 in a section of existing two-lane highway to a four-lane divided expressway. The footprint of the project is from 0.7 miles (1.1 km) south of SR-198 to 0.3 miles (0.5 km) north of Hanford-Armona Road. Construction should be complete by 1999.

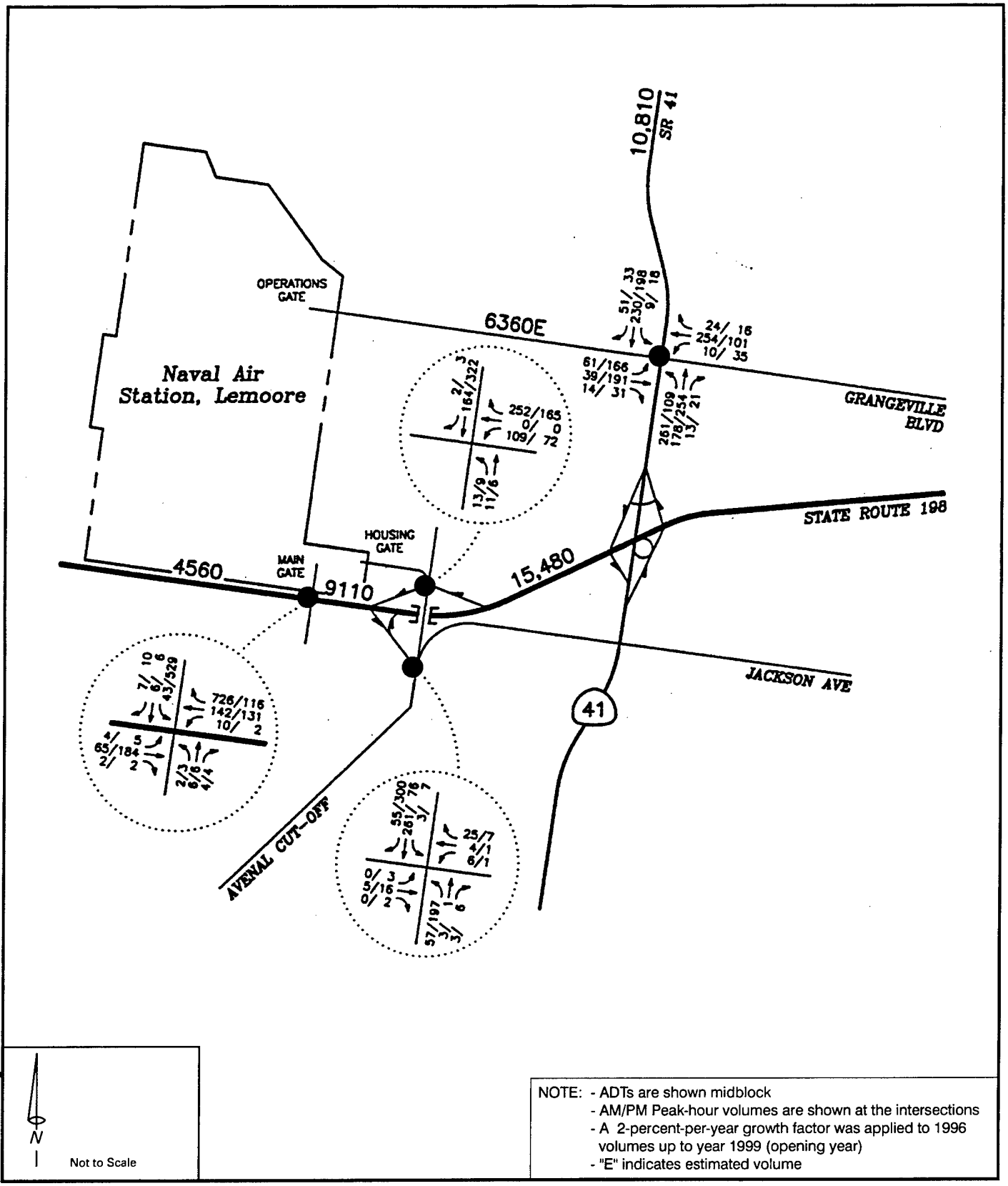
Grangeville Boulevard. Grangeville Boulevard is a two-lane, east-west road that provides direct access to the naval base. It is classified as an arterial roadway with no curbside parking. Grangeville Boulevard is signalized at the interchange with SR-41.

Avenal Cutoff Road. Avenal Cutoff Road is a two-lane, north-south roadway. It is classified as an arterial roadway and forms an interchange with SR-198.

Jackson Street. Jackson Street is a two-lane, east-west roadway providing access between SR-41 and SR-198. It is classified as a major collector roadway.

Traffic Volumes

Figure 3-15 shows the calculated 1999 on-street average daily trips (ADTs) and AM/PM peak-hour intersection volumes. The ADTs were obtained from Caltrans. The peak-hour turning movement volumes were obtained from the traffic study prepared for the NAS Lemoore Base Realignment (TJKM 1994). The



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Peak-hour traffic volumes at the primary access intersections do not exceed roadway capacities.

LEGEND:

- Analysis Intersections
- AM/PM Peak-Hour Volumes
- 1,000 Average Daily Trips

NAS Lemoore 1999 Traffic Volumes AM/PM Peak Hours & ADTs

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: Linscott, Law, & Greenspan 1997.

Figure 3-15

1999 volumes shown on Figure 3-15 reflect a two percent per year growth rate that has been applied to measured 1996 volumes. A peak-hour analysis was conducted at the following four intersections near the base:

- SR-198/NAS Lemoore Main Gate;
- Avenal Cutoff Road/SR-198 westbound ramps;
- Avenal Cutoff Road/SR-198 eastbound ramps; and
- SR-41/Grangeville Boulevard.

Levels of Service

Intersections. Tables 3-17 and 3-18 summarize the LOS analysis for the signalized and unsignalized intersections, respectively. The Grangeville Road/SR-41

Table 3-17
NAS Lemoore Signalized Intersection Operations

		Projected 1999 Conditions	
Intersection	Peak Hour	Delay (Seconds)	LOS
Grangeville	AM	13.6	B
	PM	13.0	B
SR-198/Main Gate	AM	6.4	B
	PM	12.3	B

Source: Dowling Associates 1997.

Table 3-18
NAS Lemoore Unsignalized Intersections Operations

			Projected 1999 Conditions	
Intersection	Peak Hour	Movement	Delay (Seconds)	LOS
Avenal Cutoff Road/EB SR-198 ramps	AM	EB - L/T	5.6	B
		EB - R	3.7	A
		WB - L/T	5.8	B
		WB - R	2.7	A
		NB - L	3.0	A
		SB - L	2.1	A
	PM	EB - L/T	6.0	B
		EB - R	2.9	A
		WB - L/T	5.9	B
		WB - R	2.6	A
		NB - L	2.7	A
		SB - L	2.1	A
Avenal Cutoff/WB SR-198 ramps	AM	WB - L	5.4	B
		WB - R	3.5	A
		NB - L	2.6	A
	PM	WB - L	6.5	B
		WB - R	8.0	A
		NB - L	3.1	A

LOS = Level of Service
L = Left-turn
R = Right-turn
T = Through movement
EB = Eastbound
WB = Westbound
NB = Northbound
SB = Southbound

Source: Dowling Associates 1997.

intersection operates at LOS B during both the AM and PM peak hours. The SR-198/Main Gate intersection operates at LOS B during both the AM and PM peak hours. As shown in Table 3-18, all movements at the key unsignalized intersections were evaluated, and both Avenal Cutoff Road intersections with SR-198 are expected to operate at LOS B or better.

Roadways. As indicated in Table 3-19, each street segment in the affected area operates daily at LOS B or better.

Table 3-19
NAS Lemoore Daily Street Segment Operations

Street Segment	Capacity	Projected 1999 Conditions Volume	V/C	LOS
SR-198				
West of Main Gate	14,000	4,560	0.33	B
East of Main Gate	31,000	9,110	0.29	A
Grangeville Boulevard				
West of SR-41	14,000	6,360	0.45	B
SR-41				
North of Grangeville	43,000	10,810	0.25	A

Capacities and V/C ratio thresholds based on Caltrans Standards
Source: Dowling Associates 1997.

Transit Services

NAS Lemoore is served by Kings Area Rural Transit. Bus access directly to the base is provided from neighboring cities, including Hanford and Lemoore. According to NAS Lemoore planning staff, base personnel rarely use transit.

3.5.2 NAF El Centro Alternative

Affected Area

The affected area for the traffic analysis includes Evan Hewes Highway (County Highway 80), which is the main east-west route from El Centro to NAF El Centro. Local north-south access to NAF El Centro includes Drew Road, Bennett Road, and Forrester Road. The gate to NAF El Centro is at the north end of Bennett Road. Major intersections along these roadways near NAF El Centro are included in the traffic analysis. The affected area was determined based on the location of NAF El Centro and circulation patterns of traffic accessing the site on the surrounding transportation system. The affected area does not include on-base roadways and intersections.

Road Network

Regional access to NAF El Centro is from Interstate 8 via interchanges with local roadways. Evan Hewes Highway runs parallel to Interstate 8 to the north, providing access between the city of El Centro and the base. Local access to the Main Gate is along Bennett Road.

Interstate 8 (I-8). I-8 is a four-lane divided freeway in the project vicinity that provides east-west access within southern Imperial County between the San Diego County border and Yuma, Arizona. I-8 is constructed with complete grade separation at all interchanges.

State Route 111 (SR-111). SR-111 is a north-south highway providing access to Calexico and Mexico from the cities of El Centro and Brawley. SR-111 is a four-lane divided roadway south of I-8 and a two-lane undivided roadway north of I-8.

Evan Hewes Highway (S-80). S-80 is a two- to four-lane road that runs parallel to I-8 from the cities of Ocotillo to Holtville and provides access to NAF El Centro via Bennett Road. S-80 is classified as a collector roadway. Evan Hewes Highway is stop sign-controlled at Drew Road, Bennett Road, and Forrester Road and is signalized at Imperial Avenue.

Drew Road. Drew Road is a north-south roadway classified as a collector. Drew Road is a two-lane, undivided roadway and provides access to I-8 via a full diamond interchange with stop sign controls at the east- and westbound off-ramps.

Bennett Road. Bennett Road is a north-south, two-lane undivided roadway classified as a local street. It provides direct access to the Main Gate at NAF El Centro via Evan Hewes Highway, where it is stop sign-controlled.

Forrester Road. Forrester Road is a north-south, two-lane undivided roadway classified as a collector. It provides a connection between Brawley and I-8 west of El Centro. It has an interchange at I-8 and is stop sign-controlled at both the eastbound and westbound off-ramps.

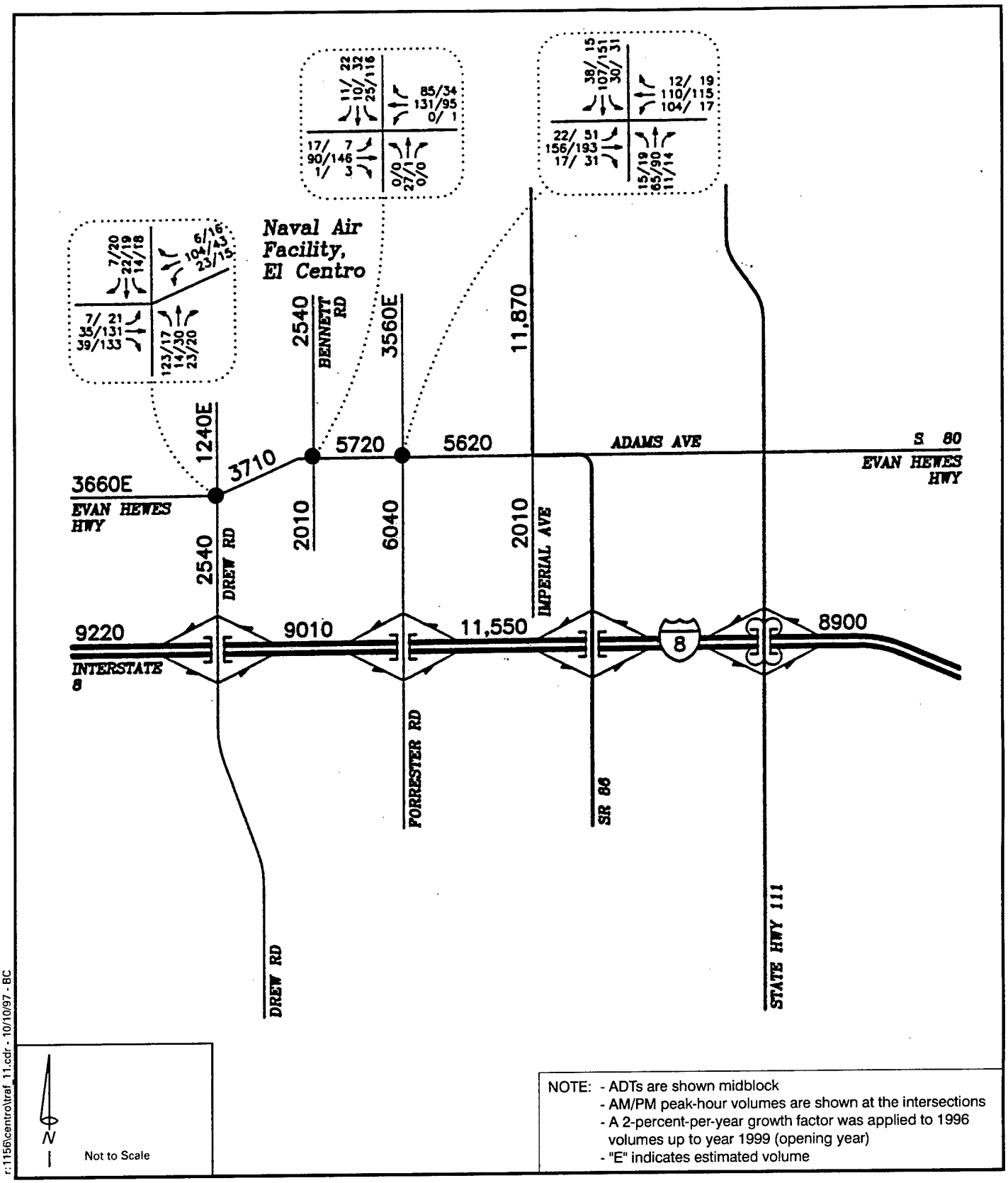
Traffic Volumes

Figure 3-16 shows the calculated 1999 on-street ADTs and AM and PM peak-hour intersection traffic volumes. The ADTs were obtained from Caltrans and Imperial County records. The 1999 volumes shown on Figure 3-16 reflect a two percent per year growth rate that has been applied to the measured 1996 volumes. The AM/PM peak-hour turning movement counts were conducted in June 1996 at the following three intersections near the base:

- Evan Hewes Highway (S-80)/Drew Road;
- Evan Hewes Highway (S-80)/Bennett Road; and
- Evan Hewes Highway (S-80)/Forrester Road.

Levels of Service

Intersections. As shown in Table 3-20, all three key unsignalized intersections operate at LOS A during both the AM and PM peak hours.



Peak-hour traffic voumes at primary access intersections do not exceed roadway capacities.

LEGEND:

- Analysis Intersections
- AM/PM Peak-Hour Volumes
- 1,000 Average Daily Trips

NAF El Centro 1999 Traffic Volumes AM/PM Peak Hours & ADTs

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: Linscott, Law, & Greenspan 1997.

Figure 3-16

Table 3-20
NAF El Centro Unsignalized Intersection Operations

Intersection	Peak Hour	Projected 1999 Conditions Delay (Seconds)	LOS
Evan Hewes/Drew Road	AM	2.9	A
	PM	3.0	A
Evan Hewes/Bennett Road	AM	2.5	A
	PM	2.8	A
Evan Hewes/Forrester Road	AM	4.9	A
	PM	4.9	A

Notes: Each of these intersections are all-way stop sign-controlled.
Source: Dowling Associates 1997.

Table 3-21
NAF El Centro Daily Street Segment Operations

Street Segment	Capacity (LOS E)	Projected 1999 Conditions Volume	V/C	LOS
Evan Hewes (S-80)				
West of Drew Road	14,000	3,660	0.26	A
East of Forrester Road	14,000	5,620	0.40	B
Drew Road				
North of Evan Hewes	14,000	1,240	0.09	A
South of Evan Hewes	14,000	2,540	0.18	A
Bennett Road				
South of Evan Hewes	14,000	2,010	0.14	A
Forrester Road				
North of Evan Hewes	14,000	3,560	0.25	A
South of Evan Hewes	14,000	6,040	0.43	B

Capacities and V/C ratio thresholds based on Caltrans Standards
Source: Dowling Associates 1997.

Roadways. As shown in Table 3-21, each street segment in the affected area operates daily at LOS B or better.

Transit Services

Bus transportation is provided to NAF El Centro from the El Centro area 365 days per year. The Liberty Shuttle provides service between NAF El Centro and several locations in the surrounding community between 7:00 PM and 2:15 AM. Cab services also are provided when necessary.

3.6 AIR QUALITY

This section describes air quality conditions at each alternative base and addresses air quality terminology, air quality conditions, and regulatory situations applicable to the F/A-18E/F action.

Definition of Resource

Air pollution discussions require an understanding of terms that have a technical meaning. At a general level it is important to understand the distinction between air pollutant emissions and ambient air quality. Other important terms include primary pollutants, secondary pollutants, and pollutant precursors.

Emissions and Ambient Air Quality

The term pollutant emissions refers to the amount (usually stated as a weight) of one or more specific compounds introduced into the atmosphere by a source or group of sources. In practice, most pollutant emissions data are presented as emission rates—the amount of pollutants emitted during a specified increment of time or during a specified increment of emission source activity. Typical measurement units for emission rates on a time basis include pounds per hour, pounds per day, or tons per year. Typical measurement units for emission rates on a source activity basis include pounds per thousand gallons of fuel burned, pounds per ton of material processed, and grams per vehicle mile of travel.

The term ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) actually experienced at a particular geographic location that may be some distance from the source of the relevant pollutant emissions. The ambient air quality levels actually measured at a particular location are determined by the interactions among emissions, meteorology, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Chemical considerations are important when chemical reactions that transform pollutant emissions into other chemical substances.

Ambient air quality data generally are reported as a mass-per-unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million by volume). Measurements of particulate matter concentrations normally are reported in units of micrograms per cubic meter.

Primary Pollutants, Secondary Pollutants, and Pollutant Precursors

Air pollutants are often characterized as being primary or secondary pollutants. Primary pollutants are those emitted directly into the atmosphere, such as carbon monoxide (CO), sulfur dioxide (SO_2), lead particulates, and hydrogen sulfide. Secondary pollutants are those formed through chemical reactions in the atmosphere, such as ozone (O_3), nitrogen dioxide (NO_2), and sulfate particles. Atmospheric chemical reactions usually involve primary pollutants, normal

constituents of the atmosphere, and other secondary pollutants. Meteorological conditions, such as temperature, humidity, and the intensity of ultraviolet light also can play an important role in atmospheric chemistry.

Those compounds that react to form secondary pollutants often are referred to as reactive pollutants, pollutant precursors, or precursor emission products. Some air pollutants, such as many organic gases and suspended particulate matter, are a combination of primary and secondary pollutants.

Ozone Precursor Emissions. Ozone, a major component of photochemical smog, is the secondary pollutant of greatest concern in most portions of California. The pollutant emissions generally categorized as ozone precursors fall into two broad groups of chemicals—nitrogen oxides and organic compounds. Many different terms are used to refer to these groups of ozone precursors.

The terms "nitrogen oxides" and "oxides of nitrogen" are often used interchangeably to refer to the combination of nitric oxide and nitrogen dioxide. This combination of nitrogen oxides often is designated by the symbol NO_x. Nitrogen dioxide is itself a secondary pollutant, generally formed from nitric oxide.

Organic compound precursors of ozone are routinely described by a large number of different terms. The phrase reactive organic compounds is the most accurate terminology for describing organic compound precursors of ozone, but the acronym for that phrase is not widely used. The closest widely used acronym is ROG (reactive organic gases). To avoid inventing a new acronym, ROG will be used in this document to mean reactive organic compounds.

Particulate Matter Precursors. Inhalable particulate matter (PM_{10}) can be generated as a primary pollutant by abrasion or erosion processes. PM_{10} also can form as a secondary pollutant through chemical reactions or by condensation of gaseous pollutants into fine aerosols. Major gaseous precursors of PM_{10} include reactive organic gases, sulfur oxides, and nitrogen oxides. Additional precursors of PM_{10} can include ammonia, hydrogen sulfide, sulfuric acid, and nitric acid.

Ambient Air Quality Standards

Both the State of California and the federal government have established ambient air quality standards for several different pollutants (Table 3-22), which often are referred to as criteria pollutants. Ambient standards for some of these pollutants have been set for both short and long periods. Federal ambient air quality standards are based on evidence of acute and chronic health effects. Most state ambient air quality standards are based primarily on health effects data but can reflect other considerations, such as protection of crops, protection of materials, or avoidance of nuisance conditions (i.e., odors).

Table 3-22
Ambient Air Quality Standards

Pollutant	Symbol	Averaging Time	Standard, as parts per million		Standard, as micrograms per cubic meter		Violation Criteria	
			California	Federal	California	Federal	California	Federal
Ozone	O_3	1 Hour	0.09	0.12	180	235	If exceeded	If exceeded on more than 3 days in 3 years
		8 hours	—	0.08	—	160	—	If exceeded by 4th highest value during a 3-year period.
Carbon Monoxide	CO	8 Hours	9.0	9	10,000	10,000	If exceeded	If exceeded on more than 1 day per year
		1 Hour	20	35	23,000	40,000	If exceeded	If exceeded on more than 1 day per year
(Lake Tahoe only)		8 Hours	6	—	7,000	—	If exceeded	
Inhalable Particulate Matter	PM_{10}	Annual Geometric Mean	—	—	30	—	If exceeded	
		Annual Arithmetic Mean	—	—	—	50		If exceeded
		24 Hours	—	—	50	150	If exceeded	If exceeded on more than 1 day per year
Fine Particulate Matter	$PM_{2.5}$	Annual Arithmetic Mean	—	—	—	15	—	If exceeded
		24 Hours	—	—	—	65	—	If exceeded by 98th percentile over 3 years
Nitrogen Dioxide	NO_2	Annual Average	—	0.053	—	100		If exceeded
		1 Hour	0.25	—	470	—	If exceeded	
Sulfur Dioxide	SO_2	Annual Average	—	0.03	—	80		If exceeded
		24 Hours	0.04	0.14	105	365	If exceeded	If exceeded on more than 1 day per year
		1 Hour	0.25	—	655	—	If exceeded	
Lead Particles	Pb	Calendar Quarter	—	—	—	1.5		If exceeded
		30 Days	—	—	1.5	—	If equaled or exceeded	
Sulfate Particles	SO_4	24 Hours	—	—	25	—	If equaled or exceeded	
Hydrogen Sulfide	H_2S	1 Hour	0.03	—	42	—	If equaled or exceeded	
Vinyl Chloride	C_2H_3Cl	24 Hours	0.010	—	26	—	If equaled or exceeded	

Notes: All standards are based on measurements corrected to 25 degrees C and 1 atmosphere pressure
Decimal places shown for standards reflect the rounding precision used for evaluating compliance
National standards shown are the primary (health effects) standards
Regulations implementing the national 8-hour ozone standard will not become effective until the 1-hour standard has been achieved.
Regulations implementing the national PM2.5 standards will not be developed until 2005.

Source: California Air Resources Board 1997; 40 CFR Part 50.

The EPA adopted new ozone and particulate matter standards in July 1997. EPA replaced the 1-hour ozone standard (0.12 ppm) with an 8-hour average standard (0.08 ppm). However, requirements relating to the 1-hour to ozone standard will remain in effect until that standard is achieved. Regulations and requirements implementing the new 8-hour ozone standard will not take effect until 2004. The EPA has adopted new $PM_{2.5}$ standards (15 micrograms per cubic meter as an annual average and 65 micrograms per cubic meter as a 24-hour average) that will supplement, but not replace, the current PM_{10} standards. The new $PM_{2.5}$ standards will not be implemented prior to 2005.

Areas that violate a federal air quality standard are designated as nonattainment areas. Nonattainment designations for ozone, carbon monoxide, and PM_{10} include subcategories indicating the severity of the air quality problem. Areas that comply with federal air quality standards are designated as attainment areas. Areas that have been reclassified from nonattainment to attainment are designated as attainment/maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified areas and are treated as attainment areas for various regulatory purposes.

Table 3-23 summarizes the federal and state attainment status designations for the two alternative receiving installations. Both NAS Lemoore and NAF El Centro are nonattainment for the federal and state ozone standards, as well as the federal and state PM_{10} standards.

Regulatory Considerations

Air pollution control programs were established in California prior to the enactment of federal requirements. Responsibility for air quality management programs in California is divided between California Air Resources Board (CARB), as the primary state air quality management agency, and air pollution control districts, as the primary local air quality management agencies. Federal Clean Air Act legislation in the 1970s resulted in a gradual merger of local and federal air quality programs, particularly stationary source air quality permit programs.

Many types of industrial and commercial facilities require air quality permits for their equipment and operations. Local air pollution control districts are responsible for air quality permit programs in California. Permit authority is derived from a combination of state and federal legislation. In general, federally required New Source review (NSR) and Prevention of Significant Deterioration (PSD) air quality permit programs have been integrated into the pre-existing state and local permit program. This results in a two-step permit process for new stationary emission sources—an initial authority to construct (ATC) permit and a subsequent permit to operate (PTO).

Table 3-23
Federal and State Attainment Status for Alternative Receiving Installations

Installation	County	Pollutant	Federal Status	State Status
NAS Lemoore	Fresno and Kings Counties	Ozone	Nonattainment	Nonattainment
		Carbon monoxide	Attainment	Attainment
		Nitrogen dioxide	Attainment	Attainment
		PM_{10}[1]	Nonattainment	Nonattainment
		Sulfur dioxide	Unclassified	Attainment
		Lead	No designation[2]	Attainment
NAF El Centro	Imperial County	Ozone	Nonattainment	Nonattainment
		Carbon monoxide	Attainment	Attainment
		Nitrogen dioxide	Attainment	Attainment
		PM_{10}	Nonattainment	Nonattainment
		Sulfur dioxide	Attainment	Attainment
		Lead	No designation[2]	Attainment

[1] PM_{10} = inhalable particulate matter.
[2] US EPA is not required to do a formal attainment/nonattainment classification for the lead standard.

Notes: Only nonattainment designations are made for the federal lead standard; formal attainment designations are made only for redesignation purposes

Sources: 40 CFR 81.305; California Air Resources Board 1997.

Air Quality Planning

Federal Requirements. The federal Clean Air Act requires each state to develop, adopt, and implement a state implementation plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. Deadlines for achieving the federal air quality standards vary according to air pollutant and the severity of existing air quality problems. SIP documents are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated. In California, the SIP consists of separate documents for different pollutants in regions of the state. Local councils of governments and air pollution control districts have had the primary responsibility for developing and adopting the regional elements of the California SIP.

Federal Clean Air Act Conformity Process. Section 176(c) of the Clean Air Act requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the Clean Air Act and with federally enforceable air quality management plans. EPA has promulgated separate rules that establish conformity analysis procedures for transportation-related actions and for other (general) federal agency actions. Transportation conformity requirements apply to highway and mass transit projects funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA). General conformity requirements are potentially applicable to most other federal agency actions but apply only to those aspects of

an action that involve ongoing federal agency responsibility and control over direct or indirect sources of air pollutant emissions. The EPA conformity rules have been adopted verbatum by most air pollution control districts.

The EPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emission thresholds that trigger requirements of the conformity rule are called de minimis levels.

Table 3-24 identifies the federal nonattainment pollutants and the relevant de minimis emission thresholds for each of the alternative receiving installations considered for the F/A-18E/F squadrons. Also shown in Table 3-24 are the deadlines for achieving the federal air quality standards. NAS Lemoore and NAF El Centro are in areas that are nonattainment for the federal ozone and PM_{10} standards.

Table 3-24
Nonattainment Pollutants and De Minimis Levels for West Coast Sites

Installation	Air District Jurisdiction	Federal Nonattainment Pollutants	De Minimis Levels[1] (Tons/Year)	Precursors	Attainment Deadline
NAS Lemoore	San Joaquin Valley Unified APCD	Ozone - Serious	50	ROG, NO_x	1999
		PM_{10} - Serious	70	PM_{10}, ROG, NO_x, SO_x	2001
NAF El Centro	Imperial County APCD	Ozone - Transitional [2]	100	ROG, NO_x	NA
		PM_{10} – Moderate[3]	100	PM_{10}, ROG, NO_x, SO_x	1994+

Notes: APCD = Air Pollution Control District
AQMD = Air Quality Management District
ROG = reactive organic compounds
NO_x = oxides of nitrogen
SO_x = oxides of sulfur
PM_{10} = inhalable particulate matter
CO = carbon monoxide
NA = not applicable

[1]De Minimis thresholds apply to individual pollutants and precursors, not to the combination of precursors.
[2]Transitional ozone nonattainment areas are defined by Section 185A of the Clean Air Act as nonattainment areas having no violations of the ozone standard between 1987 and 1990. Transitional areas were to be redesignated as attainment/maintenance or as the appropriate nonattainment category by June 1992. 40 CFR 81.305 still shows Imperial County as having a nonattainment - transitional designation for ozone.
[3]Moderate PM_{10} nonattainment areas that failed to reach attainment within Clean Air Act deadlines are reclassified by operation of law as serious nonattainment areas (Clean Air Act, Section 188(b)(2)(A)). 40 CFR 81.305 still shows Imperial County as having a nonattainment - moderate designation for PM_{10}.

Sources: 40 CFR 81.305; 40 CFR 93.153; 42 USC 7401 et seq.; California Air Resources Board 1997.

The EPA conformity rule establishes a process that is intended to demonstrate that the proposed federal action

- Would be consistent with plans for achieving federal air quality standards;

- Would not cause or contribute to new violations of federal air quality standards;
- Would not increase the frequency or severity of existing violations of federal air quality standards; and
- Would not delay the timely attainment of federal air quality standards.

Compliance with the conformity rule can be demonstrated in several ways. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant de minimis level.

If net emissions exceed the relevant de minimis value, a formal conformity determination process must be followed. A conformity determination includes a demonstration of consistency with the SIP through one of the following mechanisms:

- By showing that direct and indirect emissions from the activity are specifically identified and accounted for in the SIP;
- By showing that direct and indirect emissions associated with the federal agency action are accommodated within emissions allowances contained in an approved SIP;
- By showing that emissions associated with future conditions will not exceed emissions that would occur from a continuation of historical activity levels;
- By arranging emission offsets to fully compensate for the net emissions increase associated with the action; or
- By obtaining a commitment from the relevant air quality management agency to amend the SIP to account for direct and indirect emissions from the federal agency action.

State Requirements. The California Clean Air Act (CCCA) of 1988 requires air pollution control districts and air quality management districts to develop air quality management plans for meeting state ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide. CARB is responsible for developing a plan for meeting state PM_{10} standards.

The CCCA does not set specific deadlines for achieving state air quality standards. Instead, attainment is required as expeditiously as practicable, with various emission control program requirements based on the attainment status for ozone and carbon monoxide standards.

California ambient air quality standards (CAAQs) generally are somewhat more stringent than the comparable federal standards. The greatest difference between federal and state ambient air quality standards is for PM_{10}.

3.6.1 NAS Lemoore Alternative

Affected Area

The affected area for NAS Lemoore varies according to the type of air pollutant being discussed. Primary pollutants, such as carbon monoxide, have a localized affected area that is generally limited to less than 2,000 feet (610 m) from the source of the emissions. The time required for the formation of secondary pollutants, such as ozone and secondary particulate matter, allows precursor emissions to be transported and mixed over relatively large areas while being converted into the pollutant of concern. Consequently, the affected area for secondary pollutants includes all of the San Joaquin Valley air basin.

Air Quality Conditions

Table 3-25 summarizes air quality monitoring data for the NAS Lemoore vicinity. The closest air quality monitoring stations are in the communities of Hanford and Visalia. The entire San Joaquin Valley, including the NAS Lemoore vicinity, is designated a serious nonattainment area for the federal ozone standard and a serious nonattainment area for the federal PM_{10} standard. Ozone concentrations recorded in Hanford are lower than those recorded at monitoring stations in adjacent counties.

Emission sources at NAS Lemoore include various stationary sources, aircraft flight activity, and motor vehicle use. Stationary sources include aircraft engine test cells, portable engines for generators and compressors, fuel storage and handling facilities, boilers, solvent and coating use from aircraft maintenance operations, and gasoline stations.

Emission forecasts contained in the ozone SIP (1995 revision) assume that aircraft emissions from NAS Lemoore would increase by 14.6 tons per year for reactive organic compounds and by 65.7 tons per year for nitrogen oxides between 1990 and 1996, with emissions holding constant beyond 1996 (San Joaquin Valley Unified Air Pollution Control District 1995). The emission forecasts in the ozone SIP adjust emission sources for expected regional population growth, but do not specifically identify the portion attributable to expansion of NAS Lemoore.

As part of a previous realignment action for NAS Lemoore, a portion of the emission reductions that occurred with closure of Castle Air Force Base were transferred to NAS Lemoore to support a CAA conformity determination. Because the previously proposed realignment action did not take place, the conformity-related emission offsets (100 tons [91 metric tons] per year of reactive

Table 3-25
Air Quality Monitoring Data for the NAS Lemoore Vicinity (1991-1995)

Monitoring Station	Air Quality Indicator	1991	1992	1993	1994	1995
Ozone						
Hanford – Health Dept.	Peak 1-hour value (ppm)	0.11	0.10	0.11		
	Days above federal standard (0.12 ppm)	0	0	0		
	Days above state standard (0.09 ppm)	15	1	2		
Hanford - S. Irwin	Peak 1-hour value (ppm)				0.12	0.10
	Days above federal standard (0.12 ppm)				0	0
	Days above state standard (0.09 ppm)				9	2
Carbon Monoxide						
Visalia – Church St.	Peak 1-hour value (ppm)	14	10	7	9	9
	Peak 8-hour value (ppm)	6.1	4.8	4.0	4.6	4.4
	Days above federal standard (9 ppm)	0	0	0	0	0
	Days above state standard (9.0 ppm)	0	0	0	0	0
PM_{10}						
Hanford – Health Dept.	Peak 24-hour value ($\mu g/m^3$)	164	147	67		
	Annual geometric mean ($\mu g/m^3$)	55.0	48.6	31.4		
	Annual arithmetic mean ($\mu g/m^3$)	70.0	55.9	36.3		
	Number of 24-hour samples	56	57	38		
	% of samples above federal standard (150 $\mu g/m^3$)	5.4%	0.0%	0.0%		
	% of samples above state standard (50 $\mu g/m^3$)	53.6%	43.9%	28.9%		
Hanford - S. Irwin	Peak 24-hour value ($\mu g/m^3$)			192	116	185
	Annual geometric mean ($\mu g/m^3$)			69.8	44.3	43.6
	Annual arithmetic mean ($\mu g/m^3$)			85.9	50.1	53.8
	Number of 24-hour samples			9	55	59
	% of samples above federal standard (150 $\mu g/m^3$)			11.1%	0.0%	1.7%
	% of samples above state standard (50 $\mu g/m^3$)			66.7%	47.3%	42.4%

Notes: ppm = parts per million by volume
$\mu g/m^3$ = micrograms per cubic meter
Federal 1-hour ozone standard is 0.12 ppm; state 1-hour ozone standard is 0.09 ppm
Federal 1-hour carbon monoxide standard is 35 ppm; state 1-hour carbon monoxide standard is 20 ppm
Federal 8-hour carbon monoxide standard is 9 ppm; state 8-hour carbon monoxide standard is 9.0 ppm
Federal PM_{10} standards: 50 $\mu g/m^3$, annual arithmetic mean; 150 ug/m^3, 24-hour average
State PM_{10} standards: 30 $\mu g/m^3$, annual geometric mean; 50 ug/m^3, 24-hour average
24-hour PM_{10} samples are collected approximately once every six days. Other pollutants are monitored continuously (except for instrument calibration and maintenance periods)

Source: California Air Resources Board 1995.

organic compounds, 367.1 tons [333 metric tons] per year of nitrogen oxides, and 151.6 tons [138 metric tons] per year of PM_{10}) could be used to support the CAA conformity determination process for the F/A-18E/F action at NAS Lemoore.

3.6.2 NAF El Centro Alternative

Affected Area

The affected area for NAF El Centro varies according to the type of air pollutant being discussed. Primary pollutants, such as carbon monoxide, have a localized affected area that is generally limited to less than 2,000 feet (610 m) from the

source of the emissions. The time required for the formation of secondary pollutants, such as ozone and secondary particulate matter, allow precursor emissions to be transported and mixed over relatively large areas while being converted into the pollutant of concern. Consequently, the affected area for secondary pollutants includes all of the Salton Sea Air Basin.

Air Quality Conditions

Table 3-26 summarizes air quality monitoring data for the NAF El Centro vicinity. Imperial County is designated a transitional nonattainment area for the federal ozone standard and a moderate nonattainment area for the federal PM_{10} standard. Ozone levels in Imperial County are due in part to pollutant transport from other portions of Southern California and from Mexico.

Emission sources at NAF El Centro include various stationary sources, aircraft flight activity, and motor vehicle use. Stationary sources include portable engines for generators and compressors, fuel storage and handling facilities, boilers, and solvents and coatings used for aircraft maintenance operations. The 1997 ozone SIP emission forecasts have not anticipated any change in activity levels for NAF El Centro.

Table 3-26
Air Quality Monitoring Data for the NAF El Centro Vicinity (1991-1995)

Monitoring Station	Air Quality Indicator	1991	1992	1993	1994	1995
Ozone						
El Centro - 9th St.	Peak 1-hour value (ppm)	0.11	0.12	0.15	0.13	0.15
	Days above federal standard (0.12 ppm)	0	0	3	1	9
	Days above state standard (0.09 ppm)	3	10	25	29	31
PM_{10}						
El Centro - 9th St.	Peak 24-hour value ($\mu g/m^3$)	243	80	166	119	130
	Annual geometric mean ($\mu g/m^3$)	50.3	38.5	42.5	40.3	36.7
	Annual arithmetic mean ($\mu g/m^3$)	36.6	41.4	48.0	45.3	41.5
	Number of 24-hour samples	62	46	53	57	60
	% of samples above federal standard (150 $\mu g/m^3$)	1.6%	0.0%	1.9%	0.0%	0.0%
	% of samples above state standard (50 $\mu g/m^3$)	50.0%	30.4%	39.6%	29.8%	25.0%

Notes: ppm = parts per million by volume
$\mu g/m^3$ = micrograms per cubic meter
Federal 1-hour ozone standard is 0.12 ppm; state 1-hour ozone standard is 0.09 ppm
Federal 1-hour carbon monoxide standard is 35 ppm; state 1-hour carbon monoxide standard is 20 ppm
Federal 8-hour carbon monoxide standard is 9 ppm; state 8-hour carbon monoxide standard is 9.0 ppm
Federal PM_{10} standards: 50 $\mu g/m^3$, annual arithmetic mean; 150 ug/m^3, 24-hour average
State PM_{10} standards: 30 $\mu g/m^3$, annual geometric mean; 50 ug/m^3, 24-hour average
24-hour PM_{10} samples are collected approximately once every six days. Other pollutants are monitored continuously (except for instrument calibration and maintenance periods)

Source: California Air Resources Board 1995.

3.7 NOISE

This section describes noise conditions at each alternative base considered for the F/A-18E/F action. Noise terminology, noise level criteria, and existing noise conditions are discussed in this section.

Definition of Resource

Sound travels through the air as waves of small pressure fluctuations caused by some type of vibration. In general, sound waves travel away from the noise source as an expanding spherical surface. The energy contained in a sound wave is consequently spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source.

Sound level measurements measure the actual air pressure fluctuations caused by sound waves, with separate measurements made for different vibrational frequency ranges. These measurements are reported using a decibel (dB) scale. Decibel scales are a logarithmic index based on a ratio of the actual pressure fluctuations generated by sound waves compared to a standard reference pressure value.

Noise Terminology

Most sounds consist of a broad range of sound frequencies. Because the human ear is not equally sensitive to all frequencies, a large number of frequency weighting schemes have been used to develop composite decibel scales that approximate the way the human ear responds to noise levels. The "A-weighted" decibel scale (dBA) is the most widely used for this purpose. The A-weighted scale significantly reduces the measured pressure level for low-frequency sounds while slightly increasing the measured pressure level for some high-frequency sounds.

Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (Leq) are used to develop single-value descriptions of average noise exposure over various periods of time. Such average noise exposure ratings often include additional weighting factors for potential annoyance due to time of day or other considerations. The Leq data used for these average noise exposure descriptors are generally based on A-weighted sound level measurements.

Average noise exposure over a 24-hour period is often presented as a day-night average sound level (L_{dn}) or as a community noise equivalent level (CNEL). L_{dn} values are calculated from hourly Leq values, with the Leq values for the nighttime period (10 PM to 7 AM) increased by 10 dB to reflect the greater disturbance potential from nighttime noises. CNEL values are very similar to L_{dn} values but include a 5-dB annoyance adjustment for evening (7 PM to 10 PM) Leq values in addition to the 10-dB adjustment for nighttime Leq values. Unless specifically noted otherwise, L_{dn} and CNEL values are assumed to be based on dBA measurements. Because CNEL and L_{dn} values for the same noise condition seldom differ by more than one dB, they are often used interchangeably when interpreting noise level criteria and standards.

Regulatory Considerations

Various federal, state, and local agencies have developed guidelines for evaluating land use compatibility under different noise level ranges. Residential, educational, religious, and healthcare land uses generally are recognized as being noise-sensitive.

Federal Agency Guidelines. The federal Noise Control Act of 1972 (Public Law 92-574) established a requirement that all federal agencies must comply with applicable federal, state, interstate, and local noise control regulations. Local and state agencies have no applicable authority over military aircraft operations. Federal agencies also were directed to administer their programs in a manner that promotes an environment free from noise that Executive Order 13045 establishes a requirement that federal agencies identify, assess, and address the extent to which agency programs and activities create disproportionate environmental health and safety risks for children.

Noise levels on military bases are generally evaluated as part of installation compatible use zone studies. When military airfields are present, these studies are called AICUZ studies. An AICUZ study categorizes different portions of the installation for both noise exposure conditions and safety hazard conditions. Safety hazard conditions are indicated as accident potential zones (discussed in Section 3.1, Land Use and Airspace and 3.11, Public Health and Safety). Noise levels are mapped according to three general noise exposure zones:

- Zone 1: areas exposed to CNEL levels below 65 dB;
- Zone 2: areas exposed to CNEL levels of 65-75 dB; and
- Zone 3: areas exposed to CNEL levels above 75 dB.

Any on-base land uses are compatible with Zone 1 noise levels. Industrial, administrative, and personnel support uses are generally compatible with Zone 2 noise levels. Educational and residential land uses generally are not compatible with Zone 2 noise levels unless special acoustic treatments and designs are used to ensure acceptable interior noise levels. Administrative, residential, and personnel support land uses are not compatible with Zone 3 noise levels. Industrial and manufacturing land uses may be acceptable in Zone 3 areas if special building designs and other measures are implemented.

State Agency Guidelines. State noise standards and guidelines include airport noise standards; guidelines for noise elements of general plans, and noise insulation standards for hotels, motels, and new multi-unit residential construction.

The California Department of Aeronautics has adopted airport noise standards (CCR Title 21, Section 5012) that define an airport noise impact zone as the area within the 65-dB CNEL contour around an airport. Construction of noise-sensitive land uses (public and private schools, hospitals, convalescent homes,

churches, and residences) are prohibited or discouraged within the noise impact zone around an airport.

The California Department of Health Services (1987) has published guidelines for the noise element of local general plans. These guidelines include a noise level/land use compatibility chart that categorizes outdoor CNEL or L_{dn} levels into as many as four compatibility categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable), depending on land use (see Figure 3-1). Normally acceptable noise levels for low-density residential uses are identified as CNEL values below 60 dB. The normally acceptable range for high-density residential uses is identified as CNEL values below 65 dB. For educational and medical facilities, CNEL values of 60 to 70 dB are identified as conditionally acceptable. For office and commercial land uses, CNEL values of 67.5 to 77.5 dB are categorized as conditionally acceptable. Local cities and counties are free to adopt different land use compatibility guidelines as part of the noise element of their general plan.

The California Department of Housing and Community Development has adopted noise insulation performance standards for new hotels, motels, and dwellings other than detached single-family structures. These standards (CCR Title 24, Part 6, Section T25-28) require that hotels, motels, and multiple unit dwellings be constructed so that outdoor noise sources will not cause interior noise levels to exceed an annual average CNEL value of 45 dB with the windows closed.

Local Guidelines and Criteria. Cities and counties in California are required to adopt noise elements as part of the local general plan. Noise elements identify existing and anticipated noise problems, programs to remedy these problems when feasible, and programs to minimize the creation of future noise problems. Some cities and counties also adopt noise ordinances to establish limitations and enforcement procedures for various categories of fixed noise sources. State and federal law preempts most direct local regulation of noise from motor vehicles, locomotives, ships, and aircraft.

3.7.1 NAS Lemoore Alternative

Affected Area

Noise levels decrease with increasing distance away from the noise source, resulting in a fairly limited area affected by noise. The affected area for fixed site noise sources (such as industrial equipment or construction sites) is generally less than 0.5 miles (0.8 km) from the noise source. The affected area for aircraft noise is generally within 2 or 3 miles (3 or 5 km) of the airfield, and within 1 mile (1.6 km) on either side of major flight track corridors where flight altitudes will be below 10,000 feet (3,050 m). The affected area for traffic noise sources is generally less than 1,000 feet (305 m) from roadways experiencing significant changes in traffic volumes.

Local Community Noise Level Criteria

Aircraft operations from NAS Lemoore, crop dusting operations, and highway traffic are the major contributors to noise conditions in Kings County. NAS Lemoore is the major airfield in Kings County. Hanford Municipal Airport and Corcoran Airport are minor sources of aircraft noise. State routes 198 and 41 are the major state highways near NAS Lemoore.

The noise element of the Kings County general plan sets a CNEL level of 60 dB as the marginally acceptable limit for residential and other noise-sensitive land uses. The Kings County general plan discourages development of any sort within 3 miles (5 km) of NAS Lemoore.

The noise element of the Fresno County general plan uses an L_{dn} of 60 dB to define land uses affected by noise. In addition, the noise element of the Fresno County general plan uses a median noise level (L_{50}, or the noise level exceeded 50 percent of the time) measure to identify general land use compatibility conditions. An L_{50} of 50 dBA is the acceptable noise limit for rural residential development, while an L_{50} of 55 dBA is identified as the acceptable limit for urban residential and other noise-sensitive land uses.

Existing Aircraft Noise

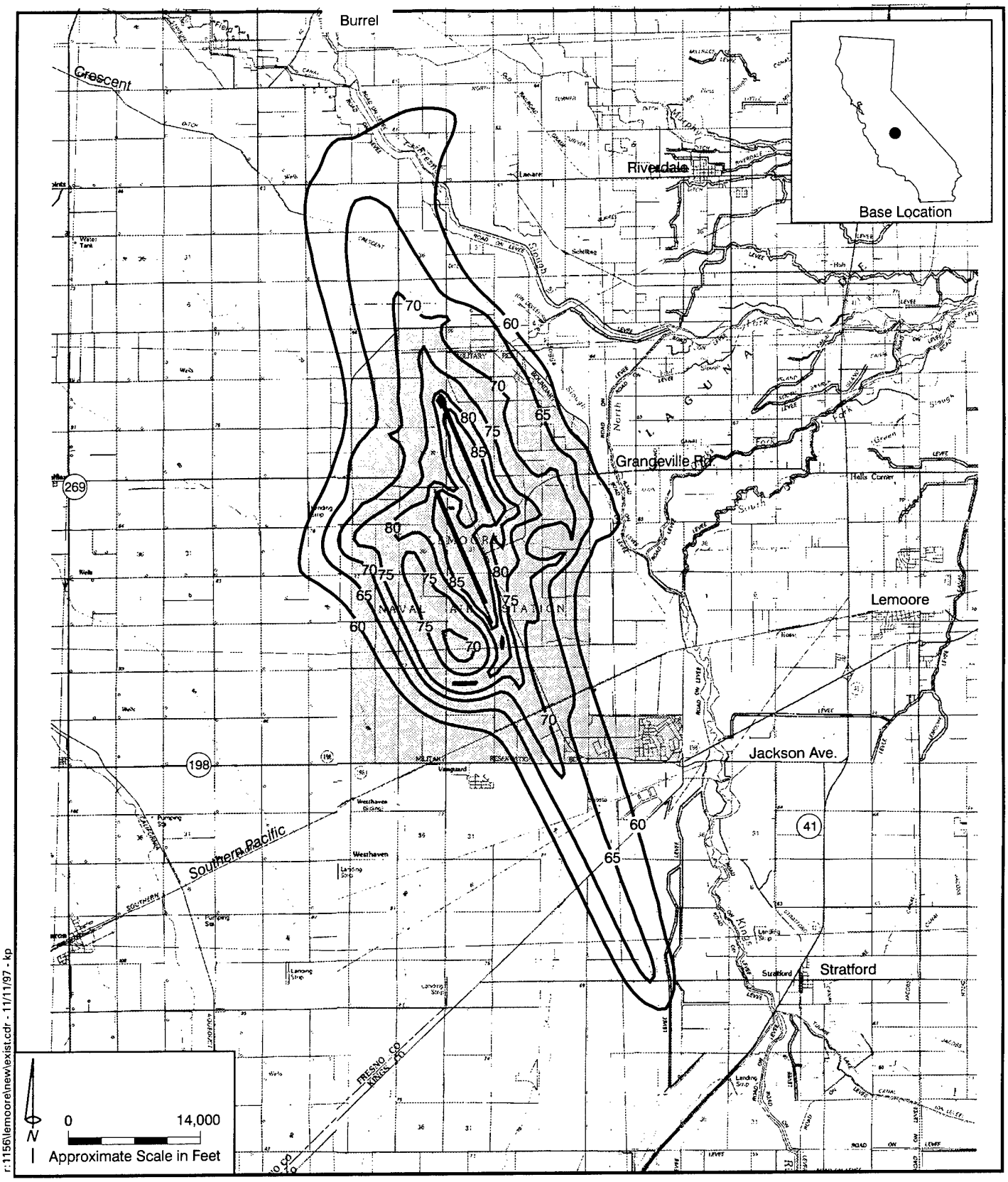
Figure 3-17 illustrates 1997 aircraft noise conditions around the airfield at NAS Lemoore. The 65-dB CNEL contour encompasses about 34,250 acres (13,700 ha), mostly within NAS Lemoore boundaries. The 65-dB CNEL contour extends off base along major approach and departure flight paths.

On-base land uses at NAS Lemoore are separated into an operations area, an administrative area, and a housing area. Some bachelor housing facilities are in the administrative area. Some portions of the administrative area, including BEQ and BOQ facilities, fall within the 65-dB CNEL contour (Zone 2). Family housing areas generally are exposed to CNEL conditions below 60 dB. The AICUZ study recommends building design and acoustic insulation measures to achieve acceptable interior noise levels for buildings within the 65-dB contour.

NAS Lemoore is surrounded by agricultural land uses. The closest residential developments are in Lemoore (7 miles [11 km] to the east), Stratford (6 miles [10 km] to the southeast), and Hanford (17 miles [27 km] to the east). Noise complaints from off-base areas are generally infrequent, averaging about seven per year (US Navy 1993b).

Existing Traffic Noise

Table 3-27 summarizes traffic noise levels along off-base major roadways near NAS Lemoore. The highest traffic noise levels occur along State Route 198. Any noise-sensitive developments along major roadways in Kings and Fresno counties are required to use setbacks, perimeter walls, or other measures to mitigate noise exposure conditions.



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The 65-dB CNEL contour extends off base along major approach and departure flight paths.

LEGEND:

—75— Community Noise Equivalent Level (CNEL) in decibels (dB)

NAS Lemoore

NAS Lemoore
Existing Noise Contours

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 3-17

Source: Wyle 1997.

Table 3-27
Existing Traffic Noise Levels Near NAS Lemoore

Location	CNEL at 100 feet to C/L (dBA)	Distance to 65 dB CNEL Contour (feet)
Grangeville Road		
West of SR-41	66.8	130
SR-41		
North of Grangeville	69.1	190
SR-198/Jackson Avenue		
SR-41 – Avenal Cutoff	70.6	240
East of Main Gate	68.3	170
West of Main Gate	65.3	100

Source: Giroux & Associates 1996.

3.7.2 NAF El Centro Alternative

Affected Area

The decrease in noise levels with increasing distance away from the noise source results in a fairly limited affected area for noise issues. The affected area for fixed site noise sources (such as industrial equipment or construction sites) is generally less than 0.5 miles (0.8 km) from the site. The affected area for aircraft noise is generally within 2 or 3 miles (3 or 5 km) of the airfield, and within 1 mile (1.6 km) on either side of major flight track corridors where flight altitudes will be below 10,000 feet (3,050 m). The affected area for traffic noise sources is generally less than 1,000 feet (305 m) from roadways experiencing significant changes in traffic volumes.

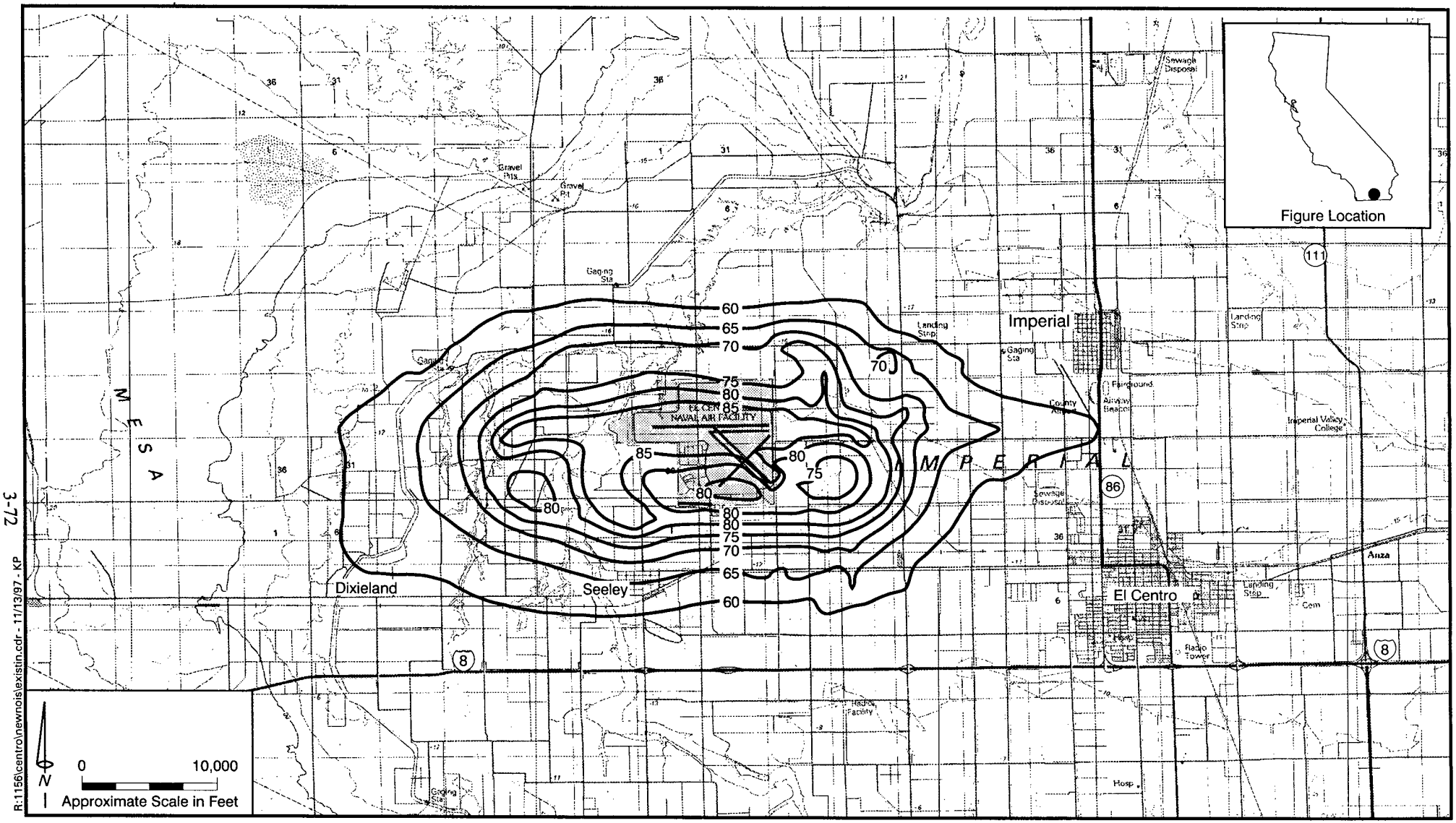
Local Community Noise Level Criteria

Aircraft operations associated with NAF El Centro and adjacent MOAs are major contributors to noise conditions in the southern part of Imperial County. Additional aircraft noise is contributed by crop dusting activity and aircraft operations from Imperial County Airport and Brawley Municipal Airport.

The noise element of the Imperial County general plan sets a CNEL level of 65 dB as the acceptable limit for residential and professional office uses. A noise impact analysis is required for proposed developments that would be exposed to CNEL values above 60 dB.

Existing Aircraft Noise

Figure 3-18 illustrates 1997 aircraft noise conditions around the airfield at NAF El Centro. The 65-dB CNEL contour extends well beyond the boundaries of NAF El Centro. Noise levels are generally higher than indicated on Figure 3-18 during



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Existing noise contours do not extend into the Town of Imperial or city of El Centro.

LEGEND:

— 75 — Community Noise Equivalent Level (CNEL) in decibels (dB)

NAF El Centro

NAF El Centro
Existing Noise Contours

Facility Development for West Coast Basing of the F/A-18-E/F Aircraft

Source: Wyle 1997

Figure 3-18

winter months when the Blue Angels are at NAF El Centro. Noise levels are lower than indicated on Figure 3-16 during the hottest summer months when flight activity is reduced.

All on-base land uses at NAF El Centro, including family housing areas and BOQs, are exposed to CNEL conditions above 75 dB (Zone 3). Because relocating these facilities is not practical, the AICUZ study recommends building design and acoustic insulation measures to achieve acceptable interior noise levels.

NAF El Centro is surrounded by agricultural open space land uses. The closest residential developments are in Seeley (1 mile [1.6 km] to the south), Imperial (6 miles [10 km] to the east), and El Centro (7 miles [11 km] to the southeast). Noise complaints from off-base areas come mostly from El Centro. Most noise complaints are triggered by unusual individual flights rather than by routine airport noise conditions. Flight patterns at NAF El Centro are modified from standard operations to minimize overflights of populated areas and recognized noise-sensitive areas.

Existing Traffic Noise

Table 3-28 summarizes traffic noise levels along off-base major roadways providing access to NAF El Centro. The highest traffic noise levels occur along Imperial Avenue.

Table 3-28
Existing Traffic Noise Levels Near NAF El Centro

Location	CNEL at 100 feet to Centerline (dBA)	Distance to 65 dB CNEL Contour (feet)
Evan Hewes Highway		
West of Drew	64.4	90
Drew – Bennett	64.4	90
Bennett - Forester	66.3	120
Forrester - Imperial	66.2	120
Drew Road		
North of Evan Hewes	59.7	<50
South of Evan Hewes	62.8	70
Bennett Road		
North of Evan Hewes	62.8	70
South of Evan Hewes	61.8	60
Forrester Road		
North of Evan Hewes	64.3	90
South of Evan Hewes	66.6	130
Imperial Avenue		
North of Evan Hewes	69.5	200
South of Evan Hewes	61.8	60

Source: Giroux & Associates 1996

3.8 BIOLOGICAL RESOURCES

This section describes the biological resources at NAS Lemoore and NAF El Centro. This discussion of biological resources includes vegetation, wildlife, special status species, and sensitive habitats.

Definition of Resource

For the purpose of this report, biological resources are defined as all plant and animal species that occur within the two alternative facilities. Plant associations or recognizable floristic groupings or "plant communities" are referred to as habitat types in this report, and vegetation and wildlife associated with the groupings are described. Sensitive biological resources are defined as those plant and animal species that are listed as threatened or endangered by the United States Fish and Wildlife Service (USFWS) or California Department of Fish and Game (CDFG), and species proposed for federal or state listing. Sensitive vegetation types and wildlife habitats include those that receive federal regulatory protection.

Analysis Approach

Biological resource data were collected from existing reports as described for each base and from field investigations. Nomenclature used throughout this report conforms to Hickman (1993) for plants, Holland (1986) for plant communities, Farrand (1985) for birds, Stebbins (1985) for reptiles and amphibians, and Ingles (1965) for mammals.

Special status species were identified by querying the California Natural Diversity Database (RAREFIND), an electronic database of the California Department of Fish and Game (CDFG) (1997), the Electronic Inventory, an electronic database for the California Native Plant Society (CNPS) (Skinner and Pavlik 1994), and from a list provided by the USFWS (Appendix G) of species that may occur at each base. In addition, field investigations were conducted from July 28 to August 1, 1997, to verify information contained in the reference documents and to identify any significant resources.

Regulatory Considerations

Federal Endangered Species Act. The Federal Endangered Species Act requires that the USFWS issue a permit prior to actions that would result in killing, harming, or harassing a federally listed endangered or threatened species. This permit process is directed under Section 7 of the federal Endangered Species Act for actions in which a federal agency is involved and in a similar process under Section 10a of the federal Endangered Species Act for state and local agencies, as well as for individuals. Federal agencies are required to consult with the USFWS (or National Marine Fisheries Service [NMFS] for some species) prior to undertaking actions that may affect endangered species. A federal agency is required to obtain a biological opinion from the USFWS on whether its actions may jeopardize the continued existence of any threatened or endangered species. Federal agencies are prohibited from enacting activities that would jeopardize the continued existence of these species.

California Endangered Species Act. California provides procedures similar to the Federal Endangered Species Act for nonfederal projects under the California Endangered Species Act, California Fish and Game Code (Section 2090 et seq.). For example, the CDFG can adopt a federal biological opinion as a state biological opinion under California Fish and Game Code (Section 2095).

Wetlands Protection. Executive Order 11990 requires that federal agencies avoid construction in wetlands unless no practicable alternative to the construction exists and that all practicable measures to minimize harm to wetlands, including opportunities for public review of plans or proposals, are provided. Wetlands are considered sensitive and declining resources by several regulatory agencies, including the CDFG and the USFWS. The US Army Corps of Engineers (COE) considers wetlands to be important to the public interest in that they perform significant biological functions, such as providing nesting, breeding, foraging, and spawning habitat for a wide variety of resident and migratory animal species. Wetlands also provide for the movement of water and sediments, ground water recharge, water purification and for the storage of stormwater runoff.

The COE defines wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The COE regulates impacts to wetlands and other waters under Section 404 of the Clean Water Act. Projects that involve excavating dredged or fill material into waters of the United States, including wetlands, must be reviewed and authorized by the COE and reviewed by the US EPA.

3.8.1 NAS Lemoore Alternative

Affected Area

The affected area for biological resources at NAS Lemoore includes the operations and administrative housing areas. These are the only areas where there is a potential for impacts. The Natural Resources Management Plan for NAS Lemoore (US Navy 1990c) identified habitat types found on base that are described below.

Vegetation

Buildings, roads, parking lots, landscaped areas, and disturbed annual grasslands cover most of NAS Lemoore's administrative, housing, and operational areas. Agricultural lands with little or no native vegetation surround the developed areas. Wetlands associated with the irrigation and drainage ditches are found in the agricultural areas and in the Sunset Lakes area in the northeast corner of the property.

Developed and Landscaped Lands. The vegetation in the developed and landscaped areas of NAS Lemoore consists of ornamental trees, shrubs, and small lawn areas

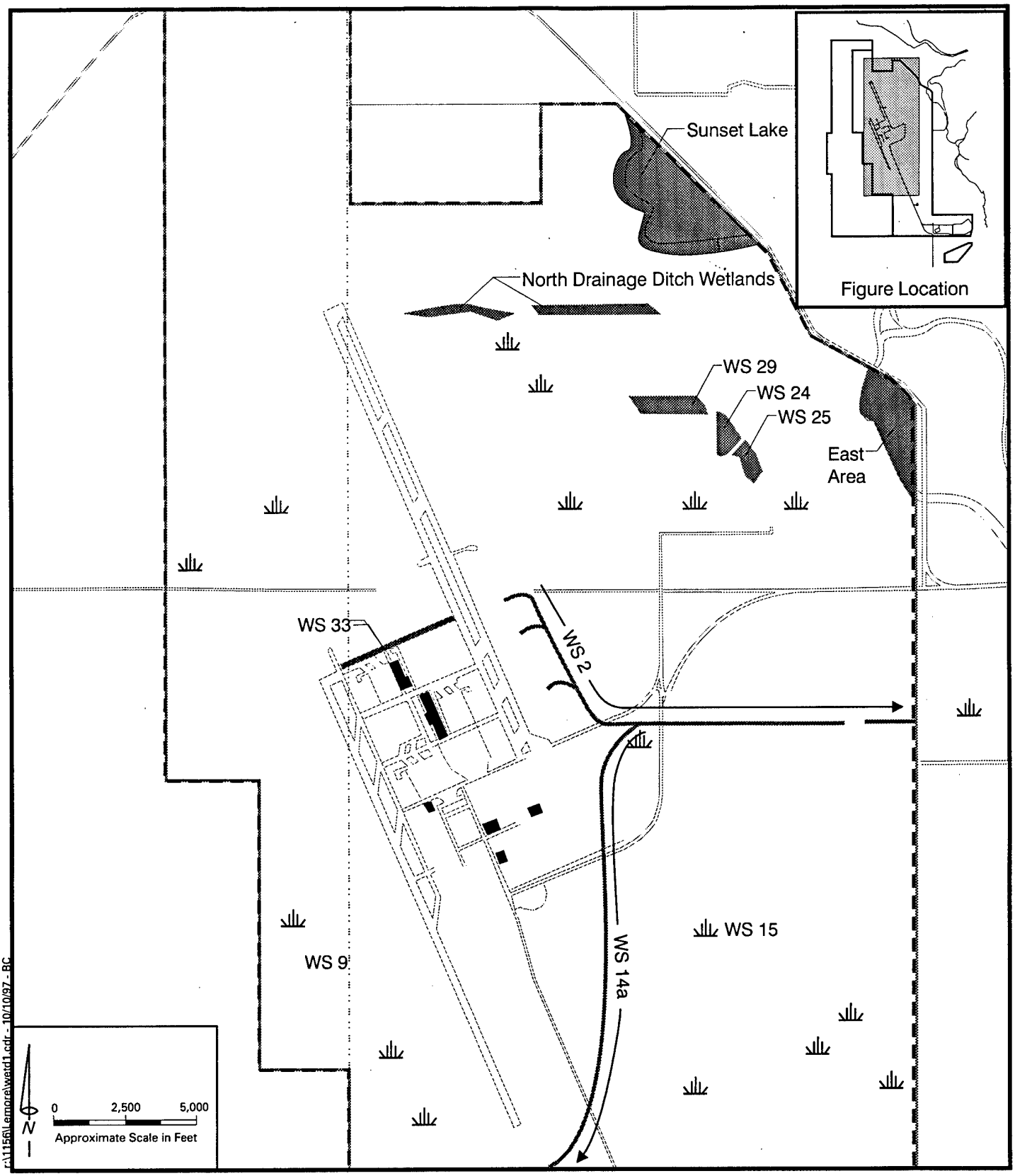
near selected buildings. Representative trees and shrubs found within the operations area include Washingtonian palm (*Washingtonian* sp.), honey locust (*Gleditsia triacanthos inermis*), black locust (*Robinia pseudo-acacia*), oleander (*Nerium oleander*), and pyracantha (*Pyracantha* sp.). The small lawn areas are planted with Bermuda grass (*Cynodon dactylon*).

The administration area includes juniper (*Juniperus* sp.), fir (*Abies* sp.), pine (*Pinus* sp.), incense cedar (*Libocedrus decurrens*), tamarisk (*Tamarix sp.*), acacia (*Acacia* sp.), honey locust, ash (*Fraxinus* sp.), olive (*Olea* sp.), eucalyptus (*Eucalyptus* sp.), Fremont cottonwood (*Populus fremonti*), poplar (*Populus* sp.), willow (*Salix* sp.), sycamore (*Platanus* sp.), Washington palm, palo ornamental fruit trees (*Cercidium* sp.), palo verde (*Cercidium torreyanum),* crepe myrtle (*Lagerstroemia indica),* and pomegranate (*Punica granatum*). There are few native plant species found in these areas.

Disturbed Annual Grassland. Disturbed annual grasslands surround the developed areas and are found almost entirely associated with the administrative area. These areas are mowed and plowed annually to reduce the threat of fire. The plants found in these areas include canary grass (*Phalaris canariensis*), barley (*Hordeum stebbinsi*), foxtail chess (*Bromus madritensis*), fiddleneck (*Amsinckia* sp.), Russian thistle (*Salsola pestifer*), wild oats (*Avena fatua*), vinegar weed (*Trichostema lanceolatum*), and sweet fennel (*Foeniculum vulgare).*

Agricultural. Cotton is the largest agricultural crop grown on NAS Lemoore. Other crops grown include barley, wheat, sugar beets, alfalfa, field corn, tomatoes, beans, onions, garlic, safflower, and melons. There is very little natural vegetation in the agricultural areas as the fields are plowed to the edge of roads and irrigation ditches. Plant species common to the disturbed grassland are sparsely distributed along dirt access roads and ditches, and some species common to the wetland areas can be found in the irrigation ditches or near well heads.

Wetlands. Wetlands found at the NAS Lemoore site are described in the Wetland Identification and Classification Report (Tetra Tech 1996) and are indicated on Figures 3-19 and 3-20. Nearly all of the wetlands on NAS Lemoore are associated with irrigated agriculture, primarily with the location of Westlands Water District irrigation valves and ditches. All but two wetland areas occur in engineered excavations. Five of the inventoried wetlands are of sufficient size and permanence to be of significance to wildlife of the area. While the remaining wetlands have hydrophytes growing within them, the hydrology of the area does not naturally provide a sufficient water source for them to be of significance to wildlife. Standing water occurs in these locations only due to intermittent seepage from irrigation pipes or pumped irrigation water.



Wetland areas are scattered throughout the base on agricultural outlease lands.

LEGEND:

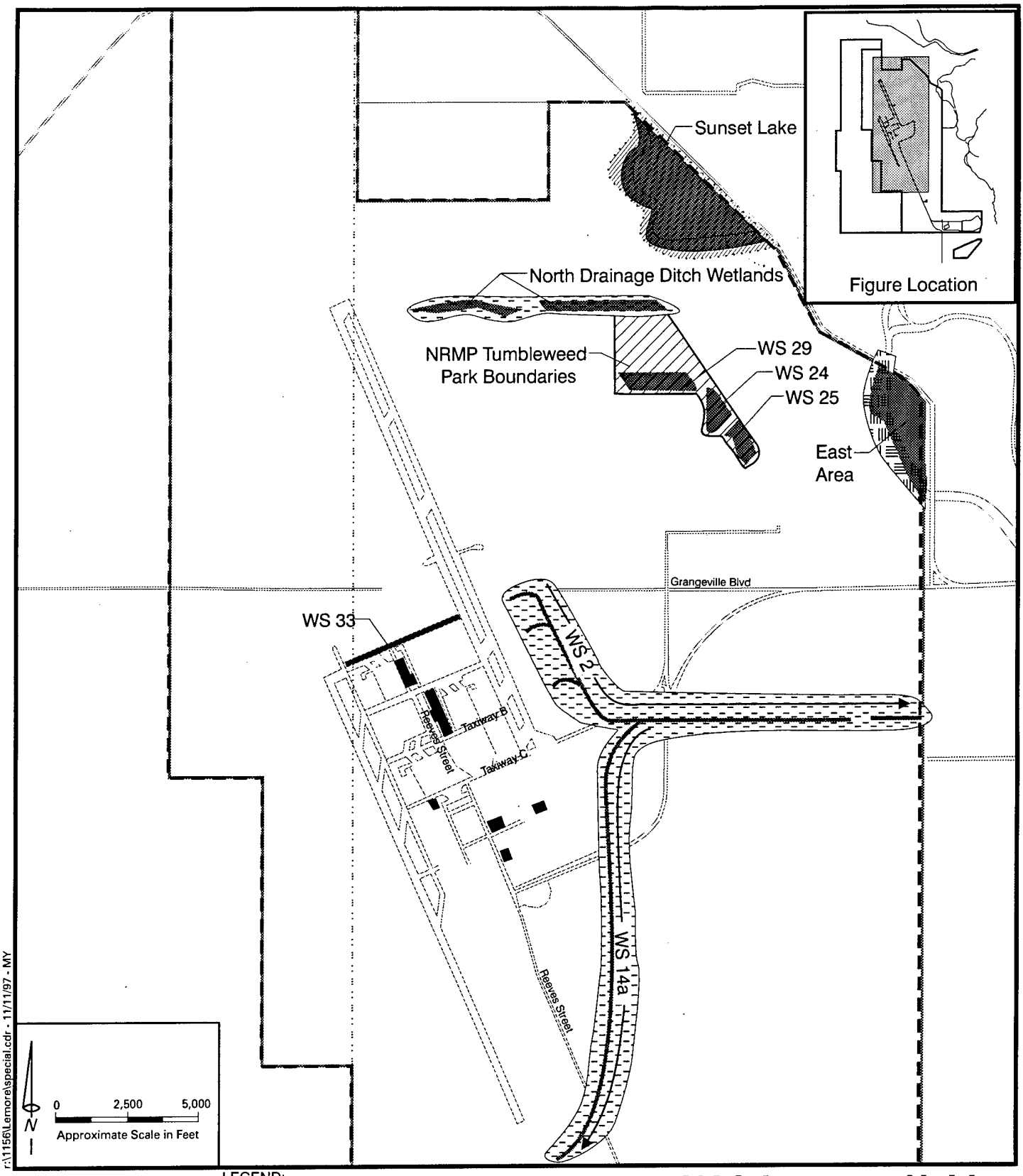
- Wetland areas
- Other wetland areas
- Construction/Expansion Projects
- NAS Lemoore Boundary

NAS Lemoore Wetland Areas: Operations Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy GIS Data; Crane, 1997; Donn, 1997.

Figure 3-19



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Habitat for special status species occurs to the north and east of the proposed construction sites.

LEGEND:

- Other wetland areas
- Giant garter snake potential habitat
- Valley elderberry long horn beetle potential habitat
- Tipton/Fresno kangaroo rat habitat (Tumbleweed Park)
- Potential California least tern and western snowy plover habitat
- Construction/Expansion Projects
- NAS Lemoore Boundary

NAS Lemoore Habitat for Special Status Species: Operations Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy GIS Data; Crane, 1997; Donn, 1997.

Figure 3-20

Three wetlands occur near the NAS Lemoore Operations Area; however, none occur in or directly adjacent to proposed project locations. No wetlands occur within the Administration/Housing Area of NAS Lemoore. Wetland sites 2, 33, and 9 are within or partially within the boundary of the Operations Area (Figure 3-19). Wetland site 2 consists of the main drainage ditch, running southeast to east along the northeast and east sides of Runway 32-R. This wetland site alternates between open water and freshwater marsh habitat. It is heavily overgrown, containing such freshwater marsh species as cattails (*Typha* sp.), umbrella sedge (*Cyperus* sp.), curly dock (*Rumex crispus*), and rabbitfoot beard grass (*Polypogon monspeliensis*), along with blueweed (*Helianthus ciliaris*), narrow-leaf milkweed (*Asclepias fascicularis*), bush seepweed (*Suaeda moquinii*), foxtail chess (*Bromus madritensis rubens*), saltgrass (*Distichlis spicata*), and alkali-mallow (*Malvella leprosa*), which line the edges of the banks. The main drainage ditch carries runoff from the Flight Operations Area and agricultural land across NAS Lemoore in an easterly direction to the Kings River. Although no proposed project actions are planned in this area, this wetland site has trapped sediments and heavy metal residuals from numerous years of aircraft washdowns and has been declared an Installation Restoration (IR) site.

Wetland site 33 consists of the drainage ditch that runs between taxiways 32-R and 32-L at the north end of the Operations Area. This wetland site alternates between open water and freshwater marsh habitat. The dominant vegetation within the ditch includes blueweed, dallis grass (*Paspalum dilatatum*), and heliotrope (*Heliotropium* sp.), with additional plant species including bristly ox-tongue (*Picris echioides*), prickly sow thistle (*Sonchus asper*) and cocklebur (*Xanthium strumarium*). This ditch transports runoff to the main drainage ditch.

Wetland site 9 consists of a small open-water sump pond located on the western side of NAS Lemoore Operations Area. The wetland area contains cattails and water smartweed (*Polypogum amphibium*). Black willows (*Salix gooddingii*), tamarisk, heliotrope, bristly ox-tongue, dallis grass, and blueweed line the edges of the pond. This wetland site is near the southwest corner of the Operations Area, well away and upslope of any proposed project sites.

Wildlife

Wildlife found at NAS Lemoore represent those common to the San Joaquin Valley and are described below by habitat type.

Developed and Landscaped Lands. Wildlife found in these areas are typical of urban areas and include house mouse (*Mus musculus*), roof rat (*Rattus rattus*), pocket gopher (*Thomomys* sp.), and California ground squirrel (*Spermophilus beecheyi*). Bird species include mourning dove (*Zenaida macroura*), house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), European starling (*Sturnus vulgaris*), rock dove (*Columba livia*), barn swallow (*Hirundo rustica*) and Brewer's blackbird (*Euphagus cyanocephalus*).

Disturbed Annual Grassland. Mammals associated with this habitat type at NAS Lemoore include black-tailed jackrabbit (*Lepus californicus*), cottontail (*Sylvilagus audubonî*), coyote (*Canis latrans*), skunk (*Mephitis* sp.), opossum (*Didelphis marsupialis*), and a number of rodents, such as ground squirrel (*Spermophilus* sp.), the Fresno kangaroo rat (*Dipodomys nitratoides exilis*), and Tipton kangaroo rat (*D. n. nitratoides*). Reptiles associated with this habitat type include western whiptail (*Cnemidophorus tigris*), western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), and gopher snake (*Pituophis melanoleucus).* Common bird species include loggerhead shrike (*Lanius ludovicianus*), common raven (*Corvus corax*), western burrowing owl (*Athene cunicularia hypugea*), and American kestrel (*Falco sparverius*).

Agricultural. Some 46 species of water birds and shore birds have been observed on the base, including a variety of herons, egrets, geese, ducks, plovers, sandpipers, and gulls (US Navy 1990c). These birds are most numerous during the winter and spring months and are most commonly associated with the agricultural and wetland areas. Thirteen species of raptors also have been seen on-base. These include nine species of hawk and four species of owl, including western burrowing owl. In addition, the agricultural areas support game birds, such as mourning dove and ring-necked pheasant (*Phasianus colchicus*), and a wide variety of other birds, including red-winged blackbird (*Agelaius phoeniceus*), tricolored blackbird (*Agelaius tricolor*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Reptiles, amphibians, and mammals found here include those associated with the disturbed grassland but at much lower population levels.

Wetlands. Most amphibians and reptiles associated with wetland areas are confined to the irrigation and drainage ditches found on the base and the wetland areas in the northeast corner of the base. Common species include California treefrog (*Hyla californiae*), bullfrog (*Rana catesbeiana*), western aquatic garter snake (*Thamnophis couchî*), and common kingsnake (*Lampropeltis getulus*). Bird species commonly using the wetland areas include great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), American coot (*Fulica Americana*), red-winged blackbird, and marsh wren (*Cistothorus palustris*).

Special Status Species

Table 3-29 describes status and presence at NAS Lemoore for threatened and endangered species and species of special concern that were identified by the USFWS (Appendix G). This table includes species found within Fresno and Kings counties whose range or habitat requirements could include NAS Lemoore. Seven federally listed endangered species, seven federally threatened species, 19 species of federal concern, seven state-listed endangered species, three state-listed threatened species, and four state species of special concern could occur at NAS Lemoore. Figures 3-20 and 3-21 depict known special status species habitat at NAS Lemoore.

Table 3-29
Sensitive Species Inhabiting or Potentially Inhabiting the Vicinity of NAS Lemoore

Scientific Name	Common Name	Federal/State/ CNPS Status	Present on Project Site?
Mammals			
Ammospermophilus nelsoni	Nelson's antelope ground squirrel	SC/-/-	P
Dipodomys ingens	giant kangaroo rat	E/E/-	U
D. nitratoides	Fresno kangaroo rat	E/E/-	C
D. nitratoides brevinasus	short-nosed kangaroo rat	SC/-/-	P
D. nitratoides nitratoides	Tipton kangaroo rat	E/E/-	C
Eumops perotis californicus	greater western mastiff bat	SC/-/-	P
Myotis ciliolabrum	small-footed myotis bat	SC/-/-	U
Myotis volans	long-legged myotis bat	SC/-/-	P
Myotis yumanensis	Yuma myotis bat	SC/-/-	P
Onychomys torridus tularensis	Tulare grasshopper mouse	SC/-/-	P
Perognathus inornatus	San Joaquin pocket mouse	SC/-/-	U
Plecotus townsendii townsendii	Pacific western big-eared bat	SC/-/-	P
Vulpes macrotis mutica	San Joaquin kit fox	E/T/-	P
Birds			
Athene cunicularia hypugea	western burrowing owl	SC/CSC/-	C
Branta canadensis leucopareia	Aleutian Canada goose	T/-/-	P
Buteo regalis	ferruginous hawk	SC/-/-	P
Charadrius alexandrinus nivosus	western snowy plover	T/CSC/-	P
Charadrius montanus	mountain plover	C/-/-	P
Empidonax traillii brewsteri	little willow flycatcher	SC/E/-	U
Falco peregrinus anatum	American peregrine falcon	E/E/-	P
Haliaeetus leucocephalus	bald eagle	T/E/-	P
Plegadis chihi	white-faced ibis	SC/-/–	C
Sterna antillarum brownii	California least tern	E/E/-	P
Reptiles			
Clemmys marmorata marmorata	northwestern pond turtle	SC/-/-	P
Clemmys marmorata pallida	southwestern pond turtle	SC/-/-	P
Crotaphytus silus	blunt-nosed leopard lizard	E/-/-	P
Masticophis flagellum ruddocki	San Joaquin whipsnake	SC/-/-	P
Phrynosoma coronatum frontale	California horned lizard	SC/-/-	U
Thamnophis gigas	giant garter snake	T/T/-	P
Amphibians			
Rana aurora draytoni	California red-legged frog	T/CSC/-	U
Scaphiopus hammondi	western spadefoot toad	SC/CSC/-	U
Fish			
Hypomesus transpacificus	delta smelt	T/T/-	Unknown
Invertebrates			
Branchinecta lynchi	vernal pool fairy shrimp	T/-/-	P
Desmocerus californicus dimorphis	valley elderberry longhorn beetle	T/-/-	P
Lytta molesta	molestan blister beetle	SC/-/-	Unknown

Source: USFWS 1997a; CDFG 1997.

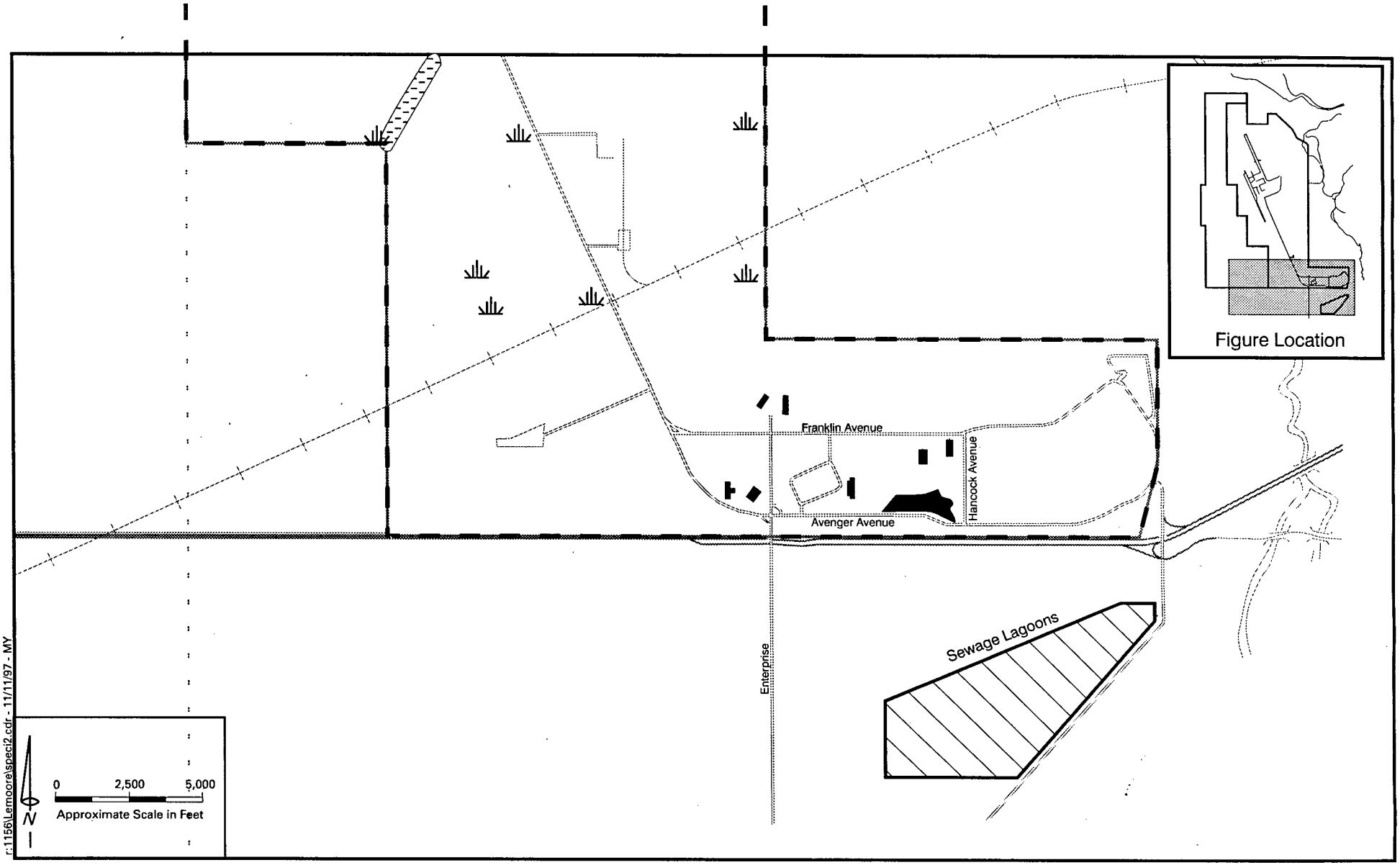
Notes:

Federal Status
E = Endangered
T = Threatened
PE = Proposed endangered
PT = Proposed threatened
SC= Species of concern

State/CDFG Status
E = Endangered
T = Threatened
R = Rare
CSC = California species of special concern

CNPS Status
1B = Rare and endangered in California and elsewhere
4 = Limited distribution

Present?
C = Confirmed
P = Possible
U = Unlikely



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Habitat for the Least tern and western snowy plover occurs north of the proposed NAMTRA and Counseling and assistance Center.

LEGEND:

- Wetland areas
- Potential giant garter snake habitat
- California least tern and western snowy plover habitat
- Construction/Expansion Projects
- NAS Lemoore Boundary

Source: US Navy GIS Data; Crane, 1997; Donn, 1997.

NAS Lemoore Habitat for Special Status Species: Administration/Housing Area

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 3-21

3.8.2 NAF El Centro Alternative

Affected Area

The affected area for biological resources includes resources within the boundaries of NAF El Centro. The Integrated Natural Resources Management Plan for NAF El Centro (US Navy 1997f) identifies the habitat found on base; these habitat types are described below.

Vegetation

Most of the lands at NAF El Centro have been heavily disturbed. Some areas are developed with structures or are paved and include a minimum of landscaping. Other areas have been graded or plowed to reduce the fire hazard, while still other areas are in agricultural production. The character of remaining disturbed plant communities is strongly influenced by the sparseness and unpredictability of rainfall and soil alkalinity.

Developed and Landscaped Areas. This habitat type includes buildings, parking areas, and landscaped areas within NAF El Centro. Common plant species found include eucalyptus, Brazilian pepper tree (*Schinus terebinthifolius*), and oleander. Few native plants are found in these areas.

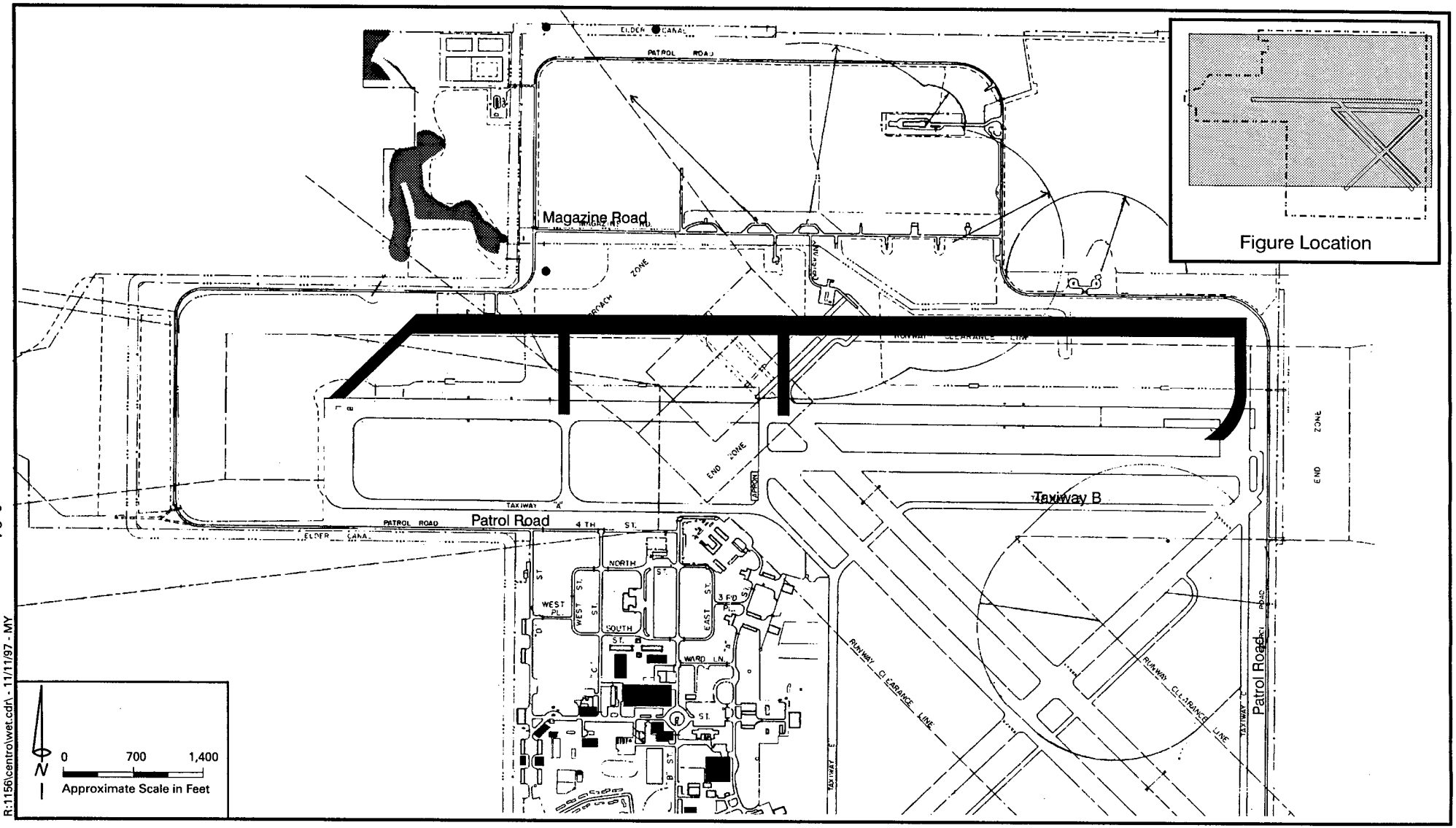
Disturbed Grassland. These areas include dirt roads, bare soil, and other disturbed lands. Wildlife diversity is low due to human disturbance and the absence or scarcity of vegetation. Weedy species, such as telegraph weed (*Heterotheca grandiflora*), black mustard, and Bermuda grass, tend to exist in undeveloped areas, such as between taxiways and runways and in many of the large bare soil areas.

Agricultural. Crops grown on the agricultural lands leased to farmers by NAF El Centro include alfalfa and Bermuda grass for seed. Many of the same species found in the disturbed grassland areas are found on field edges or irrigation ditches.

Wetlands. The Natural Resources Conservation Service completed a jurisdictional wetland delineation of NAF El Centro on November 1996. Figure 3-7 shows the location of jurisdictional wetlands found on NAF El Centro. The only jurisdictional wetland that was identified is in the northeast corner of the base in an old riverbed of New River. There are no other jurisdictional wetlands found on the base. There are several irrigation ditches on the base, which were examined during a field visit on July 31, 1997, but there is no indication of hydric soils or sufficient hydrologic conditions to support a wetland.

Wildlife

Developed and Landscaped Areas. Wildlife associated with the developed portions of NAF El Centro include mice, ground squirrels, bats, and opossums. Birds commonly found in this habitat type include rock dove, mourning dove, common grackle (*Quiscalis quiscula*), Brewer's blackbird, house finch, and house sparrow.



Wetland areas occur north of proposed construction sites.

LEGEND:

- Wetland areas
- Construction/Expansion Projects

NAF El Centro Wetland Areas

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1997.

Figure 3-22

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Disturbed Grassland. The disturbed grasslands support black-tailed jack rabbits, ground squirrels, kangaroo rats (*Dipodomys* sp.), and skunks. Bird species include killdeer (*Charadrius vociferus*), lesser nighthawk (*Chordeiles acutipennis*), western burrowing owl, and American kestrel. Reptiles found in the disturbed grassland areas at NAF El Centro include side-blotched lizards, desert horned lizard (*Phrynosoma platyrhinos*), and desert spiny lizards (*Sceloporus magister*).

Agricultural Lands. The agricultural lands, with monotypic planting, provide temporary habitat for a limited number of wildlife species that tolerate human activities. Coyote, raccoon (*Procyon lotor*), skunk, and a variety of small rodents can be found associated with the agricultural lands. Bird species sighted on agricultural lands on the base include great blue heron, burrowing owl, northern harrier (*Circus cyaneus*), white-faced ibis (*Plegadis chichi*), great egret, snowy egret, and red-winged blackbird. The Salton Sea and Pacific Flyway, located to the north of NAF El Centro, attract many species of birds, including migratory waterfowl that use the agricultural fields as resting areas.

Special Status Species

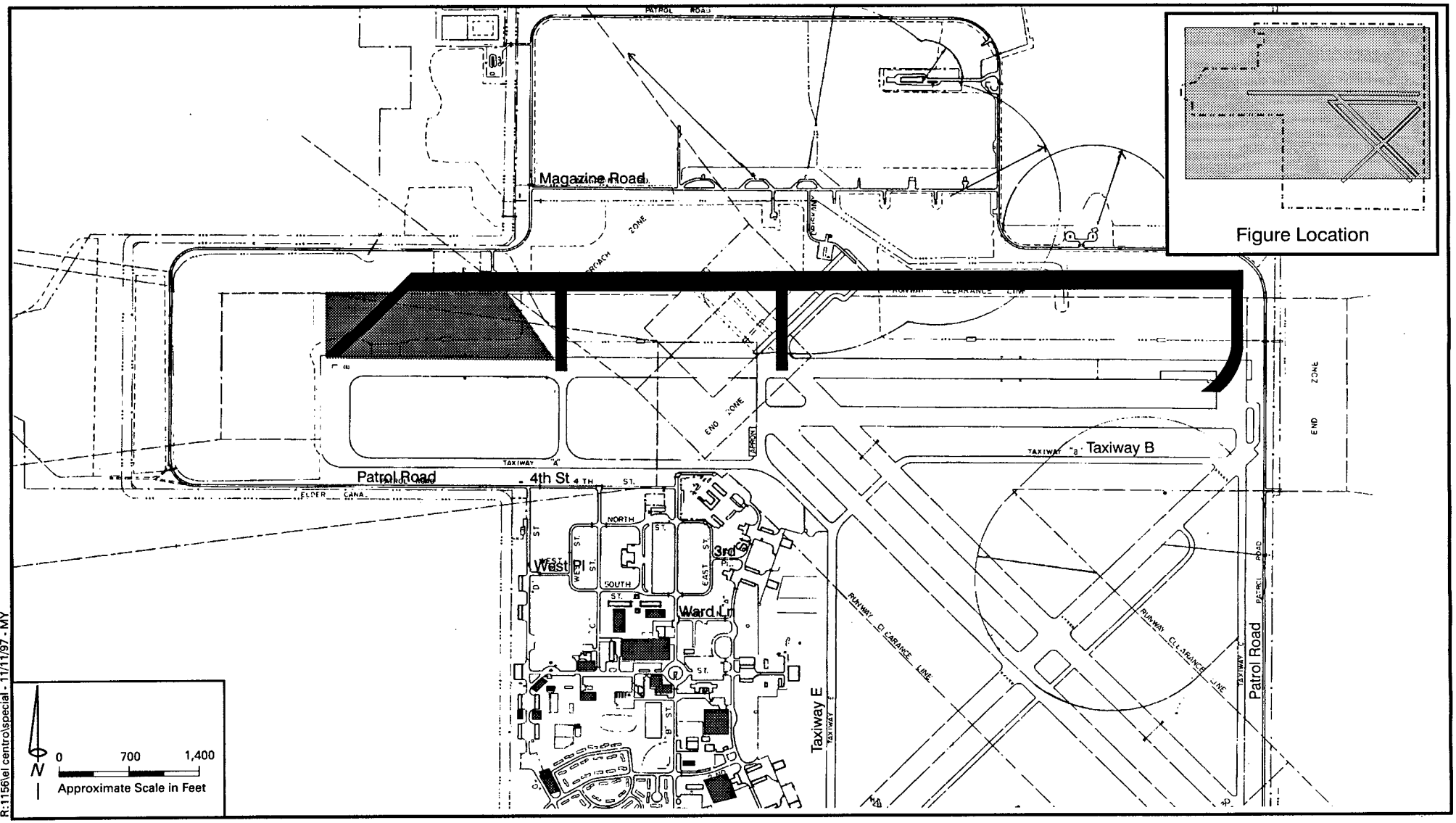
Special status species in the vicinity of NAF El Centro are listed in Table 3-32. This table includes species found within Imperial County whose range or habitat requirements could include NAF El Centro. Two state-listed and federally listed threatened species, four federally listed endangered species, two federal species of concern, two state-listed endangered species, and three state species of special concern are identified in this table as being in the vicinity of NAF El Centro. Table 3-30 describes status and presence at NAF El Centro for threatened and endangered species that were identified by the USFWS (Appendix G). Habitat for many of these species is not present at NAF El Centro, as indicated in Figure 3-23, which depicts special status species habitat at the base.

Table 3-30
Sensitive Species Inhabiting or Potentially Inhabiting the Vicinity of NAF El Centro

Scientific Name	Common Name	Federal/State/ CNPS Status	Present on Project Site?
Birds			
Athene cunicularia hypugea	western burrowing owl	SC/CSC/-	C
Empidonax traillii extimus	southwestern willow flycatcher	E/E/-	U
Falco peregrinus anatum	peregrine falcon	E/E/-	P
Rallus longirostvis yumanensis	Yuma Clapper Rail	E/T/-	U
Reptiles			
Gopherus agassizi	desert tortoise	T/T/-	P
Phrynosoma m'calli	flat-tailed horned lizard	SC/CSC/-	C
Uma notata notata	Colorado desert fringe-toed lizard	-/CSC/-	C
Fish			
Cyprinodon macularius	desert pupfish	E/ /-	U
Plants			
Astragalus magdalenae var. *peirsonii*	Peirson's milkvetch	PE/ /1B	P
Pilostyles thurberi	Thurber's pilostyles	-/-/4	C
Pholisma sonorae	sand food	-/-/1B	C

Source: USFWS 1997b, US Navy 1997b
Notes:

Federal Status	State/CDFG Status	CNPS Status	Present?
E = Endangered	E = Endangered	1B = Rare and endangered in California and elsewhere	C = Confirmed
T = Threatened	T = Threatened	4 = Limited distribution	P = Possible
PE = Proposed endangered	R = Rare		U = Unlikely
PT = Proposed threatened	CSC = California species of special concern		
SC = Species of Concern			



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Construction of the taxiway would encroach onto burrowing owl habitat.

LEGEND:

- Burrowing owl habitat
- Construction/Expansion Projects

NAF El Centro Habitat for Special Status Species

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1997.

Figure 3-23

3.9 HYDROLOGY AND SURFACE WATER QUALITY

This section describes the surface and ground water hydrology, water quality drainage and flood hazards associated with water resources at the two alternative bases.

Definition of Resource

Hydrology concerns the quality, circulation, and distribution of water. For the purposes of this analysis, hydrology is evaluated with respect to existing hydrologic conditions, including drainage patterns and flood potential. Water quality involves the chemical and physical composition of water as affected by natural conditions and human activities.

Regulatory Considerations

Water resource regulations focus on the right to use water and the protection of water quality. As a rule, each state regulates the use of water within its boundaries (except for interstate water resources). The California Department of Water Resources (DWR) allocates state water resources.

The principal federal laws protecting water quality are the Clean Water Act and the Safe Drinking Water Act. Both laws are enforced by the US Environmental Protection Agency (USEPA 1995). The Clean Water Act provides protection of surface water quality and preservation of wetlands. The Safe Drinking Water Act is directed at protection of drinking water supplies.

At the state level, the Porter-Cologne Water Quality Control Act gives the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCB) responsibility for protecting surface and ground water quality. As such, the RWQCBs prepare Water Quality Control Plans (WQCP) defining the beneficial uses and standards for protection of the waters within their regions. The regional boards also are responsible for implementing provisions of the Clean Water Act (CWA) delegated to states, such as the National Pollutant Discharge Elimination System (NPDES), which regulates point (industrial) and non-point (storm water) sources of pollutants. All of the bases assessed in this analysis are required to comply with NPDES permit requirements through compliance with statewide construction and industrial stormwater permits, and obtaining individual permits for point-source municipal and industrial discharges.

The Federal Emergency Management Agency (FEMA), in support of local flood management agencies, performs studies to identify flood zones under the National Flood Insurance Program (NFIP). A product of these studies is Flood Insurance Rate Maps (FIRMs), which delineate the regions that would be inundated by floods with average recurrence intervals of 100 and 500 years. FEMA flood insurance programs do not apply to federal lands such as the three alternative bases.

3.9.1 NAS Lemoore Alternative

Affected Area

The affected area for NAS Lemoore includes the base and drainages immediately downstream of the base.

Surface Water Hydrology and Drainage

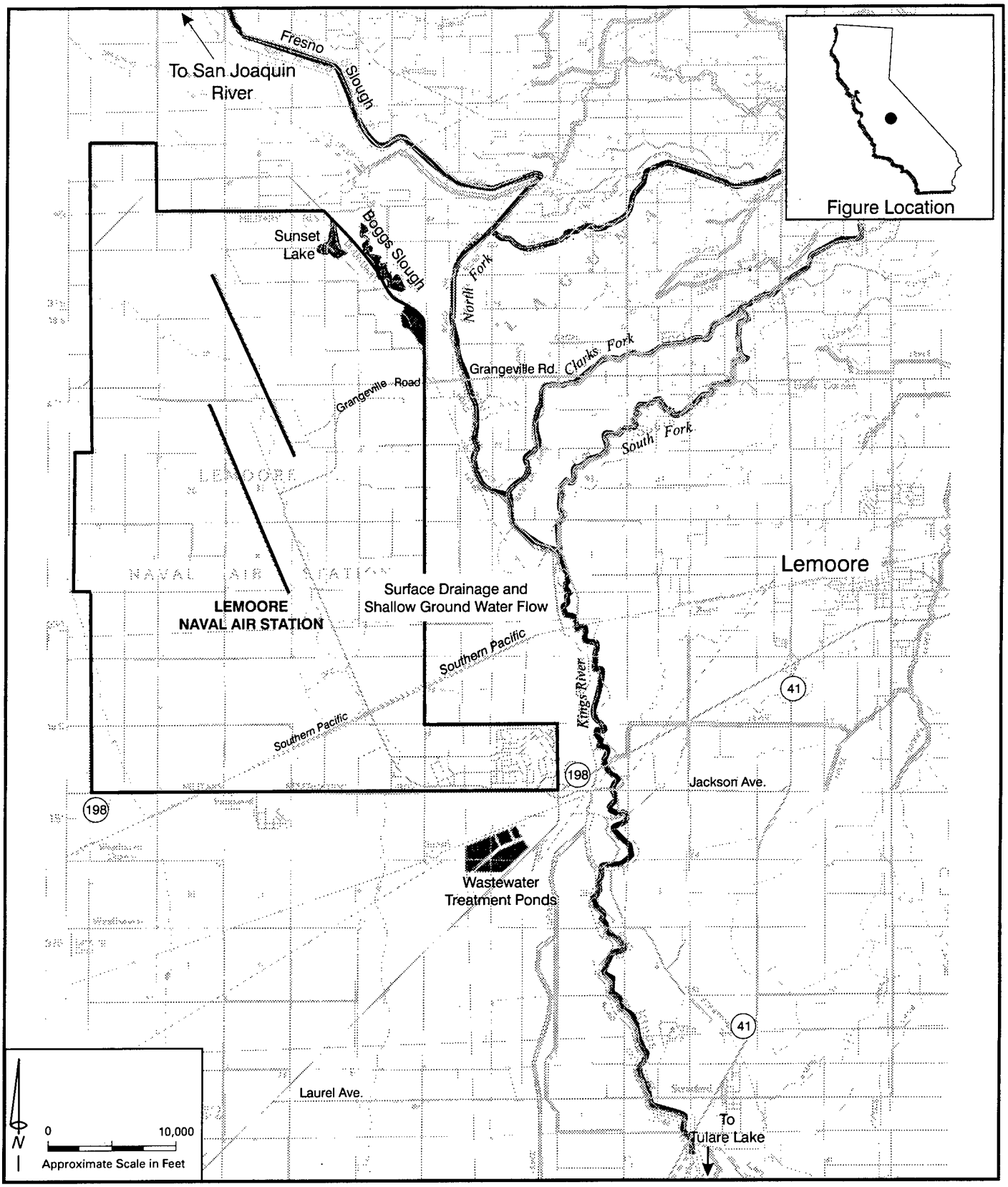
NAS Lemoore is mainly within the Westside Basin, adjacent to the Kings and Tulare Lake basins of the Tulare Lake hydrologic region. The base is near the divergence of the north and south forks of the Kings River on its alluvial fan. The north fork flows north into the San Joaquin River drainage. The south fork runs south near the eastern boundary of the base and drains to Tulare Lake, which has no outlets. Present day flows in the Kings River are depleted by upstream irrigation diversions, so that during most of the year, there is little flow in the Kings River as it passes NAS Lemoore. Average precipitation within the Tulare Lake hydrologic region is 15.4 inches (39 cm) per year (DWR 1994). However, in the vicinity of NAS Lemoore, the average annual rainfall is only 6 to 8 inches (15 to 20 cm).

Elevations at the base range from approximately 210 feet to 265 feet (64 to 81 m) above msl (figure 3-24). The land surface in the vicinity of the base is relatively level and slopes toward the northeast at a rate of approximately 8 feet (2.4 m) per mile (1.6 km). In the past, surface runoff from the alluvial fan of the Arroyo Pasajero, which collects drainage from the hills west of Coalinga, has sometimes flowed across the base into the Kings River. The California Aqueduct created a barrier to this flow.

Surface drainage at NAS Lemoore is generally to the northeast, toward the Kings River. Drainage is poor in some areas, occasionally resulting in ponding. Wetlands in the northeast part of the base that lie along the North Fork of the Kings River are fed in part by stormwater runoff from the base and agricultural drainage. Approximately 400 acres (162 ha) of sewage treatment ponds for treating sanitary wastewater from NAS Lemoore are south of Highway 198.

Ground Water Hydrology

The Tulare Lake Basin is underlain by a thick sequence of clay sediments deposited in the large lakes that have covered the region in recent geologic time. The clay deposits overlie and confine several freshwater aquifers at relatively great depths. The confined ground water has been highly exploited for agriculture, resulting in overdraft conditions, where net ground water withdrawal exceeds recharge. Ground water overdrafts led to 4 to 12 feet (1 to 4 m) of land subsidence by the 1960s in the immediate vicinity of NAS Lemoore. Subsidence of more than 20 feet (6 m) occurred further to the west (Poland and Evenson 1966).



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Kings River is the principal surface water feature near NAS Lemoore.

LEGEND:

Water

NAS Lemoore Boundary

NAS Lemoore
Principal Surface Water Features

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: USGS Fresno 1:100,000-scale topographic map 1982.

Figure 3-24

Imported surface water from the state and federal water projects has significantly reduced dependence on ground water, except during droughts. Ground water use during an average water year in the Tulare Lake Basin is estimated to be about 915,000 acre-feet (112,865 ha-m). During drought conditions, annual ground water use increases nearly four-fold to 3,773,000 acre-feet (465,400 ha-m) (DWR 1994).

The thick, extensive, shallow clay sediments underlying the region, limit local recharge of the deeper aquifers. Instead, water used for crop irrigation (primarily cotton) tends to contribute to the shallow perched water table. The shallow water table ranges from approximately (1.5 to 3 m) feet deep in agricultural outlease areas and flows generally toward the northeast (CSU Fresno 1990). Drainage sumps and canals are needed to prevent flood irrigation recharge from waterlogging shallow soils and to keep the water table below the root zone of crops.

Flooding

Flooding potential exists at NAS Lemoore due to the potential overflow of streams to the west. The natural floodplain for these streams lies north of the town of Huron and crosses Highway 198 immediately west of NAS Lemoore. Floodwaters drain to the Kings River by crossing NAS Lemoore. None of the proposed construction sites associated with this alternative are within areas historically subject to flooding or ponding.

Water Quality

In portions of Kings County, elevated concentrations of boron, arsenic, and selenium occur in ground water, affecting drinking water supplies. Boron concentrations also impair crop yields. Shallow ground water is of generally poor quality due to the accumulation of salts in irrigation water. The total dissolved solids concentration of shallow ground water in the vicinity of NAS Lemoore is reported to be in the range of 500 to 1,500 milligrams per liter (mg/l). By comparison, the primary drinking water standard for total dissolved solids is 1,000 mg/l.

Ground water and local surface water are not a primary source of potable water for NAS Lemoore or the surrounding communities. Good quality ground water is available from wells that are 1,500 to 2,000 feet (457 to 610 m) deep (CSU Fresno 1990), which are used only as an emergency water supply. Domestic and agricultural water is supplied by the Westlands Water District through the California Aqueduct.

3.9.2 NAF El Centro Alternative

Affected Area

The affected area for NAF El Centro includes the base and immediate downstream areas of the New River, as well as canals crossing or draining the base.

Surface Water Hydrology and Drainage

NAF El Centro is within the Imperial Valley basin of the Colorado River hydrologic region. With an average annual precipitation of 5.5 inches (14 cm), the Colorado River Basin is characterized as arid (DWR 1994). Drainage in the 1,870 square miles (3,010 km) Imperial Valley is provided by the New River, the Alamo River, and irrigation drainage ditches that discharge to the Salton Sea, which has no outlets. The Salton Sea watershed, which extends into Mexico, has an area of about 7,700 square miles (12,390 ha^2), with an average annual precipitation of 1 to 3 inches (Iwanaga Seidel Associates 1987).

Most of the water used within the Colorado River Basin comes from the Colorado River, and most is used for agriculture. Irrigation water from the Colorado River is delivered to water users by a network of canals operated by the Imperial Irrigation District (IID). Total agricultural water demand in the Colorado River Basin is about 3,705,000 acre-feet (457,011 ha-m) per year, while urban water demand is about 301,000 acre-feet (37,128 ha-m) (DWR 1994). Colorado River water is allocated by interstate and international agreements. The amount of ground water used annually within the Colorado River Basin is independent of rainfall and averages about 80,000 acre-feet (9,868 ha-m) per year. NAF El Centro receives 2 acre-feet (0.25 ha-m) per day of raw water from the IID/Colorado River and treats this water on base.

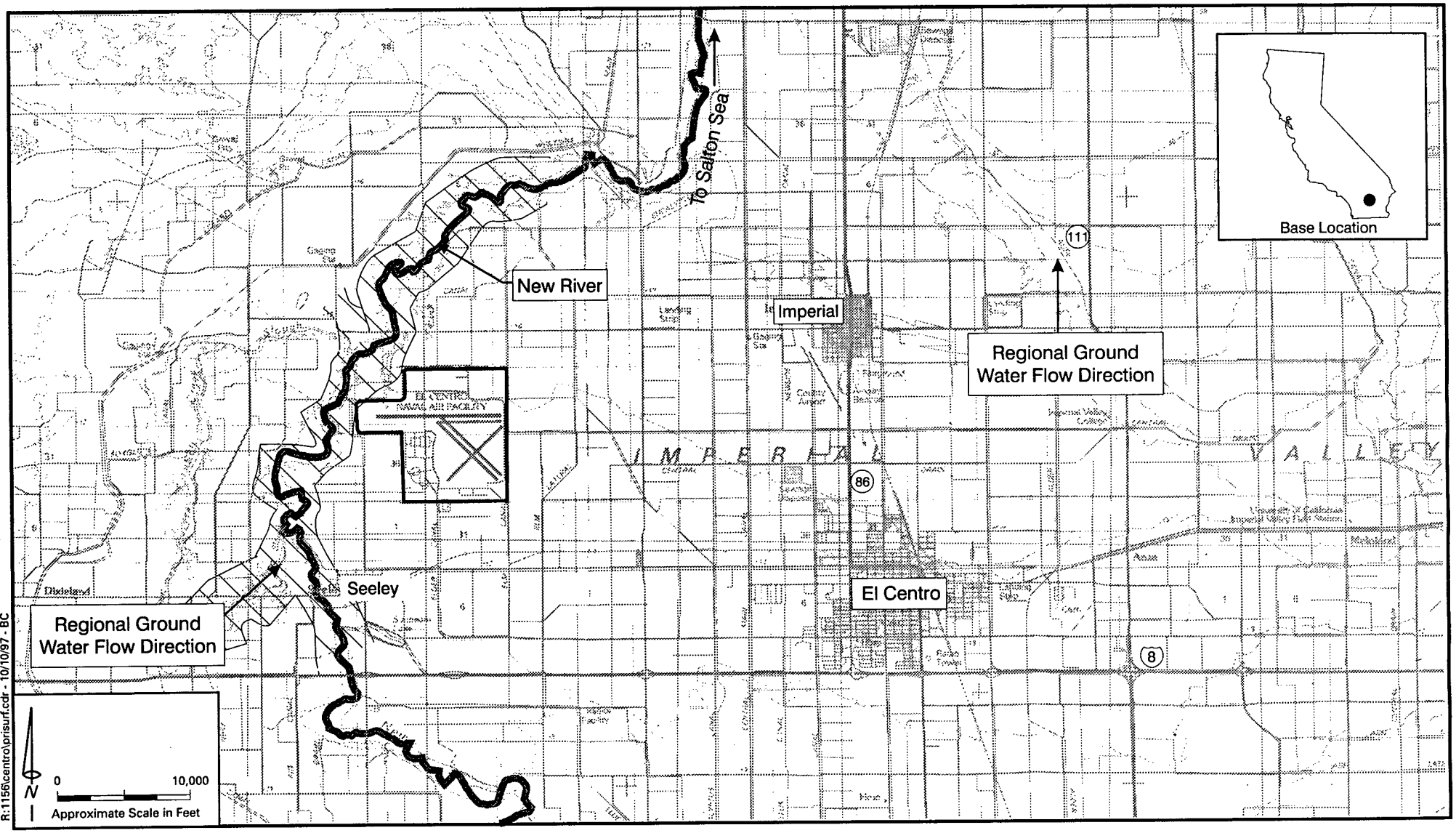
The topography at NAF El Centro is generally flat. Elevations range from 52 feet (16 m) below msl to 42 feet (13 m) below msl. Surface drainage from NAF El Centro is to the New River, which originates in Baja California, Mexico, and runs near the western boundary of NAF El Centro (figure 3-25).

Ground Water Hydrology

Shallow, perched ground water occurs at depths of as little as 3 to 5 feet (1 to 1.5 m) below the ground surface in the vicinity of NAF El Centro (US Department of Agriculture 1981). Several confined aquifer units exist below the perched aquifer. Wells drilled to depths of 1,000 to 8,000 feet (305 to 2,438 m) encounter hydrothermal brines, which are used to produce geothermal energy (Hely et al. 1966). The main source of ground water recharge in the Imperial Valley is from the Colorado River and leakage from canals (Loeltz et al. 1975). Regional ground water flow moves toward the axis of the Imperial Valley, which roughly corresponds with the channel of the Alamo River, and then flows northwest toward the Salton Sea (Bechtel 1996, Morton 1997, Loeltz et al. 1975).

Flooding

The floodplain of the New River extends approximately 1,200 feet (366 m) onto the westernmost portion of the base. No flooding has occurred outside this floodplain since the completion of Hoover Dam and the All American Canal, which prevented the Colorado River from flooding the region (US Navy 1988a).



The New River is the principal surface water feature near NAF El Centro.

LEGEND:

- Water
- Approximate New River Flood Plain
- NAF El Centro

NAF El Centro
Principal Surface Water Features

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: USGS El Centro 1:100,000-scale topographic map 1989.

Figure 3-25

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Moderate to severe flash flooding during storms reportedly is restricted to areas within and along stream channels or dry washes having a width of 200 feet (61 m) or more (Iwanaga Seidel Associates 1987).

Water Quality

The New River is used primarily for drainage of agricultural return flows and treated municipal wastewater, which are not suitable for domestic or agricultural use. The Salton Sea contains poor quality water. Ground water in the Imperial Valley contains mineral concentrations in excess of primary drinking water standards. Sulfate concentrations range from 80 to 4,000 milligrams per liter (mg/l), chloride concentrations from 500 mg/l to 8,500 mg/l, and total dissolved solids concentrations from 1,480 mg/l to 15,700 mg/l (Bechtel 1996, Iwanaga Seidel Associates 1987). The base receives all of its water from the IID, which diverts the water from the Colorado River at the Imperial Dam. The quality and quantity of the water available from the Colorado River has steadily declined during recent years due to increased upstream use and reduced allocations.

3.10 UTILITIES AND SERVICES

This section describes the utility systems and services at each alternative base and surrounding local communities. Water supply systems, wastewater treatment and disposal, solid waste collection and disposal, stormwater collection, natural gas and electric services, health services, child care services, police services, and fire services are discussed.

Definition of Resource

The service providers, applicable supplies and/or capacities, constraints to service provision, and other relevant information pertaining to public services and utilities are described below for the two alternative bases. Relevant state and federal laws and regulations also are discussed. Information relating to these services was collected from master plans of each naval base and communications with the respective facility planners and service agencies.

Regulatory Considerations

No regulations govern utilities and services as a single entity; the various utilities and services are subject to different federal, state, or local regulations. These may be municipal codes, permitting requirements, legislation, or federal, state, or local agency requirements. The regulations particular to the various utilities and services at the specific alternative bases are discussed below.

Water Supply. Drinking water standards developed under the Safe Drinking Water Act have been widely used to define cleanup standards for surface water and ground water resources used as a source of drinking water. The act requires sampling for lead and copper in drinking water. The Navy's Environmental and Natural Resource Program Manual identifies requirements and responsibilities for protecting drinking water supplies at Navy installations, and EPA enforces this law.

Wastewater and Stormwater Collection and Treatment System. The RWQCB implements provisions of the Clean Water Act delegated to states, such as the NPDES permits, which regulates point (industrial) and nonpoint (stormwater) sources of pollutants. NPDES permit requirements apply to the discharge of wastewater into sanitary sewers. The stormwater systems operate under NPDES Statewide General Industrial Stormwater Discharge Permits. In California, the Navy is complying with the SWRCB general permit requirements instead of applying for individual permits for each facility. However, Navy facilities in California submit a notice of intent to comply with the general permit requirements to the SWRCB.

Solid Waste Collection and Disposal. The Solid Waste Disposal Act of 1965, as amended by the Resource Conservation and Recovery Act (RCRA) in 1976, requires that federal facilities comply with all federal, state, interstate, and local requirements regarding the disposal and management of solid waste. RCRA establishes public safety and health standards for disposing of solid waste,

including requirements for landfill liners and leachate collection and treatment. RCRA and the Military Construction Codification Act of 1982 also provide for various means of recovering value from solid waste through reclamation as fuel supplements or selling for profit.

California Assembly Bill (AB) 939 requires California cities to divert 25 percent of their solid waste from landfills by 1995 and 50 percent by 2000. California Senate Bill 1223 establishes state programs designed to increase recycling and to encourage the development of commercial markets for recyclable materials. In general, the state places the burden of action and responsibility on the city to meet the state requirements; however, US Navy bases are working to achieve these goals by reducing generation of solid waste and increasing reclamation of recyclable materials.

3.10.1 NAS Lemoore Alternative

Utilities at NAS Lemoore are provided through agreements with local providers and by on-base infrastructure and programs. Most services are provided on base and are supplemented by local agencies from Kings County and the cities of Lemoore and Hanford. Local utilities providers that serve the base include the Westlands Water District (Westlands), the Kings County Waste Management Authority and City of Avenal Landfills, the Southern California Gas Company (SCGC), the US Navy Western Area Power Administration (WAPA), and Pacific Gas and Electric Company (PG&E). The base maintains its own wastewater and stormwater collection and treatment system and its own solid waste recycling program and a composting facility. Services are provided by the Naval Hospital Lemoore and the NAS Lemoore Security and Fire departments. These services are supplemented by hospitals throughout Kings County, the county sheriff's and fire departments, and the police and fire departments of the cities of Lemoore and Hanford.

Affected Area

The affected area is the entire installation as well as the surrounding local service areas that would provide off-site utilities and services, such as wastewater treatment and landfill disposal, and supplementary services, such as health services, fire protection, and police.

Water Supply Systems

NAS Lemoore purchases water from Westlands Water District (Westlands), which in turn receives water from the US Bureau of Reclamation's Central Valley Project (CVP). All water at NAS Lemoore is treated on base before use. Water is piped from the San Luis Canal to the station treatment plant, which can treat 7.5 mgd (28.4 mLd). Storage facilities consist of six 600,000-gallon (2,271,000-liter) tanks. NAS Lemoore also has six wells that were the station's source of water before it was connected to the San Luis Canal in 1974. Although water from these wells is generally of poor quality because of high chemical content, one well is used to irrigate windbreak trees in a remote area (US Navy 1994d). The water supply

system at the base is in good condition and does not need any major repairs or upgrades at this time (Stewart 1997). NAS Lemoore's current annual contract with Westlands guarantees the base 977 million gallons of water per year (mgy) (3,698 million liters per year [mly]). The average consumption by the base over the last seven years has been 945 mgy (3,577 mly) (O'Donnell 1997).

The cities of Lemoore and Hanford are served by their own water departments and are operating below their capacities (Pereira 1997, Haley 1997). The City of Lemoore Public Works Department water system consists of five production wells, two standby wells, and two million-gallon (3.8 million-liter) storage tanks. The City of Hanford Public Works Department water systems consists of 18 wells and 4 975,000-gallon (3.7 million-liter) storage tanks.

Wastewater Treatment and Disposal

NAS Lemoore treats a combination of sanitary wastewater, industrial wastewater, and stormwater at an on-base sewage pump station. The pump station has an average flow capacity of 2 mgd (8 mld) but can accommodate a peak flow of 4 mgd (15 mld). The average flow to the pump station is 1.7 mgd (6.4 mld), and peak flows are 2.8 mgd (10.6 mld) (O'Donnell 1997). A network of facultative, waste stabilization, and evaporation ponds connected by force mains on approximately 340 acres (138 hectares) provides physical screening and shredding, primary treatment via biological processes, and final processing. The wastewater treatment system at the base is in good condition and does not need any major repairs or upgrades (Stewart 1997). Effluent is monitored daily for volume and quality in compliance with RWQCB requirements (US Navy 1994d).

The cities of Lemoore and Hanford have their own wastewater treatment facilities. All of these facilities are currently operating well below their capacities (Pereira 1997, Sisneroz 1997).

Stormwater Collection

The stormwater collection system at NAS Lemoore consists of a network of underground drains in the operations and administration areas and a series of ditches in the undeveloped areas. These drains and ditches transport stormwater runoff to a wet well and stormwater pumping station where it is mixed with wastewater when the discharge rate of the wastewater system is low. Wet weather runoff is discharged into the Kings River from an open channel if the flow cannot be accommodated by the pump station. In the undeveloped areas, stormwater normally dissipates by evaporation and percolation. The stormwater collection system at the base is in good condition and does not need any major repairs or upgrades (Stewart 1997). NAS Lemoore maintains an NPDES permit regulating its stormwater discharges from industrial activities.

Solid Waste Collection and Disposal

Approximately 4,500 tons (4,050 tonnes) of solid waste were generated at NAS Lemoore in 1993 (US Navy 1994d). Solid waste produced by the base and in local

areas is removed weekly by a private contractor and is delivered to different locations, depending on the waste type. Most solid waste is transported to the Kings County Waste Management Authority (KCWMA) Landfill in Hanford. This landfill is projected to close in mid-1997 due to limited capacity; however, KCWMA will be opening a new 300-ton per day (272-tonnes per day) facility in Kettleman Hills. The new landfill is scheduled to open by late 1997 and has a projected lifetime of at least 40 years.

Solid waste from industrial activities at NAS Lemoore is disposed of at the City of Avenal Landfill, which is 22 miles (35 kilometers) from NAS Lemoore. Avenal Landfill has a 50-ton per day (45-tonne per day) capacity and is projected to close in 2012 (US Navy 1994d).

Green waste from the base, such as grass clippings, is hauled by the waste contractor to the NAS Lemoore composting facility. The base also manages the Earth Care Recycling Center, which picks up curbside recyclables from the housing area once per week (US Navy 1994d).

Natural Gas and Electric Services

Natural gas is provided to NAS Lemoore and local residents by SCGC. The base also rents natural gas storage facilities from SCGC (US Navy 1994d). In 1996, NAS Lemoore consumed an average of approximately 730,000 cfd (20,400 cmd) of natural gas for cooking and heating in base facilities (Stewart 1997). The natural gas supply system at the base is in good condition and does not need any major repairs or upgrades (Stewart 1997).

The Western Area Power Administration (WAPA) and Pacific Gas and Electric (PG&E) furnish the base with electricity transmitted over PG&E power lines. WAPA allocates a maximum of 18 MW of power per month (Stewart 1997). PG&E provides electricity to the surrounding communities and supplements NAS Lemoore's power needs in the summer when air conditioner use is high. NAS Lemoore consumed approximately 79.8 million KWH of electricity in 1996 (Stewart 1997). The electrical system at the base is in good condition and does not need any major repairs or upgrades (Stewart 1997).

Health Services

The full-service hospital at NAS Lemoore provides services to all military families and their children, and also provides access to emergency care and after-hours services. Naval Hospital Lemoore provides primary care and physical exams for personnel, and specialty services such as laboratory, pharmacy, radiology, and audiology (Crosby 1997). Naval Hospital Lemoore staffs 15 primary care providers, a flight surgeon, a nurse practitioner, two physician's assistants, an IDC, and four specialty care providers (Ormsbee 1997). The hospital serves approximately 10,000 patients per month, of which about 6,500 are military family members (O'Donnell 1997). The complex will be expanded, with

construction scheduled for completion by mid-1999 (Ormsbee 1997). The hospital also coordinates health services with local area hospitals off-base.

Off-base, there are three hospitals within a 60-mile (97-kilometer) radius of the base. These include Central Valley General Hospital in Hanford, Hanford Community Medical Center in Hanford, and Kaweah Delta District Hospital in Visalia. All of these hospitals provide a full range of services, including emergency care.

Child Care Services

NAS Lemoore provides child care services for military families. The base provides child care services for approximately 300 children on a full-time and part-time basis. The child development center is capable of handling up to 216 children on a full-time basis. Child care also is provided by Family Child Care, a program that certifies on-base residences to provide child care for up to six children each. Additionally, the base sponsors a School-age Care Program that currently serves 125 children on a part-time basis.

Police Services

Police services within the boundaries of the base are the responsibility of NAS Lemoore Security. Security for the site consists of drive-by patrols and responses to service calls. Two to four patrols are on duty at all times. The department is staffed by 88 military personnel and 12 civilian employees and maintains a 60-member Auxiliary Security Force. Civilians arrested at NAS Lemoore are transferred to the Kings County jail (Billick 1997).

The NAS Lemoore Security Department maintains a memorandum of understanding (MOU) with the Kings County Sheriff's Department. Through the MOU, the Sheriff's Department, staffed by 73 sworn officers, supplies resources not available at NAS Lemoore, such as a special weapons and tactics (SWAT) team and mobile command center. Assistance also is provided in cases of natural disaster or any incident that exceeds NAS Lemoore's capabilities. The cities of Lemoore and Hanford also have their own police departments, staffed by 24 and 44 sworn officers, respectively (Billick 1997).

Fire Services

The NAS Lemoore Fire Department has a staffing level of 52 firefighters, with 22 firefighters on duty daily. The department maintains six fire engines—three for structural fires and three for crash-fire response at the airport. Two structural fire engines and two crash fire engines are on duty at all times. The department also maintains a single truck for fighting brushfires (US Navy 1994d). The NAS Lemoore Fire Department has mutual aid agreements with the Kings County Fire Department in Hanford, the City of Lemoore Fire Department, and the City of Hanford Fire Department (US Navy 1994d).

The Kings County Fire Department operates 11 fire stations in the county, with the Lemoore and Island stations located closest to NAS Lemoore. The department has 42 firefighters, 22 structural-fire engines, 13 wildland squads, and a water truck. The City of Lemoore Fire Department has a volunteer fire fighting staff of 35 and maintains six fire engines, a rescue truck, and a medical truck. The City of Hanford Fire Department operates 2 stations, has 23 firefighters, and maintains four fire engines, a wildland squad, and a light-utility vehicle (US Navy 1994d).

3.10.2 NAF El Centro Alternative

Utilities at NAF El Centro are provided through agreements with local providers and by on-base infrastructure and programs. Most services are provided on-base and are supplemented by local agencies from Imperial County and the cities of El Centro, Brawley, and Holtville. Local utilities providers include the IID, the Imperial County Sanitation (ICS) Landfill, and SCGC. The base maintains its own wastewater and stormwater collection and treatment systems and its own solid waste recycling programs. Services are provided by the branch medical and dental clinic on-base and by the NAF El Centro Security and Fire Departments. These services are supplemented by the Naval Hospital Balboa, hospitals throughout Imperial County, the Imperial County Sheriff's and Fire Departments, and the police and fire departments of the cities of El Centro, Holtville, and Brawley.

Affected Area

The affected area is the entire installation and the surrounding local service areas that would provide off-site utilities and services, such as wastewater treatment and landfill disposal, and supplementary services, such as health services, fire protection, and police.

Water Supply Systems

NAF El Centro and local communities, including El Centro, Brawley, and Holtville, purchase water from IID. The base treats the water before distribution for domestic and aircraft-related uses. Agricultural fields are irrigated with raw water from supply canals. IID is the principal supplier of water to the Imperial Valley and distributes approximately 2.6 million acre-feet (0.3 hectare-meters) of Colorado River water to over 500,000 acres (202,350 hectares) of farmland and to nine incorporated communities (US Navy 1990a). NAF El Centro obtains approximately 650,000 gallons per day (gpd) (250,000 liters per day [lpd]) of raw water from IID's Elder Canal and transports it to the water treatment plant in the southwestern area of the base (Sewester 1997). The treatment plant currently treats an average of approximately 440,000 gpd (1.66 mld) and has a capacity of 2.5 mgd (9.5 mld) (Sewester 1997). The existing infrastructure is in good condition (Weller 1997).

Wastewater Treatment and Disposal

NAF El Centro operates its own wastewater treatment plant in the northwestern area of the base. A modified activated sludge system uses bacteria and natural

processes to provide primary, secondary, and tertiary wastewater treatment. The treatment plant has a capacity of 300,000 gpd (1.14 mld) of wastewater and presently treats approximately 130,000 gpd (490,000 lpd) (Bay 1997). The plant also has an eight million-gallon (30 million-liter) storage pond that can store wastewater for up to 30 days in cases of emergency. Effluent generated by the treatment process is monitored by the RWQCB. Treated effluent from the plant is piped and released directly into the New River, which lies immediately northwest of the base. Discharge from the plant into the New River is quantified by a NPDES permit that allows a peak-week average flow of 200,000 gpd (760,000 lpd). The wastewater infrastructure is in good condition and does not require any major repairs (Bay 1997).

The cities of El Centro, Brawley, and Holtville have their own wastewater treatment facilities, all of which are operating well below their capacities (Hines 1997, Smith 1997, Garcia 1997).

Stormwater Collection

On-base storm drains at NAF El Centro collect stormwater into several drainage ditches that traverse the base and the surrounding agricultural land. The system eventually discharges into the Salton Sea from eight outfalls surrounding the base. The stormwater system at the base is in good condition and does not require any major repairs or upgrades (Flowers 1997). Stormwater quality is monitored by the base and conforms to the standards of its NPDES permit

Solid Waste Collection and Disposal

Solid waste collection and disposal at the base and for local communities is performed by a private contractor, Imperial County Sanitation (ICS). The waste is disposed of at a private landfill managed by ICS in Imperial, California. Approximately 1,090 tons (989 tonnes) of solid waste were generated at NAF El Centro in 1995, with average monthly waste generation amounting to 90 tons (82 tonnes). The expected closure date of the landfill is 2016 (Curiel 1997).

The Pollution Prevention and Management Program at NAF El Centro collects and sorts recyclable material from the solid waste stream. Materials gathered include metals, cardboard, glass, plastic, paper, and wood. The program at NAF El Centro also coordinates the direct sales of these recycled items to local processing organizations (Curiel 1997).

Natural Gas and Electric Services

SCGC provides natural gas to NAF El Centro and Imperial County. Natural gas is piped through 8- and 10-inch- (20- and 25-centimeter) diameter gas lines that follow the San Diego and Arizona Eastern Railroads and the Evans Hewes Highway. Natural gas then enters the base through a 3-inch- (8-centimeter) diameter main (US Navy 1990a). NAF El Centro's recent usage averaged 5,034 cfd (468 cmd). The existing infrastructure is in good condition (Kear 1997).

Electrical power for NAF El Centro and local residents is provided by the IID, which produces 23 percent of its power by burning oil and natural gas and 20 percent by hydroelectric power. The remaining amount is purchased from Arizona Public Service and El Paso Electric (US Navy 1990a). Recent usage at the facility averaged 50,000 KWH per day, and the electrical system is in good condition (Kear 1997).

Health Services

NAF El Centro has a combined medical and dental clinic on base. This clinic provides only primary care services to active duty base personnel and their family members, and to retired military personnel in the community. The clinic does not provide hospitalization services. Approximately 85 active duty personnel are served per month. Two physicians, and one physician's assistant are assigned to the clinic, and two personnel provide administrative support (Rodriguez 1997). Patients requiring medical services beyond what the on-site clinic can provide are referred to civilian medical doctors or to local hospitals. For emergency room or hospitalization during business hours, the clinic transports patients to the Balboa Naval Hospital in San Diego. For after-hours medical care, patients use the two major hospitals in Imperial County—El Centro Regional Medical Center in El Centro or Pioneers Memorial Hospital in Brawley (US Navy 1990a). All hospitals in Imperial County provide 24-hour emergency service.

Child Care Services

NAF El Centro provides child care services for military personnel. The base presently provides child care services for 57 children. The child development center is operating above its maximum capacity of 40 children. Additionally, child care is provided by family home care, a program that certifies on-base residences to provide child care for up to six children each. Family home care at NAF El Centro provides an additional 17 children with child care services. NAF El Centro is planning to convert a former furniture store and barber shop into classrooms for children, which will provide child care services for an additional 20 children in 1999 (Sewester 1997).

Police Services

Police services at NAF El Centro are provided by approximately 24 military personnel and are coordinated through an on-base police station (Stammreich 1997). The department will be supplemented by additional personnel to monitor the base entrance gate later this year, and by four additional personnel in September of 1998 (Stammreich 1997). Military security patrols the base 24 hours a day and the surrounding desert in the evening. NAF El Centro is presently negotiating a memorandum of understanding with the City of El Centro (US Navy 1990a).

Police services for El Centro are provided by the City of El Centro Police Department. The department operates one police station and employs 44 sworn officers and 22 nonsworn personnel (US Navy 1990a). Additionally, the cities of

Holtville and Brawley maintain their own police departments, and the remainder of Imperial County is served by the South Coast Operations Division of the Imperial County Sheriff's Department (Jordan 1997, Graham 1997, Hackett 1997). The Sheriff's department operates 4 four stations and employs 236 personnel, 91 of which are deputy sheriffs (US Navy 1990a).

Fire Services

NAF El Centro maintains a fire and rescue station in an aircraft hangar on base. The station has a total staffing level of 37 civilian firefighters, with a minimum of 34 firefighters on duty daily (Zurn 1997). Additionally, the department has five administrative personnel and is equipped with two structural-fire engines, one crash-fire engine, and three fire engines in reserve. The department is not a first respondent for medical emergencies, but eight of its firefighters are trained EMTs. The base maintains mutual aid agreements with the City of El Centro Fire Department and the City and County of Imperial Fire Department for additional fire protection services (Zurn 1997).

The City of El Centro Fire Department operates two stations and employs 37 firefighters. The department maintains three fire engines for active service and two other fire engines as reserves. The Imperial City and County Fire Department provides secondary fire response to the City of El Centro. This department is staffed by 24 volunteer firefighters, operates two stations, and maintains fire engines at 14 fire stations throughout the county (US Navy 1990a). The cities of Brawley and Holtville also have their own respective fire departments (Zendejas 1997; Gronstedt 1997).

3.11 PUBLIC HEALTH AND SAFETY

This section describes airspace safety, explosive safety quantity distance arcs, and electromagnetic radiation hazards that may be present at the two alternative basing installations. Accident potential zones have been discussed in Section 3.1, Land Use and Airspace.

Definition of Resource

Airspace Safety

Each base operates an airfield to fulfill its mission. Aircraft operations may be conducted within airspace above and surrounding the base or in special use airspace (i.e., restricted areas, MOAs, warning areas). Airspace operations and coordination with surrounding air facilities are conducted according to FAA and Navy regulations. Although alterations in aircraft activity at Navy bases do not constitute an environmental impact, the results of aircraft operations and related facilities can have direct and indirect impacts on public health and safety.

Explosive Safety Quantity Distance Arcs

Operations at bases may require storing and handling ordnance. Explosive Safety Quantity Distance (ESQD) arcs are developed to protect humans from the possible sabotage or accidental detonation of explosives or ammunition. ESQD arcs surround each magazine and facility used for storing or handling ordnance, and the distance that the ESQD arc extends from the magazine or facility depends on the type and quantity of explosives authorized for storage or handling. ESQD arcs prohibit placing inhabited buildings within unsafe distances of ordnance storage facilities.

Electromagnetic Radiation

Radar and other high-energy electromagnetic emissions can constitute a hazard to personnel exposed to radiation above a maximum power density. These effects are managed under the regulations of the Navy Hazards of Electromagnetic Radiation to Personnel (HERP) program. Ordnance and fuel are also susceptible to the hazards of electromagnetic radiation (EMR). These effects are managed under Navy regulations for Hazards of Electromagnetic Radiation to Ordnance (HERO) and Fuel (HERF). Arcs providing a safe distance for storing these substances in relation to communication and radar equipment have been established at each base, as necessary.

An electromagnetic radiation hazard occurs when civilian or military transmitting equipment generate an electromagnetic field sufficient to

- Induce or couple currents or voltages with sufficient magnitudes to initiate electro-explosive devices in ordnance;
- Cause harmful/or injurious effects to humans and to wildlife; or

- Create sparks having sufficient magnitude to ignite flammable materials.

A minimum distance must be maintained between ordnance and communication equipment for the safety of all personnel. An ordnance item is defined as HERO-unsafe when its internal wiring is exposed during testing, which results in additional electrical connections when electro-explosive devices with exposed wire leads are present, handled, or loaded assembly or disassembly or when it is disassembled. A HERO-susceptible ordnance system is any tested ordnance system proven to contain electro-explosive devices that can be adversely affected by radio frequency energy so that the safety or reliability of the system is jeopardized when the system is employed.

HERP is defined in terms of power density or watts of power flowing through a given unit of area. For a HERP condition to exist, personnel would have to be within close proximity to an emitting antenna directing the power into a concentrated area. Therefore, HERP zones are not considered as construction exclusion zones for habitable facilities but as zones where a heightened awareness of the potential hazard should exist. The distances for HERP zones are designated on a case-by-case basis during the initial siting process and involve the Frequency Management Division at each base, which provides guidance concerning hazards of electromagnetic radiation to personnel. HERF zones also are handled on a case-by-case basis. No distance guidelines are defined for HERF arc zones.

3.11.1 NAS Lemoore Alternative

Affected Area

The affected area includes airspace above and surrounding NAS Lemoore, special use airspace, ESQD arcs, and electromagnetic radiation arcs.

Airspace Safety

The region or airspace surrounding NAS Lemoore supports high-altitude regional commercial carriers, low-altitude local commercial carriers, small private jets, crop dusters, and military jet fighter aircraft. The main air corridor, west of NAS Lemoore, carries commercial and military aircraft in a northwest-southwest direction along the western edge of the San Joaquin Valley (US Navy 1993b). Commercial air carrier flight corridors traverse the Central Valley at 27,000 feet (8,230 m) above msl. These flight corridors connect northern and southern California (between Los Angeles, Sacramento, and Fresno) and are some of the busiest in the country. The flight corridors are located approximately 20 miles (32 km) on either side of the base.

Private and commercial air traffic is frequent in the region near NAS Lemoore. Commercial and private aircraft routinely descend through the NAS Lemoore terminal radar approach control air traffic facility to land at one of the several private or commercial airports. Neighboring radar air traffic control facilities include Bakersfield to the south, Fresno to the east, and Castle Air Force Base

(now closed) to the north. Twelve private airports and three commercial airports (Harris Ranch, Hanford Municipal, and Corcoran Farms) surround the NAS Lemoore airspace.

Low-altitude propeller aircraft, such as crop dusters and light civilian aircraft, generally use the private airports. Air traffic from these local private and commercial airports may receive air traffic control service from NAS Lemoore on request.

Explosive Safety Quantity Distance Arcs

There are five ESQD arcs at NAS Lemoore. One ESQD arc, with a diameter of 1,250 feet (381 m) from the storage facility, encompasses the proposed project location for the FRS hangar. Figure 3-26 shows the ESQD arcs on base.

Electromagnetic Radiation

The NAS Lemoore Master Plan has identified 12 HERO-susceptible areas generated by on-base equipment (US Navy 1992b). No ordnance classified as HERO-unsafe is allowed within the specified distances. A transmitter in the air traffic control tower (Transmitter AN/URT 23) affects many facilities in the NAS Lemoore operations area (Figure 3-27). According to the master plan, an alternate site for this transmitter has been investigated, and in 1992 there were plans to relocate it (US Navy 1992b). The status of the relocation is unknown. None of the proposed project sites would be located within an EMR arc.

3.11.2 NAF El Centro Alternative

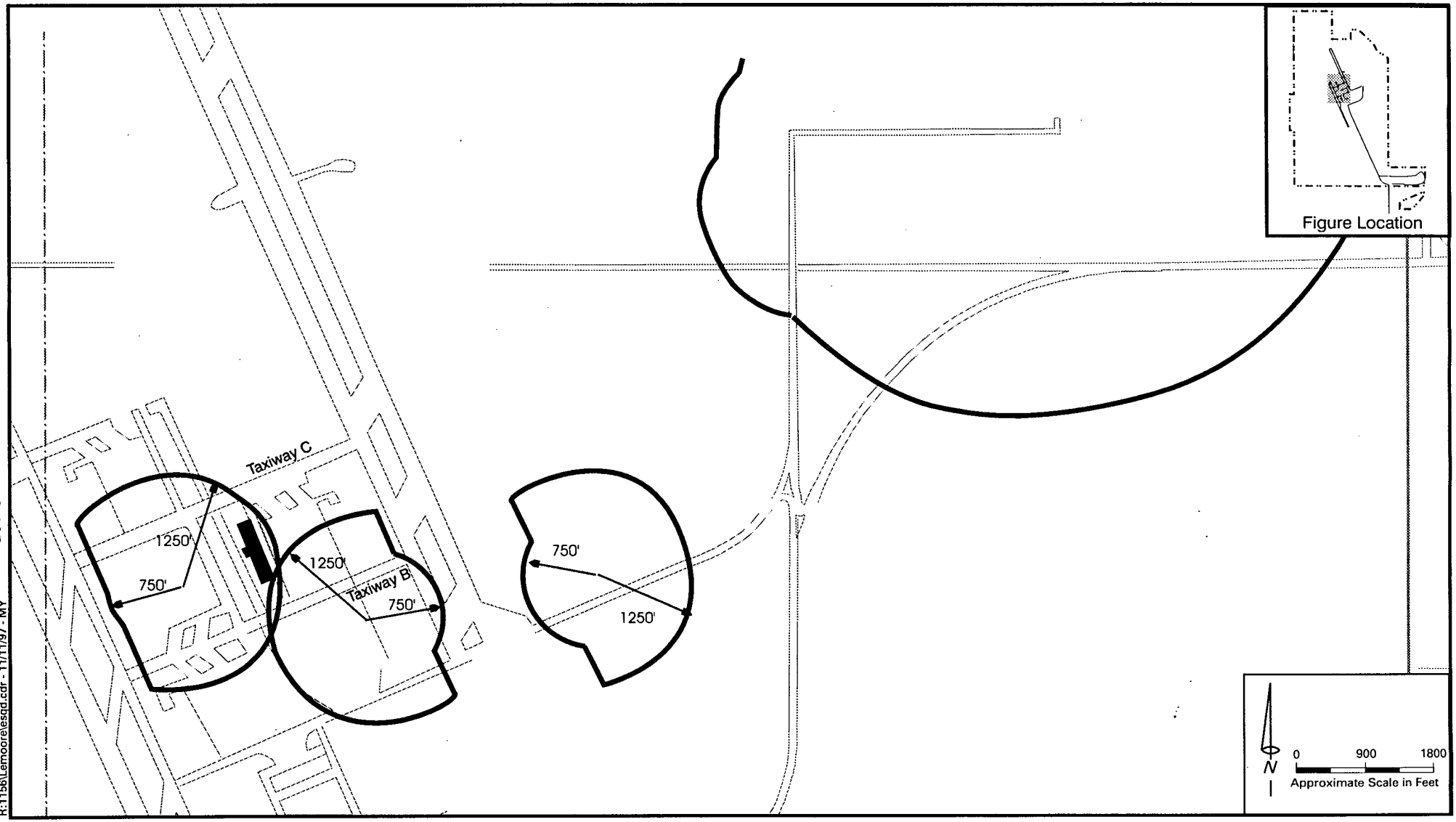
Affected Area

The affected area includes airspace above and surrounding NAF El Centro, special use airspace, and areas within ESQD arcs, and electromagnetic radiation arcs.

Airspace Safety

The control zone for airspace granted by the FAA for NAF El Centro is combined with that of the Imperial County Airport. Airspace allocated to Imperial County Airport abuts NAF El Centro airspace to the east. Imperial County Airport handles limited commercial passenger service (to and from San Diego and Los Angeles), mail, light cargo, and general aviation aircraft. Tower coordination between the NAF El Centro airfield and Imperial County Airport permits operational flexibility without hazard at either airfield (US Navy 1988a). NAF El Centro aircraft typically operate at 2,500 feet (742 m) above msl, while the pattern altitude for Imperial County Airport is 1,500 feet (457 m) above msl (Cameron 1997).

The airspace controlled by NAF El Centro extends approximately 2.5 miles (4 km) eastward before encountering Imperial County Airport airspace. This truncated airspace necessitates some additional procedures in support of aircraft



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The only proposed construction within an ESQD arc at NAS Lemoore would be the fleet hangar.

LEGEND:

ESQD Arcs

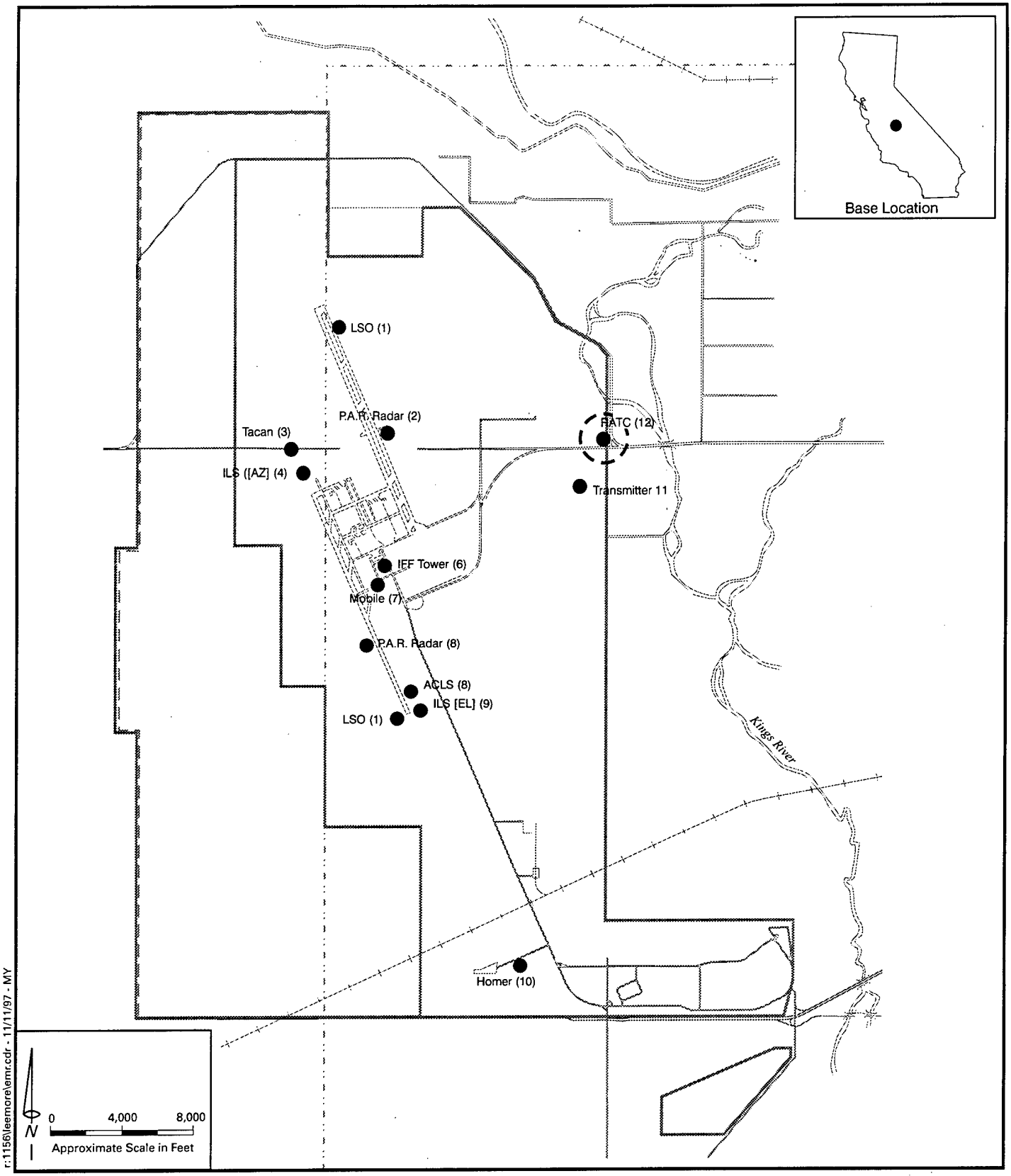
Construction/Expanison Projects

NAS Lemoore ESQD Arcs

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1992.

Figure 3-26



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None of the proposed construction at NAS Lemoore would be within EMR arcs.

LEGEND:

- Electromagnetic Radiation (EMR) Generator Site
- EMR Arcs
- Boundary NAS Lemoore

NAS Lemoore EMR Arcs

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1992.

Figure 3-27

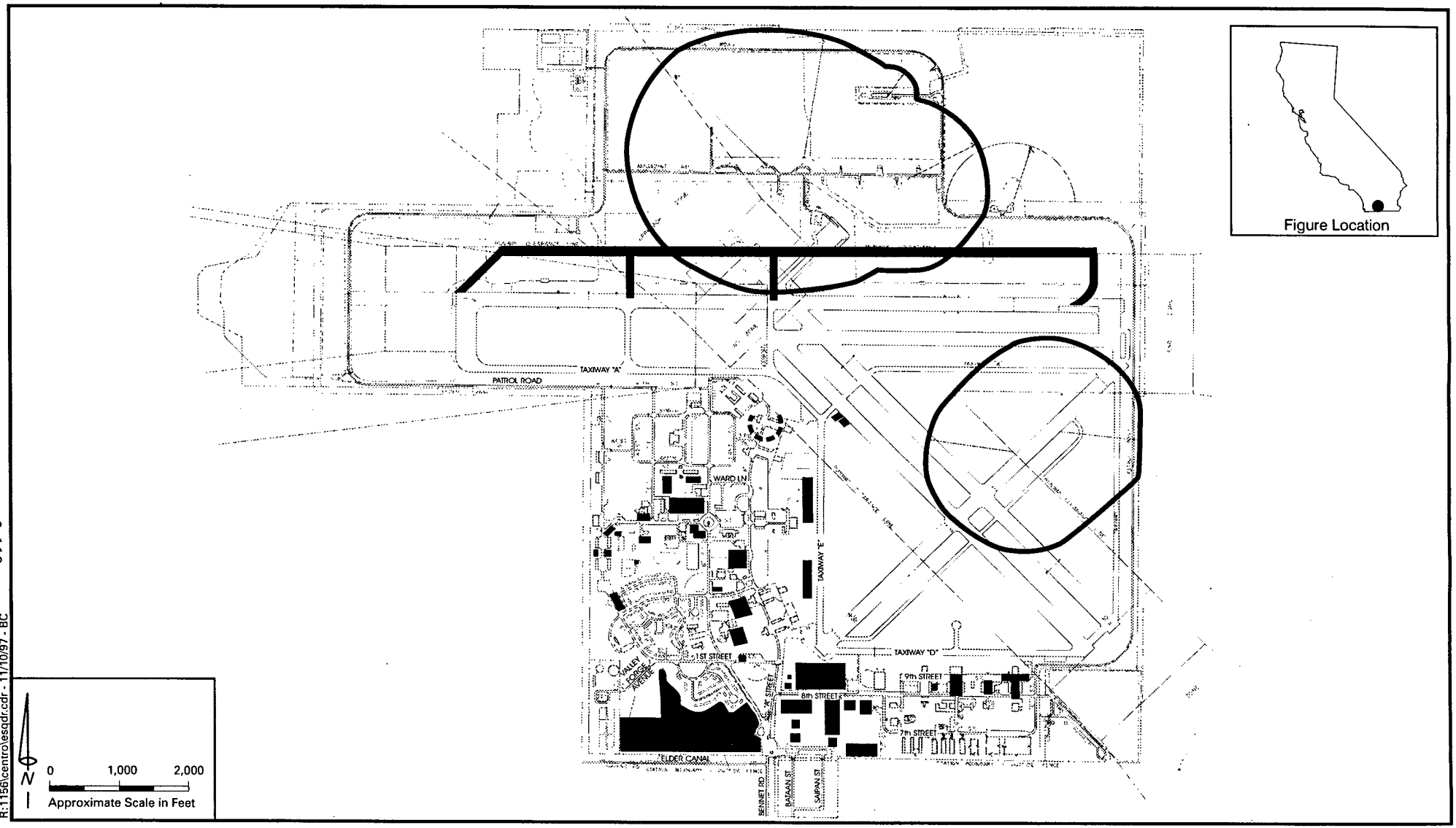
operations. First, military aircraft approaching runway 26 from the north must hold to a 3,000-foot (914-m) altitude over Imperial County Airport airspace, descending rapidly thereafter to 1,500 feet (457 m) over NAF El Centro airspace. Second, the airspace boundary also prevents elongation of the downwind leg on Runway 08 patterns.

Explosive Safety Quantity Distance Arcs

The ESQD arcs at NAF El Centro are used to cover the maximum amount of ordnance authorized for storage or handling at each magazine or facility (US Navy 1988a). There are two groups of ESQD arcs at NAF El Centro surrounding ordnance areas and ordnance loading pads adjoining the airfields. One ESQD arc intersects the proposed project location for the parallel runway and taxiways (Figure 3-28).

Electromagnetic Radiation

The NAF El Centro Master Plan has identified one electromagnetic radiation concern, which may affect ordnance, fuel, or personnel at NAF El Centro (US Navy 1988a). The Air Traffic Control Tower, (Building 130) generates a 500-foot (152-m) electromagnetic radiation arc (Figure 3-28). None of the proposed project sites would be located within an EMR arc.



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The only proposed construction at NAF El Centro within an ESQD arc is a portion of the runway and taxiway.

LEGEND:

- ESQD Arcs
- EMR Arcs
- Construction/Expansion Projects

NAF El Centro ESQD and EMR Arcs

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: US Navy 1988a.

Figure 3-28

3.12 HAZARDOUS MATERIALS AND WASTES

This section describes hazardous materials and waste at NAS Lemoore and NAF El Centro. Hazardous materials management, hazardous waste management, installation restoration program sites, asbestos, polychlorinated biphenyls, storage tanks and oil/water separators, pesticides, lead, ordnance, and radon are discussed for each alternative.

Current F/A-18 model aircraft (F/A-18A-D) generate approximately 13,800 pounds (6,280 kg) of hazardous waste a year at NAS Lemoore (Smith 1997). The waste streams include waste rags, paint, solvent, absorbent materials, petroleum, oil, lubricant, batteries, adhesive materials, corrosion prevention compounds in aerosol cans, and debris materials. Materials that are unique to the F/A-18E/F aircraft have been evaluated by McDonnell Douglas Aerospace in a report labeled "The F/A-18E/F ILS Environmental Analysis Report MDC 95A0130," dated 20 October 1995.

Definition of Resource

Hazardous Materials

As defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, (42USC 9601 Parts 14 and 33), and the Superfund Amendments and Reauthorization Act (SARA) of 1986, a hazardous material is a substance, pollutant, or contaminant that, due to its quantity, concentration, or physical and chemical characteristics, poses a potential hazard to human health and safety or to the environment if released into the workplace or the environment. The Navy's Environmental and Natural Resources Program Manual (Office of the Chief of Naval Operations Instruction [OPNAVINST] 5090.1B) (US Navy 1994g) states that hazardous materials include but are not limited to hazardous substances, hazardous waste, and any material that a handler or administering agent has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Hazardous Wastes

The Resource Conservation and Recovery Act (RCRA) of 1976, Title 40 CFR Parts 240-280, and the Hazardous and Solid Waste Amendments (HSWA) of 1984 define a hazardous waste as a solid waste, or combination of wastes, that due to its quantity, concentration, or physical, chemical, or infectious characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, or may pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, disposed of, or otherwise managed. A solid waste is a hazardous waste if it is not excluded from regulation as a hazardous waste (40 CFR 261.4[b]); exhibits any ignitable, corrosive, reactive, or toxic characteristic, or is listed in Subpart D of RCRA.

RCRA requires the management of hazardous wastes through a recordkeeping system that requires the manifesting of properly labeled hazardous waste shipments from point of generation to ultimate disposal. Also required by federal and California law are proper labeling, storage, containerization, training, and emergency procedures for hazardous waste.

Each base presently conducts industrial operations in support of its mission to maintain and operate aviation activities and other operational forces of the Navy. These operations generate waste materials, which include hazardous wastes. Hazardous wastes generated at each base must be containerized, labeled, stored, and transported off the base in accordance with US EPA, state, and Navy requirements for hazardous waste storage and disposal (US Navy 1994g).

Installation Restoration Program

OPNAVINST 5090.1B provides Navy policy for restoring contaminated sites (US Navy 1994g). The purpose of the Installation Restoration Program (IRP) is to identify, investigate, and clean up or control releases of hazardous substances from past waste disposal operations and hazardous material spills at Navy facilities.

The IRP provides for compliance with the procedural and substantive requirements of CERCLA, as amended by SARA, as well as regulations issued under these acts or by state law. Although the IRP is primarily intended to clean up past releases of hazardous waste, it may address the cleanup of past releases of any pollutant or contaminant that endangers public health, welfare, or the environment, including petroleum, oil, and lubricant products. Cleanup of past contamination from underground storage tanks (USTs) and corrective action for past contamination at RCRA sites may be part of the IRP (US Navy 1994g).

CERCLA requires that all federal facilities comply with state and federal laws with regard to the remediation process. The IRP follows this process and includes the following phases:

- Site discovery (SD) and notification;
- Preliminary assessment (PA);
- Site inspection (SI);
- Hazard ranking system (HRS);
- Remedial investigation (RI)/feasibility study (FS);
- Record of decision (ROD);
- Remedial design (RD)/remedial action (RA);
- Long-term monitoring; and
- Site closure.

Asbestos

The US EPA, the Occupational Safety and Health Administration (OSHA), and the state of California regulate asbestos-containing material (ACM) remediation. Asbestos fiber emissions into the ambient air are regulated in accordance with Section 112 of the Clean Air Act, which established the National Emissions Standards for Hazardous Air Pollutants (NESHAP). NESHAP regulations address the demolition or renovation of buildings with ACM. The Toxic Substances Control Act (TSCA) and the Asbestos Hazardous Emergency Response Act (AHERA) provide the regulatory basis for handling ACM in school buildings. AHERA and OSHA regulations protect employees who encounter or remediate ACM.

Renovating or demolishing buildings with ACM can release asbestos fibers into the air by disturbing or damaging various building materials, such as pipe and boiler insulation, acoustical ceilings, sprayed-on fireproofing, and other materials used for soundproofing or insulating. Only friable ACM, such as those listed above, are considered health risks. Nonfriable ACM, such as transite piping, shingles, or floor tile, are not health risks unless they are mechanically abraded to produce dust.

Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs), which are electrically nonconductive and stable at high temperatures, may be found in the dielectric fluids of electrical equipment, including transformers and capacitors, particularly if such equipment was manufactured before the early 1970s. PCBs also are found in other manufactured items, including light fixtures, ballasts, and hydraulic systems, and as plasticizers and fire retardants in many solid materials.

The US EPA regulates the disposal of equipment containing PCBs in concentrations of 50 parts per million (ppm) or greater under TSCA, which bans the manufacture, processing, and distribution in commerce of PCBs, with limited specific exceptions for some PCBs used in totally enclosed systems. US EPA disposal regulations distinguish between PCB-contaminated electrical equipment, defined as that containing PCBs in concentrations of 50 ppm or greater but less than 500 ppm, and electrical equipment, such as a PCB transformer, in which the concentration of PCBs is at least 500 ppm. Primary federal regulations for controlling existing PCBs are found in 40 CFR Part 761. California regulations, however, are more stringent than their federal equivalents and are found in Title 22 of the California Code of Regulations (CCR). Within California, a waste fluid containing 5 ppm PCBs or more is regulated as hazardous waste.

In accordance with Navy procedures and applicable federal and state regulations, Navy shore personnel must inventory annually all PCB waste that they generate, treat, store, or dispose of. The California Environmental Protection Agency's Department of Toxic Substances Control (DTSC) regulates PCBs as a non-RCRA hazardous waste. OPNAVINST 5090.1B specifies eliminating all transformers

containing 500 ppm or more PCBs by October 1998 and eliminating all transformers containing 50 ppm or more PCBs by October 2003.

Storage Tanks and Oil/Water Separators

Both USTs and aboveground storage tanks (ASTs) are used to store hazardous substances and petroleum products at locations throughout Navy bases. Because oil/water separators (OWSs) are often below ground and can create environmental issues similar to USTs, they are included in this discussion.

USTs are subject to federal regulations of RCRA (40 CFR 280), as mandated by HSWA. The state of California has adopted regulations under Title 23, Division 3, Chapter 16 of the CCR. California regulations are more stringent than the federal regulations and require secondary containment on both the tank and piping systems installed after January 1, 1984.

ASTs are regulated under CHSC, Division 20, Section 6.7, the Uniform Fire Code, and the National Fire Protection Association regulations. The mechanism used for cleaning up and preventing spills is SB 1050 of January 1990.

Fuel is transported and stored at Navy bases according to US EPA and Navy regulations. Each naval base has a fuel storage area, identified as a fuel farm, and fuels stored there may include jet fuel (JP-5), automobile gasoline, diesel fuel, used oil, and propane. Fuel is transported to the fuel farm by underground pipelines from off-base sources or delivered by tanker trucks to a receiving island. The fuels are stored in ASTs or USTs equipped with visible and audible high-level tank system leak alarms. Each naval base with air operations has aircraft refueling stations, which dispense JP-5 to aircraft.

Pesticides

The registration and use of pesticides are regulated under the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) of 1972, as amended (7 USC 136 et seq.). Pest Management activities are subject to federal regulations contained in 40 CFR 162, 165, 166, 170, and 171, and California regulations contained in CCR Title 3, Chapter 4.

Lead

Lead was a major ingredient in house paint used throughout the country and at naval bases for many years. In 1978, the maximum lead content was reduced to 0.06 percent of newly applied dry paint. Lead-based paint use was discontinued in 1980.

The California Division of OSHA Construction Lead Standard regulates the exposure of employees to lead during construction work (28 CCR 1532.1). Although paints may be below the HUD definition for "lead-based paints," these paints may contain some lead and may result in lead exposure to workers if demolition practices, such as torching and power-cutting, are utilized. Employees

must be notified of lead hazards in the surroundings or in working conditions, and appropriate dust control and personal protective demolition procedures must be followed.

The TSCA (15 USC 2682) addresses lead-based paint hazards, and protects the general public from exposure to lead hazards.

Radon

Radon is a colorless and odorless radioactive gas produced by radioactive decay of naturally occurring uranium to radium. Radium, of which radon gas is a by-product, is found in high concentrations in rocks containing uranium, granite, shale, phosphate, and pitchblende. Atmospheric radon is diluted to insignificant concentrations; radon that is present in soil, however, can enter a building through small spaces and openings, accumulating in enclosed areas, such as basements. The cancer risk caused by inhaling radon is currently a topic of concern.

The amount of radon is measured in picocuries per liter of air (pCi/l). The average indoor level is estimated to be 1.3 pCi/l, and about 0.4 pCi/l of radon is usually found in the outside air (US Public Health Service 1989). There are no laws that require testing and remediating for radon, but EPA has made recommendations for both housing and schools. For short-term testing (two to 90 days), the most commonly used devices are charcoal canister, alpha-track, electret ion chamber, continuous monitor, and charcoal liquid scintillation detectors. For long-term testing (more than 90 days), alpha-track and electret ion detectors are commonly used. Long-term testing more accurately provides a year-round average radon level (US Public Health Service 1989).

The *Application of Radon Reduction Methods* (US EPA 1988) summarizes the recommended action level of 4 pCi/l. It also provides guidance for action and recommends the following action schedule:

- For radon concentrations greater than 200 pCi/l, action shall be initiated within a few weeks;
- For radon concentrations in the range of 20 to 200 pCi/l, action shall be initiated within several months;
- For radon concentrations in the range of 4 to 20 pCi/l, action shall be initiated within a few years (the higher the radon level, the more urgent the need for action); and
- For radon concentrations less than 4 pCi/l, no action is specifically recommended; however, many individuals may elect to further reduce radon concentrations in the range of 1 to 4 pCi/l.

3.12.1 NAS Lemoore Alternative

Affected Area

The affected area includes the proposed project locations for the aircraft, aircraft support facilities, and personnel support facilities.

Hazardous Materials Management

Hazardous materials are used in various operations throughout the base and are managed in accordance with NAS Lemoore Instruction (NASLEMINST) 4110.2. NAS Lemoore has submitted a list of chemicals in compliance with Section 311 of EPCRA, and emergency planning information in accordance with Section 302 of EPCRA (US Navy 1994d).

Hazardous materials used on the base include lubricants, degreasers, cleaners, paint strippers, solvents, acids, and pesticides (US Navy 1994d). Most of the hazardous materials are used for airfield operations and industrial support. These materials are used at the following locations:

- Buildings 217, 218, 247, 248, 277, 278, 307, 308, 337, and 338 High Speed Refuelers;
- Building 170 Jet Maintenance Shop (aircraft paint, plating, and cleaning);
- Buildings 173, 174, and 175 Turbo-Jet Engine Test Cells;
- Building 179 Ground Equipment Maintenance Facilities;
- Building 188 Air Frames Shop; and
- Building 722 Drinking Water Treatment Plant.

Buildings 774 and 775 house the supply storage area for flammable liquids, gases, and solids used throughout NAS Lemoore. A separate paint storage area used by the Department of Public Works also is located within the warehouse (US Navy 1994d). Small quantities of hazardous materials are used for cleaning and other maintenance operations throughout the base.

Hazardous materials are not stored at any of the proposed project sites. Hazardous materials are delivered and picked up daily for transfer to the satellite accumulation area (Mora 1997).

Hazardous Waste Management

NAS Lemoore possesses an active EPA generator number and generated approximately 280 tons (254 metric tonnes) of hazardous waste in 1993. Hazardous wastes are generated from aircraft-related activities and consist primarily of asbestos, contaminated soil, empty containers, waste asphalt, waste paint, contaminated jet fuel, spill residues, ethylene glycol, waste methyl alcohol, and waste cleaning compounds (US Navy 1994d). The only extremely hazardous

wastes regularly generated are PCB-containing ballast fluids and waste mercury (US Navy 1994d).

Hazardous wastes are collected from satellite accumulation areas throughout the base on a daily basis, and transferred to the Department of Public Works hazardous waste less than 90-day storage compound (Building 748), where they are stored for up to 90 days. The wastes then are manifested and transported off the base by Laidlaw Environmental Services under contract with the Defense Revitalization and Marketing Office (DRMO). The wastes are transported to Laidlaw treatment, storage, and disposal facilities on the East Coast (Smith 1997). Hazardous wastes are not stored at any of the proposed project sites but are picked up daily for transfer to the satellite accumulation area (Mora 1997).

Installation Restoration Program Sites

Based on results of a 1984 initial assessment study (IAS), a 1986 verification phase/confirmation study, and California Department of Health Services (DHS) and NAS Lemoore recommendations, 17 potentially contaminated sites were identified for inclusion in the IRP. An RI/FS final work plan was completed for the hazardous waste disposal sites and contaminated areas caused by past hazardous waste storage, handling, or disposal practices at NAS Lemoore. Two of the sites have been combined for further investigation due to their proximity (US Navy 1994d). Table 3-31 identifies sites within a 0.25-mile (0.4-km) radius of the proposed project sites for this alternative. There are no IRP sites within a proposed project location.

Table 3-31
IR Program Sites within One Quarter Mile of the Proposed Project Locations at NAS Lemoore

Site Number	Site Name	Approximate Location
2	Pesticide rinse area (Building 752)	1,300 feet (396 m) northeast of the proposed NAMTRA project location. 1,300 feet (396 m) north of the proposed counseling and assistance center project location.
3	Pesticide rinse area (Building 50)	500 feet (152 m) south of the proposed airframes shop project location.
5/9	Fire fighting school /industrial treatment sludge ponds	1,000 feet (305 m) southwest of the proposed airframes shop project location.
10	Landing strip	1,300 feet (396 m) north of the proposed BEQ project location.
11	PCB-contaminated soil (Building 3)	400 feet (122 m) northeast of the proposed strike fighter weapons school project location.
13	Transformer storage area (Building 50)	500 feet (152 m) southwest of the proposed airframes shop project location.
14	UST fuel spills (Building 173 and 174)	500 feet (152 m) east of the proposed airframes shop project location.
16	Sludge drying beds and pond (north of Building 65)	1,000 feet (305 m) southeast of the proposed strike fighter weapons school project location. 1,100 feet (335 m) southwest of the proposed airframes shop project location.

Source: Uribe and Associates 1994

All identified IRP sites are being investigated and, if deemed necessary, will be remediated. Remedial action is completed according to the requirements of the Central Valley RWQCB, Kings County, and the California DTSC.

Asbestos

Asbestos surveys of facilities were conducted in two phases; the initial phase was conducted from October through December 1992, and the follow-up second phase was conducted from September through November 1993. Friable or damaged ACM identified in this survey were abated. As buildings are renovated, ACM will be abated if it presents a potential health and safety concern. Although ACM remains in buildings on the base, it is nonfriable and does not represent a threat to persons working in these areas (Mora 1997).

Polychlorinated Biphenyls

There are three transformers on the base containing PCB concentrations less than 5 ppm. Transformers that were determined to contain PCB concentrations above 5 ppm have had the dielectric fluid replaced with non-PCB fluid (Smith 1997).

No PCB equipment or PCB-contaminated equipment is present at any of the proposed project locations. In addition, there is no record of any PCB equipment or PCB-contaminated equipment at any of these locations. PCB-containing electrical equipment, such as light fixtures and ballasts, may be present at the proposed project locations (Smith 1997).

There have been no known releases of dielectric fluid or transformer explosions at any of the proposed project locations (Smith 1997).

Storage Tanks and Oil/Water Separators

Both USTs and ASTs are used to store hazardous substances and petroleum products throughout the base. There are 30 USTs, ranging in capacities from 4,122 gallons (15,603 l) to 596,262 gallons (2,257,090 l), and 44 ASTs, ranging from 10 gallons (31 l) to 8,000 gallons (30,283 l) in capacity, on the base (US Navy 1997g, 1997h). These tanks store waste oil and fuel for generator, vehicle, and aircraft operations at the base.

JP-5 jet fuel is transported to NAS Lemoore via a pipeline from Fresno. The pipeline terminates at the fuel farm in the south Operations Area where six JP-5 USTs have a combined total capacity of 2,624,000 gallons (9,932,890 l). From these receiving tanks, jet fuel is distributed by pipeline to five 119,478-gallon (452,260-l) USTs, each adjacent to the aircraft parking aprons and hangars on the base. These tanks in turn supply ten high-speed aircraft refueling stations in the operations area of the base, two at each of the five hangars (US Navy 1994d).

The refueling stations are at Buildings 217, 218, 247, 248, 277, 278, 307, 308, 337, and 338. Each station includes a 125,000-gallon (473,175-l), single-walled UST for

JP-5 equipped with high/low-level alarms and high-level shut-off valves. The tanks and piping are wrapped and have cathodic protection. Fuel supplied to the refueling stations passes through filters in a filter room near each UST (US Navy 1994d).

Jet engine test cell 3 (Building 175) is served by one 20,000-gallon (75,703-l) JP-5 UST, and test cell 2 (Building 174) is served by a partially excavated 10,000-gallon (37,854-l) JP-5 UST. There is a 500-gallon AST outside Building 175 that stores preservation oil. A starting engine test cell and AST (less than 500 gallons) (1,873-l) in the storage yard of Building 175 have no secondary containment (US Navy 1994d).

An external fuel tank storage area, located near the aircraft apron, provides secure storage of external fuel tanks not used for flight operations and spares. The existing rack system is designed to store 330-gallon external fuel tanks (US Navy 1997j).

Fifty USTs have been removed from the base and five USTs are in the process of closure and await removal. Fifteen of these removed USTs have been reported as leaking, and site monitoring is being conducted under RWQCB oversight (Ike 1997).

NAS Lemoore has implemented a spill prevention and countermeasure (SPCC) plan for the base (NASLEMINST 5090). Spill response equipment is stored at each fuel storage area, and the fire department responds to any spills over five gallons on pavement and any spills to soil or water (US Navy 1994d).

There are three active OWSs at NAS Lemoore. One is at Building 765 (Public Works Transportation), one at the MRW car wash, and one at Building 945 (Hobby Shop). Water collected in the units is discharged to the sanitary sewer. There are no OWSs at any of the proposed project locations (Mora 1997).

Pesticides

Pesticides are applied throughout the base by certified station or contracted personnel. Past usage includes common pesticides, such as chlordane and dichlorodiphenyltrichloroethane (DDT), which were banned in 1988 and 1971, respectively. NAS Lemoore implements a pest management plan that specifies the area to be treated, the type of pest, the frequency of application, pesticide product name and EPA registration number, the mixing concentration, and any special precautions or remarks (US Navy 1997i).

Soil samples were collected from potential sources of pesticide contamination in June 1997. Stormwater drainage ditches, Building 752, Building 50, the former landing strip used by crop dusting aircraft, and west of PWT (contractor rinse area) were sampled to determine the presence of residual pesticides. The sampling program was part of the IR environmental investigation conducted through the IRP (Crane 1997). Although analytical results indicated that pesticides and their

constituents were detected in the samples, a human health risk assessment and ecological risk assessment determined that these sites do not pose an unacceptable risk to human health or the environment (US Navy 1997i).

Lead

NAS Lemoore has not conducted an LBP survey of the residential buildings on the base. DOD regulations do not require surveying nonresidential structures for LBP, but LBP is likely to be present in buildings constructed before 1978.

Ordnance

Ordnance is loaded aboard aircraft at the outboard areas of the aircraft parking aprons in the combat aircraft ordnance area. This practice requires parked aircraft to be towed out of the ordnance area and portions of maintenance hangars to be evacuated during loading procedures. No known ordnance manufacture, storage, or disposal have been conducted at any of the proposed project locations (Winckelmann 1997).

Radon

The Navy conducted a radon facility screening survey of all buildings and housing at the installation in November 1989. No radon concentration above the action level of 4 pCi/l was detected at base facilities or housing units and no further action is planned based on these results (Hudson 1997).

3.12.2 NAF El Centro Alternative

Affected Area

The affected area includes the proposed project locations for the aircraft, aircraft support facilities, and personnel support facilities.

Hazardous Materials Management

Hazardous materials are used in various operations throughout the base and are managed in accordance with the Hazardous Materials Management Plan of September 26, 1997. NAF El Centro has submitted a list of chemicals, in compliance with Section 311 of EPCRA, and emergency planning information, in accordance with Section 302 of EPCRA (Bay 1997). Hazardous materials are used and stored at proposed project sites in the operation and shop areas.

Hazardous materials used by divisions, departments, and tenants on the base are listed on the authorized user list, which is submitted to the Hazardous Materials Division. Most of the hazardous materials are used at operation and shop areas. Each department has its own hazardous materials storage locker, but the Hazardous Materials Center stores the reusable hazardous materials. Small quantities of hazardous materials also are used for cleaning and other maintenance operations throughout the base.

Hazardous Waste Management

Hazardous wastes are generated by NAF El Centro operations and by tenant activities. According to the NAF El Centro Hazardous Waste Annual Report, the total amount of hazardous waste generated in 1988 was approximately 140 tons (127 tonnes), and approximately 110 tons (100 tonnes) of hazardous waste were generated in 1989. The wastes consisted primarily of asbestos, contaminated soil, empty containers, waste asphalt, waste paint, contaminated jet fuel, spill residues, ethylene glycol, waste methyl alcohol, and waste cleaning compounds (US Navy 1990a). Hazardous wastes are properly stored at proposed project sites located within operation and shop areas. These wastes are collected and transferred to accumulation areas for temporary storage pending disposal.

Hazardous wastes generated at NAF El Centro are collected, packaged, and transferred from user/work areas to 29 approved less-than-90-days accumulation points for temporary storage. The hazardous wastes then are transferred to the central (less-than-90-days accumulation point) hazardous waste storage area where they are manifested and transported off the base (Bay 1997). ELTEX Chemical, under contract with the DRMO, transports the hazardous wastes to its processing facility in Houston, Texas (Tousseau 1997).

Installation Restoration Program Sites

In accordance with the IRP, preliminary assessments were conducted at NAF El Centro to identify potentially hazardous disposal sites and contaminated areas caused by past hazardous waste storage, handling, or disposal practices. Seventeen potentially contaminated sites were identified, and recommendations have been made for further investigation of 15 of the 17 sites (US Navy 1990a). Two additional sites were closed by the DTSC in August 1997.

Under the IRP, all 13 sites are being investigated and, if deemed necessary, will be remediated. In addition to the site investigations, the Colorado River Basin RWQCB has required hydrogeological assessment reports at sites 10 and 17, and solid waste assessment tests at sites 1, 2, and 3 in accordance with the Toxic Pits Cleanup Act (US Navy 1990a). Remedial action will be completed according to the requirements of the Colorado River Basin RWQCB, Imperial County, and the California DTSC.

Table 3-32 identifies IRP sites within a 0.25-mile (0.4-km) radius of the proposed project sites for this alternative. There are no IRP sites identified within the proposed project locations.

Asbestos

An asbestos survey has been conducted at NAF El Centro, and 221 buildings were inspected for ACM by the Navy industrial hygienist. Suspect ACM was sampled and analyzed by a Navy laboratory. Of the 221 buildings, 174 reportedly contain ACM. ACM that could become friable was removed during the inspection. Family housing was not included in the survey because ACM had been removed

prior to the inventory. Approximately 25 buildings have not been surveyed for ACM and are scheduled for inspection in fiscal year 1998 (Bay 1997). ACM present at proposed project sites and other locations will be abated during renovation activities if it presents a potential health and safety concern.

Table 3-32
IR Program Sites within One Quarter Mile of the Proposed Project Locations at NAF El Centro

Site Number	Site Name	Approximate Location
1	Magazine Road Landfill	750 feet (229 m) north of the proposed parallel runway 2 project location.
2	Patrol Road Landfill	200 feet (61 m) south of the proposed parallel runway 2 project location. 750 feet (229 m) east of the proposed taxiways project location.
8	Scrapyard	500 feet (152 m) north of the proposed parallel runway 2 project location.
12	Fuel farm tank rinseate disposal area	1,000 feet (305 m) south of the proposed engine test cell project location. 1,100 feet (335 m) south of the proposed engine maintenance shop project location.
13	Fuel farm filter cleaning area	500 feet (152 m) southeast of the proposed engine test cell project location. 600 feet (183 m) southeast of the proposed engine maintenance shop project location. 1,000 feet (305 m) southeast of the proposed airframes shop project location.

Source: US Navy 1988a

Polychlorinated Biphenyls

There are approximately 58 PCB-containing transformers (PCB concentrations less than 50 ppm) on the base. These transformers are scheduled for removal and replacement with non-PCB transformers in October 1997 (Bay 1997). No PCB equipment or PCB-contaminated equipment is present at any of the proposed project sites. PCB- containing electrical equipment, such as light fixtures and ballasts, may be present at the proposed project sites but are scheduled for removal in October 1997.

There have been no known releases of dielectric fluid or transformer explosions at any of the proposed project sites.

Storage Tanks and Oil/Water Separators

NAF El Centro is surveying the status of all abandoned and removed USTs and assessing regulatory compliance of all operational USTs. The base also is aggressively implementing a program to replace all USTs with ASTs when this option is the most feasible method of obtaining or maintaining compliance. The Underground Storage Tank Management Plan (US Navy 1995d) provides NAF El Centro with guidance on effective management approaches for achieving and maintaining compliance with all UST requirements and implementing preventive measures to avoid an unauthorized release from a UST.

JP-5 is transported to NAF El Centro by pipeline from a fuel storage facility operated by Southern Pacific Pipeline near the city of Imperial. The pipeline is located along Aten Road and delivers jet fuel at a rate of 155 barrels per hour. Jet fuel also is delivered to NAF El Centro by truck. The pipeline terminates at the fuel farm in the southeastern section of the base where three JP-5 storage tanks have a combined capacity of 1,174,000 gallons (4,444,060 l) (US Navy 1995d).

Two active JP-5 jet fuel USTs at the fuel farm are owned and operated by NAF El Centro. There is one 567,000-gallon (2,146,322-l) UST at H-13 and one 40,000-gallon (15,416-l) UST at H-14. There is an additional active 500-gallon (1,893-l) JP-5 UST on the base at I-15, but it is owned and operated by Santa Fe Pacific Pipeline (US Navy 1995d).

Although 89 USTs are documented as having been removed, there are approximately 72 suspected UST locations on the base (Bay 1997). USTs are considered suspect either when information indicates that a tank may be present but the presence cannot be confirmed or when information indicates that a UST has been removed or abandoned but no documentation is available (US Navy 1995d).

Fifty-three ASTs are present on NAF El Centro, and an SPCC plan has been implemented for the base. Spill response equipment is stored at each fuel storage area, and the fire department responds to any spills over five gallons (19 l) on pavement and any spills to soil or water. Fuel releases at the base have been remediated and the sites approved for closure (Bay 1997).

There is one closed-loop system at the car wash, and the wastewater is recycled. No engine cleaning, radiator draining, or any activity that will contaminate the system is allowed. An aircraft wash area is also available and collects wastewater. Samples collected from this water have indicated the presence of less than one-percent oil. Because oil or any POL contaminated water is allowed to be dumped in this area, and the hazardous waste concentration is below regulatory limits, no permits have been issued for these systems (Bay 1997).

Pesticides

Pesticides are applied monthly and on an as-needed basis throughout the base by a contractor. Past usage included common pesticides, such as chlordane and DDT, which were banned in 1988 and 1971, respectively. NAF El Centro implements a pest management plan that specifies the terrain to be treated, the type of pest, pesticide product name and EPA registration number, and the mixing concentration or rate of application. Soil samples have not been collected to determine the presence of residual pesticides (Gallant 1997).

Lead

NAF El Centro conducted an LBP survey of the residential buildings on the base. Buildings containing LBP are being remediated systematically and on an as-needed basis (Bay 1997).

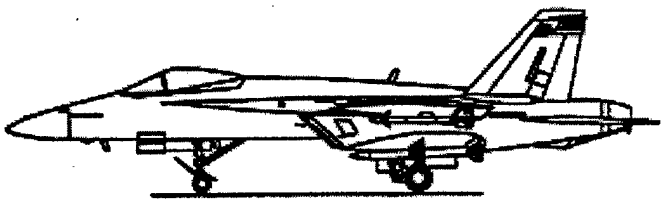
DOD regulations do not require the survey of nonresidential structures for LBP, but LBP is likely to be present in buildings constructed before 1978. A LBP survey of the nonresidential buildings is scheduled for January 1998 (Bay 1997).

Ordnance

Ordnance is loaded aboard aircraft at the outboard areas of the aircraft parking aprons in the combat aircraft ordnance area. This practice requires parked aircraft to be towed out of the ordnance area and portions of maintenance hangars to be evacuated during loading procedures. No known ordnance manufacture, storage, or disposal have been conducted at any of the proposed project locations (Bay 1997).

Radon

An initial radon facility screening survey of all housing at the installation was conducted and no radon concentrations above the action level of 4 pCi/l were detected. No further action is planned at the housing units based on these results. A second radon screening at the base is in progress and is scheduled to be completed fiscal year 1998 (Bay 1997).



4.0 ENVIRONMENTAL CONSEQUENCES

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

This chapter describes potential environmental consequences associated with implementing the proposed action at Naval Air Station (NAS) Lemoore and Naval Air Facility (NAF) El Centro. The Council on Environmental Quality regulations on implementing the National Environmental Policy Act (NEPA) state that the environmental consequences discussion shall include direct effects and their significance and indirect effects and their significance (40 CFR 1502.16). Direct effects are caused by the action and occur at the same time and place (40 CFR 1508.8). Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8).

Impacts for the resource areas described in Chapter 3 are presented for each alternative. The resource area discussions begin with an introduction that includes planning issues for the resource area and is followed by the criteria used to determine the significance of an impact. Significant impacts and mitigation measures are numbered; less than significant impacts, including those that are beneficial, are listed separately from the significant impacts and are not numbered. Unavoidable impacts that cannot be mitigated to a less than significant level are also identified. Mitigation measures are identified for any impact determined to be significant.

Complete implementation of the proposed action at each alternative base is assumed in determining impacts. At NAS Lemoore the proposed action would result in an increase of 92 aircraft and 4,900 military personnel and family members. At NAF El Centro the proposed action would result in an increase of 164 aircraft and 9,090 military personnel and family members.

4.1 LAND USE AND AIRSPACE

This section identifies potential consequences to land use and airspace from F/A-18E/F facility construction and aircraft operations at NAS Lemoore and NAF El Centro. The impact analysis compares projected conditions, after construction of

F/A-18E/F facilities and aircraft arrival, to the affected areas described in Section 3.1, Land Use and Airspace. The analysis evaluates changes to existing land uses, compatibility of land use changes with the Air Installation Compatible Use Zone (AICUZ) program standards, and impacts upon existing air operations resulting from implementation of the proposed action.

Significance Criteria

Within a Navy facility, the base master plan and the AICUZ program identify land use designations and standards for land use compatibility based on noise and safety conditions (see Figure 3-1 for AICUZ land use compatibility criteria). County master plans designate land uses off base, however, consistency with AICUZ recommendations is also encouraged. F/A-18E/F facility development or aircraft operations would cause significant land uses impacts if they would be incompatible with existing land uses and land use/noise standards, or would be located in accident potential zones. Impacts to airspace operations would occur if the proposed action affects the way airspace is being used. Table 4-1 summarizes the potential impacts to land uses and airspace identified in this analysis.

Table 4-1
Summary of Land Use and Airspace Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Compatibility with on-base land uses	○	◐
Consistency with AICUZ land use compatibility guidelines: safety	○	○
Consistency with AICUZ land use compatibility guidelines: noise	◐	◑
Exceedance of imaginary surface restrictions	◐	◑
Compatibility with regional land uses	◐	◐
Impacts to airspace operations	◐	◐

LEGEND:
● = Significant and not mitigable impact
◑ = Significant but mitigable impact
◐ = Less than significant impact
○ = No impact

4.1.1 NAS Lemoore Alternative

Less than Significant Impacts

Compatibility with On-base Land Uses. Implementing the proposed project at NAS Lemoore would not significantly affect existing land uses where new structures are compatible with these uses. Projects associated with the F/A-18E/F aircraft and personnel would be consistent with existing land uses as described below.

The fleet replacement squadron (FRS) hangar, naval air maintenance training (NAMTRA), strike fighter weapons school, fleet hangar, airframes shop, and engine maintenance shop would be expanded to meet the needs of the F/A-18E/F aircraft. The expansion of the existing uses would not change the land use. The

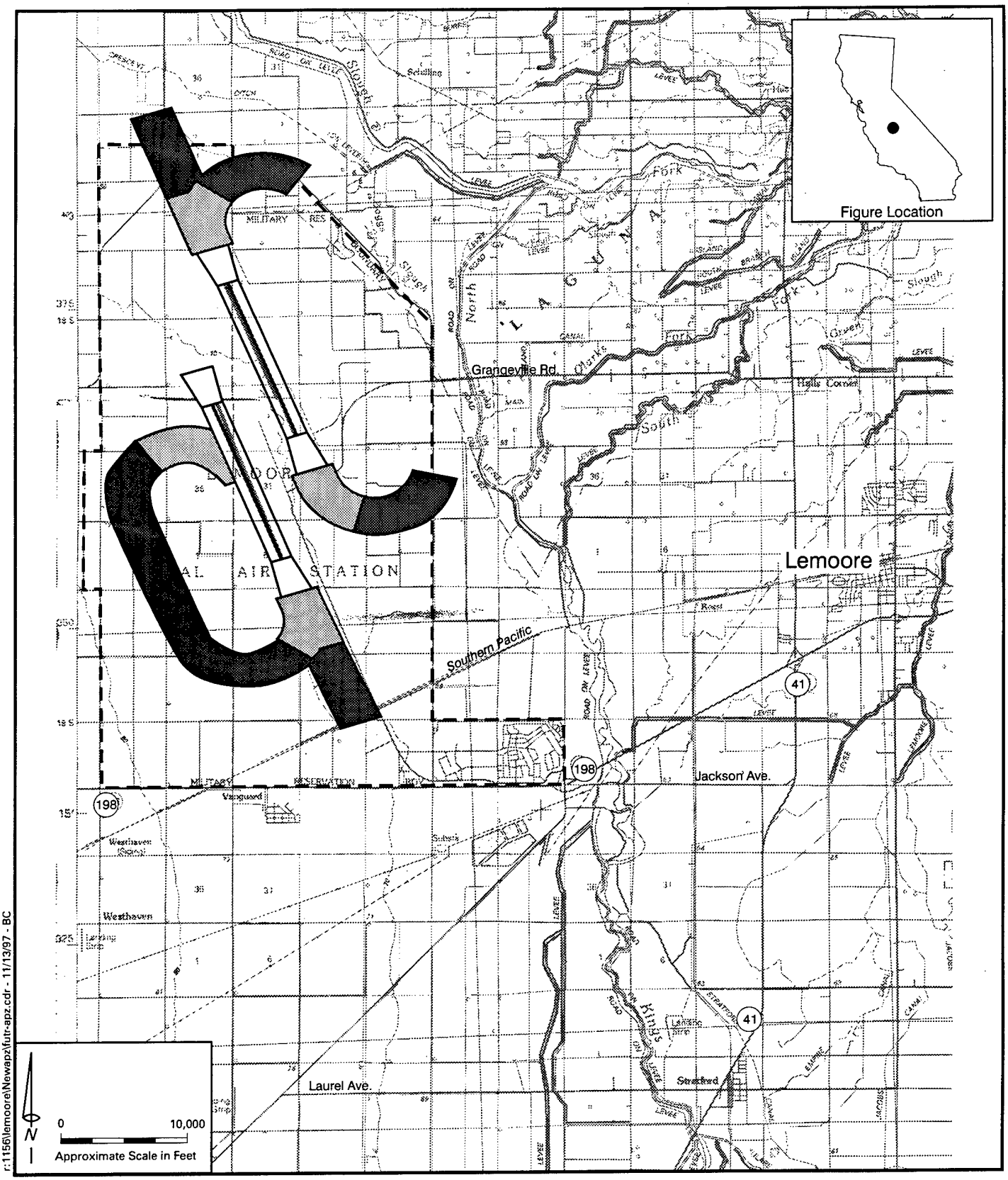
proposed aviation armament shop would be constructed within an area designated for supply uses, the bachelor enlisted quarters (BEQ) would be constructed in an area designated for personnel support, and the child development center would be constructed in an area designated for recreation. These proposed uses are consistent with these designations and existing land uses in these areas. The counseling center, youth center, and family housing complex would be built on undeveloped land in areas containing support facilities. Existing land uses in these areas are consistent with these proposed uses. There would be no significant impacts to on-base land uses associated with implementation of this project, and no mitigation would be required.

It is unlikely that the conversion of on base agricultural outlease land in a predominantly developed area would constitute a significant impact to agricultural production. The Farmland Protection Policy Act (FPPA) would not apply because §658.3 of the legislation would exempt conversion of farmland for purposes of national defense (Bunter 1997). No mitigation would be required.

Consistency with AICUZ Land Use Compatibility Guidelines: Safety. APZ designations would be modified as a result of implementing the proposed action at NAS Lemoore (Figure 4-1). As a result, APZII designations would extend slighty beyond the base boundaries to the east and northeast, however, these modifications would not result in any incompatibilities with existing, off-base land uses. All existing, on-base facilities and proposed F/A-18E/F support facilities would be outside of the modified APZs. There would be no impacts from safety restriction violations and no mitigation would be required.

Consistency with AICUZ Land Use Compatibility Guidelines: Noise. A less than significant impact would occur at NAS Lemoore from the location of facilities relative to CNEL contours. New construction or expansion activities would be required to include implementation of noise attenuation measures to reduce noise to levels compatible with AICUZ noise guidelines. Future noise contours most proximate to NAS Lemoore with the proposed action are shown on Figure 4-2. Three proposed facilities at NAS Lemoore would require noise attenuation: the BEQ, the NAMTRA, and the strike fighter weapons school. The BEQ would be located in an noise environment exceeding 65-dB CNEL; the NAMTRA would be located in a 65- to 75-dB CNEL and the strike fighter weapons school would be located in a 80-dB CNEL contour. Development of these facilities would include noise attenuation measures. All other facilities would be consistent with the ALCUZ noise guidelines. No mitigation would be required. Impacts to the noise environment from the proposed action are discussed in Section 4.7, Noise.

Exceedance of Imaginary Surface Restrictions. Proposed facilities to support the F/A-18E/F squadrons would not exceed imaginary surface restrictions. Facilities proposed for the operations area are between two runways and outside the primary surface of each. These facilities would be within the inner horizontal



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The APZs for NAS Lemoore extend beyond the northern boundaries of the base.

LEGEND:

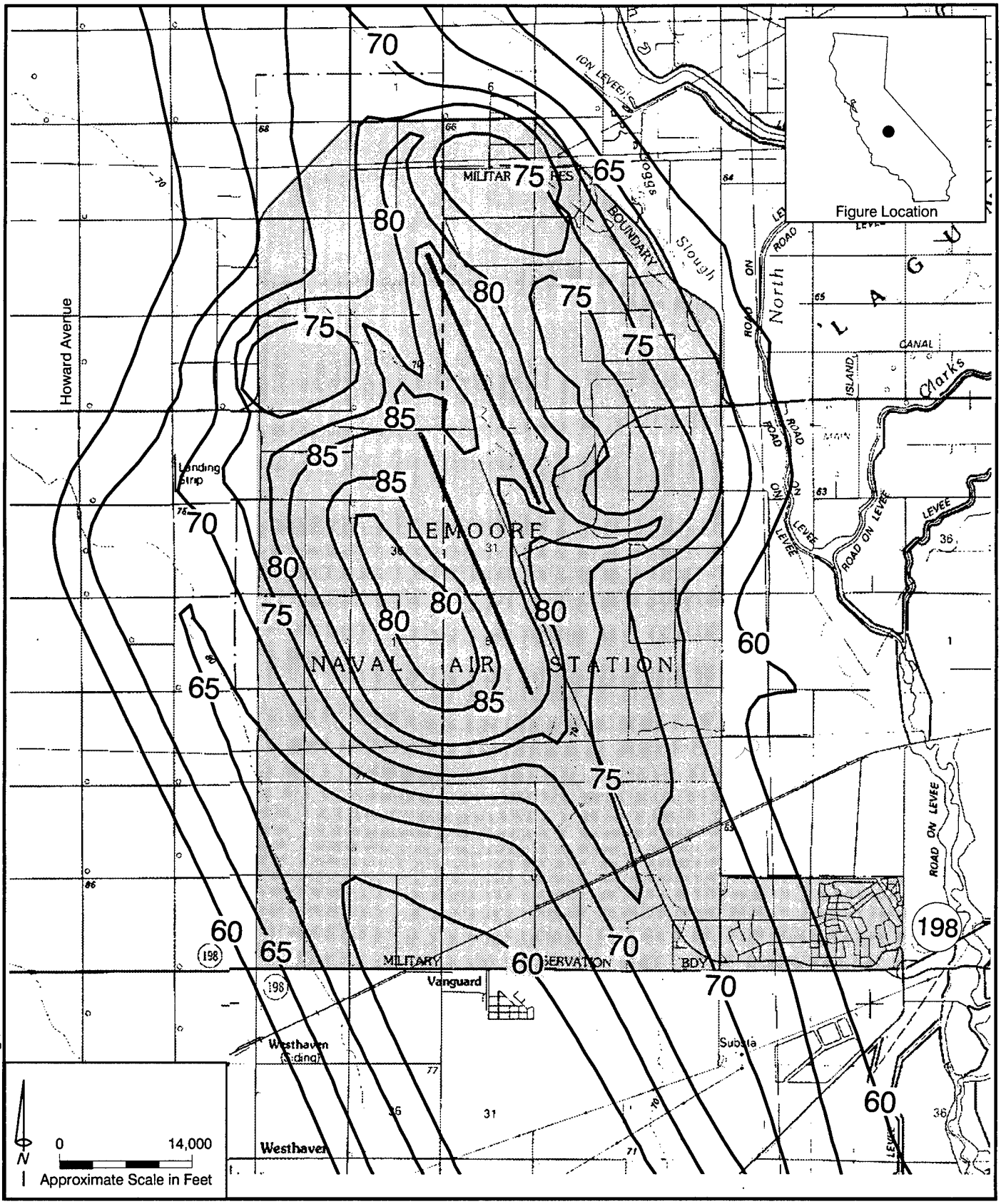
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II
- NAS Lemoore

NAS Lemoore Proposed Action Accident Potential Zones

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 4-1

Source: Wyle 1997



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Future on-base noise contours exceed levels associated with most noise sensitive.

LEGEND:

— 75 — Community Noise Equivalent Level (CNEL)

NAS Lemoore

NAS Lemoore Proposed Action Noise Contours

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 4-2

Source: Wyle 1997.

surface, however, they would not exceed the 150 foot (46 meters) restriction. Proposed facilities in the housing and administration areas located in the approach-departure clearance surface but would not exceed the height restrictions for these imaginary surfaces. There would be no significant impacts to aircraft navigation from these structures, and no mitigation would be required.

Compatibility with Regional Land Uses. Implementing the proposed action at NAS Lemoore would not significantly affect regional land uses. Airfield operations at NAS Lemoore are protected from encroachment by Fresno and Kings counties, which both have general plan policies that encourage agricultural production and limit building heights near the base. There would be no significant impacts associated with regional land uses, and no mitigation would be required.

Impacts to Airspace Operations. The increase in numbers of flights at NAS Lemoore from the F/A-18E/F squadrons would not significantly affect flight operations. Airfield use and flight operations in the airspace above the airfield would increase by approximately 70 percent. Consultation with an air traffic control specialist at NAS Lemoore indicates that this increase could be accommodated within established operational procedures and flight patterns (Vaughan 1997). No changes in airfield operations or airspace designations would be necessary to operate and train the F/A-18E/F aircraft squadrons. No mitigation would be required.

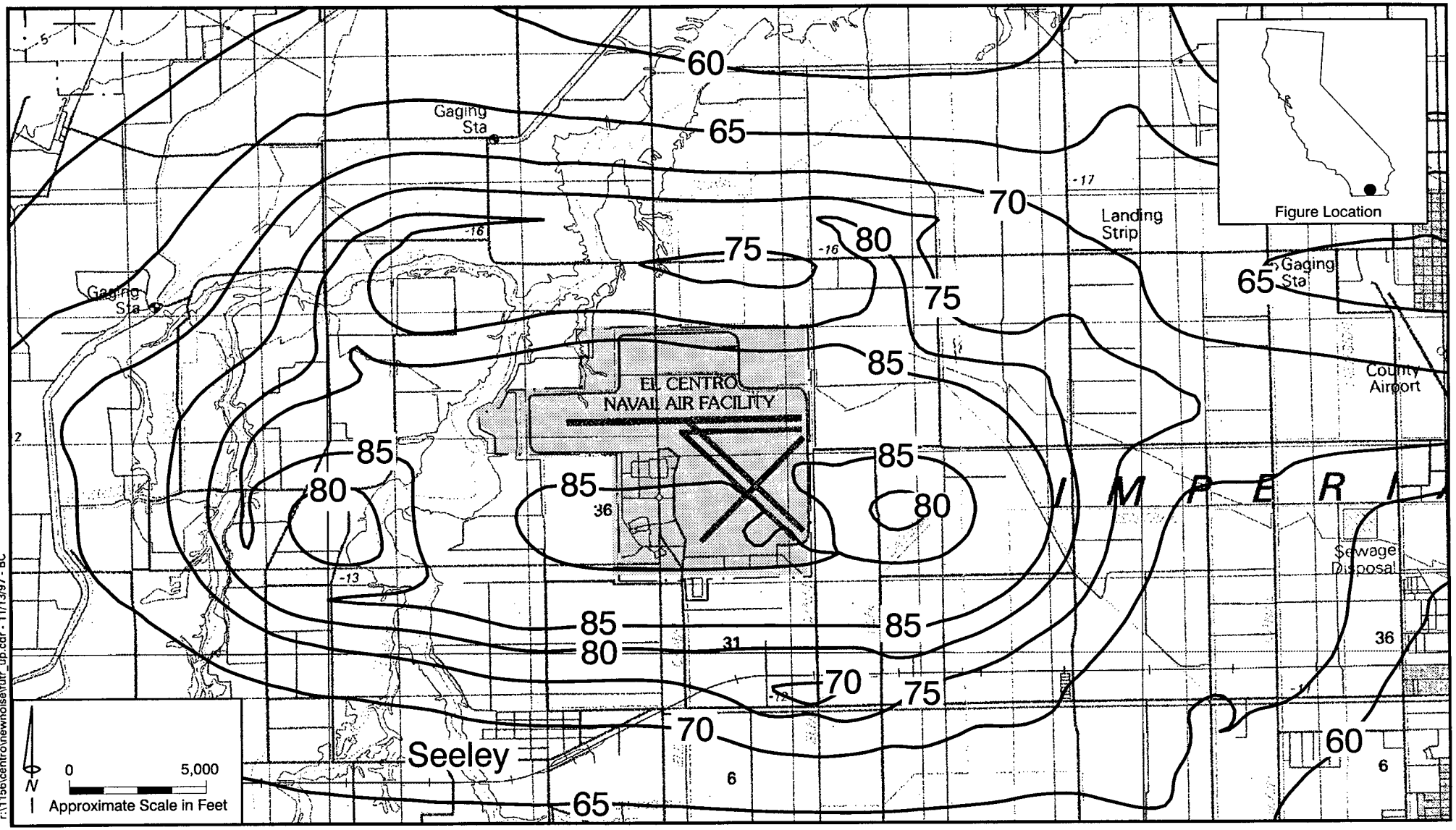
4.1.2 NAF El Centro Alternative

Significant Impacts

Impact 1. Consistency with AICUZ Land Use Compatibility Guidelines: Noise. A significant but mitigable impact would occur at NAF El Centro from locating administration, personnel support, and housing facilities in an 85-dB CNEL noise contour (Figure 4-3). No other feasible sites have been identified for these buildings. The AICUZ identifies these uses as clearly incompatible with this noise level.

Mitigation 1. Do not locate the facilities within the boundaries of NAF El Centro. Identify areas off-base for location of these facilities that would provide compatible noise environments. Work with local agencies and the communities to implement development plans for these facilities. Should the action be located at NAF El Centro, off-base property would be procured for development of these facilities.

Impact 2. Exceedance of Imaginary Surface Restrictions. A significant but mitigable impact would occur at NAF El Centro from locating F/A-18E/F facilities within the helicopter imaginary surface restrictions. The proposed general warehouse, aviation life support system shop and battery shop would be located in this area. The general warehouse could exceed the 150 foot (46 meters) height restriction for the helicopter imaginary surface at the end of Runway 3. No other feasible sites have been identified for these buildings.



Future on-base noise contours exceed levels associated with most noise sensitive land uses.

LEGEND:

—75— Community Noise Equivalent Level (CNEL)

NAF El Centro

NAF El Centro
Proposed Action Noise Contours

Facility Development for West coast Basing of the F/A-18E/F Aircraft

Source: Wyle 1997.

Figure 4-3

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Mitigation 2. The Navy would modify the approach-departure path of the helicopter pad to avoid new structures. Implementation of this mitigation would reduce impacts to a less than significant level.

Less than Significant Impacts

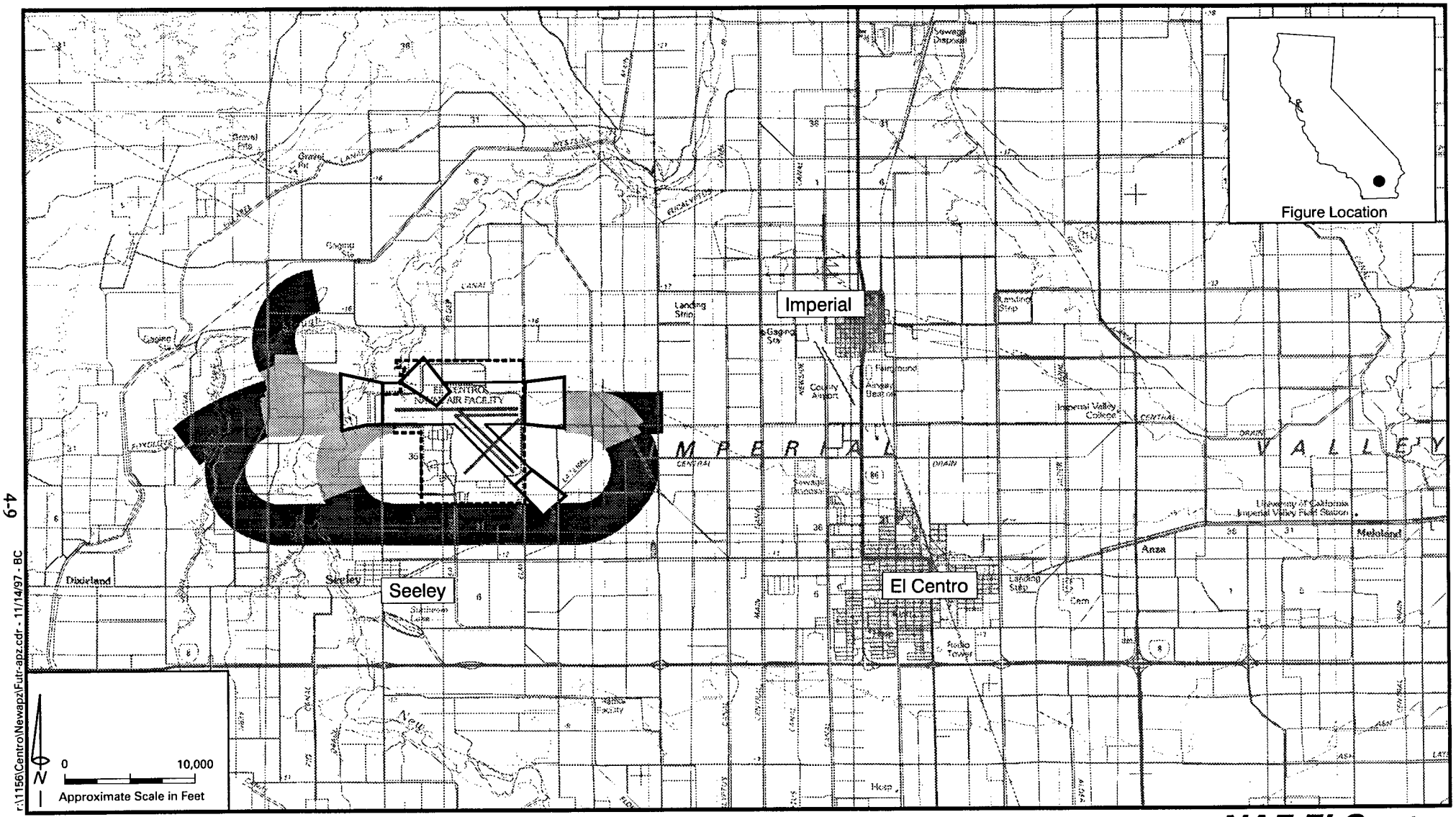
Compatibility with On-base Land Uses. Implementing the proposed action at NAF El Centro would not significantly affect existing land uses. The runways, taxiways, FRS hangar, fleet hangars, airframes shop, engine maintenance shop, engine test cell, avionics shop, aviation armament shop, aviation life support system shop, external fuel storage, and battery shop all would be constructed in an area designated for aircraft operations and training. The enlisted personnel club, exchange food service, commissary, credit union, religious ministry facility, and BOQ would be constructed in a personnel support area. The enlisted personnel dining facility, BEQs, and the child development center would be constructed in a housing area. The crafts hobby shop, automotive hobby shop, equipment rental center, bowling center, fitness center, indoor playing courts, and youth center would be constructed in an area designated for recreation.

The family housing, NAMTRA, strike fighter weapons school, flight simulator, aircraft ground support equipment shed, ground support equipment holding shed, general warehouse, general storage shed, open storage area, and administrative offices would be constructed on undeveloped land currently used for open space/agricultural outlease. Constructing facilities in this area would not constitute a significant land use impact since the proposed uses would be similar to the adjacent existing uses. There would be no significant impacts to on-base land uses associated with implementation of this project, and no mitigation would be required.

It is unlikely that the conversion of agricultural outlease land that is on base and in a predominantly developed area would constitute a significant impact to agricultural production. The Farmland Protection Policy Act (FPPA) would not apply because §658.3 of the legislation would exempt conversion of farmland for purposes of national defense (Bunter 1997). No mitigation would be required.

Consistency with AICUZ Land Use Compatibility Guidelines: Safety. APZ designations would be modified as a result of implementing the proposed action at NAF El Centro (Figure 4-4). Agricultural and recreational land uses surrounding NAF El Centro and would remain compatible land uses within the modified, off-base APZ boundaries. All existing, on-base facilities and proposed F/A-18E/F support facilities would be outside of the modified APZs. There would be no impact and no mitigation would be required.

Consistency with AICUZ Land Use Compatibility Guidelines: Noise. A less than significant impact would occur at NAF El Centro from the location of aircraft operations, training and maintenance facilities in an 85-dB CNEL noise



4-9

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El Centro and Imperial are outside NAF El Centro's APZ and imaginary surfaces.

LEGEND:

- Clear Zone and Setback
- Accident Potential Zone I
- Accident Potential Zone II
- NAF El Centro Boundary

NAF El Centro
Proposed Action Accident Potential Zones

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Source: Wyle 1997

Figure 4-4

environment. The aircraft operations and maintenance facilities are identified as normally compatible or clearly compatible. Training activities in this noise environment would be a normally incompatible use. The Navy will incorporate acoustical reduction measures into facility design or modification to comply with the adopted AICUZ noise standards. No further mitigation would be required. Impacts to the noise environment from the proposed action are discussed in Section 4.7, Noise.

Compatibility with Regional Land Uses. Implementation of the proposed action at NAF El Centro would not significantly affect regional land uses. Airfield operations at NAF El Centro are protected from encroachment by Imperial County General Plan policies that encourage agricultural production and limit building heights near the base. No mitigation would be required.

Impacts to Airspace Operations. The increase in numbers of flights at NAF El Centro from the proposed action would not significantly affect flight operations. Although airfield use and flight operations in the airspace above NAF El Centro would substantially increase over existing operations, it is anticipated that aircraft would be scheduled within established operational procedures and flight patterns. No changes in airfield operations or airspace designations would be necessary to operate and train the F/A-18E/F aircraft squadrons. No mitigation would be required.

4.2 VISUAL RESOURCES

This section identifies potential impacts to visual resources from implementing the proposed action at NAS Lemoore and NAF El Centro. The impact analysis compares projected conditions after project implementation to the affected environments and affected area. The analysis is a qualitative evaluation of the nature and extent of change to existing landscape and engineered visual character and views that would occur at each alternative basing installation.

Significance Criteria

An alternative would have a significant impact on the visual environment if its implementation would result in the following:

- Substantially contrast with the character and scale of the existing community;
- Degrade views from any formally recognized scenic viewshed or roadway; or
- Dominate views of a visually unique structure or landform.

Table 4-2 summarizes the potential impacts to visual resources that have been identified in this analysis.

Table 4-2
Summary of Visual Resources Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Visual character	◐	◐
Views	◐	◐
Consistency with applicable plans and regulations	◐	◐

LEGEND:
- ● - Significant and not mitigable impact
- ◑ - Significant but mitigable impact
- ◐ - Less than significant impact
- ○ - No impact

4.2.1 NAS Lemoore Alternative

Less than Significant Impacts

Visual Character. Development and operations at NAS Lemoore required to support the proposed action would have a less than significant impact on visual character at or near the base. Development of the NAMTRA and other training, maintenance, supply, personnel support, and housing facilities would require construction at NAS Lemoore. Many of these structures would be infill projects consistent with existing structures in terms of scale and architectural treatments

based on the base exterior and architecture plan (BEAP) guidelines. The new operational buildings are proposed among structures that are similar in scale and character. The proposed personnel support facilities also would be constructed among administration buildings with similar architecture and scale (i.e., recreation and housing areas). No unique landforms or scenic attributes would be affected by this alternative. Because the new structures would integrate architectural treatments required by the BEAP, the proposed development would have a less than significant impact on visual character.

NAS Lemoore is home to F/A-18C/D fixed-wing aircraft squadrons. Operationally, the proposed action would result in 92 new aircraft stationed at the base. The increase in flight activity would not substantially change the perceived character of existing operations because there are no visually sensitive land uses beneath the airfield flight path. Therefore, operations associated with the NAS Lemoore Alternative would have a less than significant impact on the visual environment. No mitigation would be required.

Views. Implementing the proposed action at NAS Lemoore would result in a less than significant impact to nearby views. The interior location of the proposed structures would restrict their visibility to internal base operations. None of the structures would be visible from outside the base perimeter. Therefore, there would be no visual impacts to off-base public views. This impact is considered less than significant because the new development still would be visible from on-base residential areas. No mitigation would be required.

Regulatory Considerations. Implementing the proposed action at NAS Lemoore would be consistent with relevant plans and regulations. All construction would comply with NAS Lemoore BEAP design guidelines. No mitigation would be required.

4.2.2 NAF El Centro Alternative

Less than Significant Impacts

Visual Character. Development and operations at NAF El Centro required to support the proposed action would have a less than significant impact on visual character at or near the base. Developing a new runway and operational, training, maintenance, supply, personnel support, and housing facilities would require constructing and expanding some existing facilities at NAF El Centro. The proposed new family housing, general warehouse, general storage shed, ground support equipment holding shed, flight simulator, strike fighter weapons school, NAMTRA, aviation life support system shop, and expanded open storage area would be within 1,000 feet (305 meters) of the main gate. These buildings would be larger in scale to other nearby facilities but similar in scale to other on-base hangars. The visually detectable change from agricultural land to operational area would contrast with the surrounding agricultural character of the site but would remain consistent with hangar and other military airfield facilities. The personnel

support facilities would be constructed among structures similar in scale and character as the proposed buildings (i.e., recreation and housing areas). No unique landforms or scenic attributes would be removed with the NAF El Centro Alternative. Landscaping and architectural treatments required in the BEAP would serve to integrate the proposed structures into the visual theme established at the base. Therefore, the impact to visual character associated with the NAF El Centro Alternative would be less than significant.

Currently, 89 percent of flight activity at NAF El Centro is composed of five fixed-wing aircraft. Siting the 164 F/A-18E/F aircraft at NAF El Centro would noticeably change the visual character of flight activity at the base because of the increased number of aircraft. However, visually-sensitive land uses are limited within the base's airfield flight path (i.e., there are no sensitive viewsheds outside the base perimeter). Therefore, the impact of operations associated with the NAF El Centro Alternative to the visual environment would be less than significant. No mitigation would be required.

Views. Implementing the proposed action at NAF El Centro would have a less than significant impact on nearby views. Although the new operational and housing structures would be visible from the perimeter of the base and main gate, there are no sensitive viewsheds outside the base perimeter. None of the personnel support structures would be visible from outside the base perimeter or main gate because of distance and intervening structures which block views to internal areas. Overall, views of each project site within NAF El Centro have low visual quality because there is minimal variation in scenery, topography, and architecture. Therefore, impacts to existing views associated with the NAF El Centro Alternative would be less than significant. No mitigation would be required.

Regulatory Considerations. The NAF El Centro Alternative is consistent with relevant plans and regulations. All construction would comply with the NAF El Centro BEAP design guidelines. No mitigation would be required.

4.3 SOCIOECONOMICS

This section describes potential consequences to socioeconomic indicators that may result from implementing the proposed action at NAS Lemoore or NAF El Centro. The socioeconomic indicators for this study include population, employment, income, housing, business volume, net government revenues, schools, and recreation and community facilities. The impact analysis compares projected conditions after basing the F/A-18E/F squadrons to the affected environments and areas of influence described in Section 3.4, Socioeconomics.

Significance Criteria

Implementing the proposed action would have a significant socioeconomic effect if it would:

- Fall outside the Economic Information Forecast System (EIFS) model rational threshold values (RTV) boundaries for population, employment, personal income, or business volume;
- Substantially affect the local housing market and vacancy rates, school enrollment, or recreation and community facilities; or
- Substantially decrease net government revenues.

Economic Impact Forecast System (EIFS) is a computerized economic base model, which includes an RTV standard that determines whether the expected change generated by a proposed action is significant. The RTV is calculated on the basis of yearly historical fluctuations in population, employment, income, and business volume within the appropriate county or counties. For a change to be significant, it must exceed the computed positive or negative RTV. Appendix B contains complete RTV tables and EIFS model results for the proposed action areas of influence.

Two types of models were used within the EIFS modeling system to take into consideration the effects of operations and construction. The operations effects (the change in F/A-18E/F aircraft personnel and procurement) are described by the standard model, and the construction phase effects are described by the construction model. In both cases, any change entered into the model affecting a sector of the economy causes a change in payrolls and employment of local firms. Further, the change in payrolls and employment for the export sector is transmitted to the local service sector as a multiple of the original change. In addition to this multiplier effect, EIFS converts the direct and indirect effects of business volume, employment, and income into other economic and social impacts by a series of county-specific equations.

Table 4-3 summarizes the potential socioeconomic impacts that have been identified in this analysis. In the following analysis of impacts, the year with the most change is discussed, which in most cases is 2004 for NAS Lemoore and 2007

Table 4-3
Summary of Socioeconomic Impacts

IMPACT ISSUES	Alternatives: NAS Lemoore	Alternatives: NAF El Centro
Population	◐	◐
Employment	◐	◐
Income	◐	◐
Housing	◐	◐
Business volume	◐	◐
Net government revenues	◐	◐
Schools	◑	◐
Recreation and Community Facilities	◐	◐

LEGEND:
● = Significant and not mitigable impact
◑ = Significant but mitigable impact
◐ = Less than significant impact
○ = No impact

for NAF El Centro. However, high construction costs would be experienced in some years because of construction phasing, causing higher changes in some indicators. Business volume is its highest in 2001 for the NAS Lemoore area of influence; and in the NAF El Centro area of influence business volume is at its highest in 2000.

Analysis Approach

Some assumptions were made with respect to operations and construction activities. As described in Chapter 2, the location of personnel and construction of facilities to support the F/A-18E/F squadrons would precipitate locating 1,856 military personnel to NAS Lemoore and 3,443 military personnel to NAF El Centro.

Because most economic activity would remain at the selected base (income would be sent back to the home base), deploying personnel has not been considered in this study. To generate support, it is anticipated that civilian personnel would be hired at each base. For this study, the additional support personnel are assumed to be clerical or semi-skilled and easily hired from the local area.

The construction phase would involve the construction/expansion or renovation/rehabilitation of facilities. The amount of construction activity depends on which base is chosen for the project; therefore, the dollar costs of construction vary from base to base (Table 4-4). The construction phase would begin in 1999 and end in 2001 or 2003, depending on the base. No major

Table 4-4
Estimated Annual Construction Costs

Year	NAS Lemoore	NAF El Centro
1999	$20,540,000	$86,358,560
2000	$37,810,000	$289,134,000
2001	$51,000,000	$82,615,000
2002	$28,150,000	NA*
2003	$24,802,000	NA*
Total	**$162,302,000**	**$458,107,560**

*NA = Not applicable. Only NAS Lemoore would have construction activities in 2002 and 2003.

construction activities are anticipated to occur in 2004 or beyond. It is expected that local procurement for the F/A-18E/F aircraft, related facilities, and personnel would be $107,500 per year.

4.3.1 NAS Lemoore Alternative

Implementing the proposed action at NAS Lemoore would require construction, modification of existing facilities, and new equipment in support of the F/A-18E/F squadrons and associated personnel. The total construction costs would be approximately $162.3 million. Table 4-5 describes the predicted personnel build-up.

Table 4-5
Projected Personnel Build-up at NAS Lemoore

	1999	2000	2001	2002	2003	2004
Military	167	594	780	1,058	1,336	1,856
Civilian	120	120	120	120	120	120

Source: US Navy 1997b

Significant Impacts

Impact 1: Schools. A significant but mitigable impact to schools could occur due to the action at NAS Lemoore, but would be mitigated by federal impact aid payments to eligible school districts. Area schools are either near or over capacity. Implementing the proposed action at NAS Lemoore would add 783 students to area schools in 2004.

Mitigation 1. School districts may be eligible for compensation for the addition of federally connected students by impact aid, which is intended to compensate local school districts for burdens placed on their resources by federal activity. Schools must apply for impact aid through a competitive process and funds are paid directly by the Department of Education (US Department of Education 1995). The Navy would assist, to the extent practicable, affected schools in their pursuit

for federal impact aid. Implementation of this mitigation would reduce this impact to a less than significant level.

Less than Significant Impacts

Population. The increase in population at NAS Lemoore from implementing the proposed action would be a less than significant impact. The aggregated population of Kings and Fresno counties would increase by 4,621 in 2004 (Table 4-6). This population increase would be less than 1 percent more than the baseline population. This change would be within the historic RTV range and would not be considered significant. No mitigation would be required.

Table 4-6
Socioeconomic Effects at NAS Lemoore

	Population	Employment	Income ($1,000)	Housing Rental	Housing Owner-Occupied	Business Volume ($1,000)	Net Government Revenues ($1,000)	Number of School Children
1999								
Operations	416	389	$11,700	63	35	$13,208	$501	70
Construction	92	346	$8,419	41	0	$27,652	$34	16
Total	**508**	**735**	**$20,119**	**104**	**35**	**$40,860**	**$535**	**86**
2000								
Operations	873	933	$29,617	224	126	$28,290	$1,631	250
Construction	170	636	$15,498	75	0	$50,901	$62	30
Total	**1,043**	**1,569**	**$45,115**	**299**	**126**	**$79,191**	**$1,693**	**280**
2001								
Operations	1,942	1,170	$37,442	295	166	$34,860	$2,123	329
Construction	229	858	$20,905	101	0	$68,658	$84	41
Total	**2,171**	**2,028**	**$58,347**	**396**	**166**	**$103,518**	**$2,207**	**370**
2002								
Operations	2,634	1,353	$44,511	400	225	$37,763	$2,798	446
Construction	126	474	$11,539	56	0	$37,896	$47	22
Total	**2,760**	**1,827**	**$56,050**	**456**	**225**	**$75,659**	**$2,845**	**468**
2003								
Operations	3,327	1,879	$60,752	504	284	$54,498	$3,593	564
Construction	111	417	$10,166	49	0	$33,389	$41	20
Total	**3,438**	**2,296**	**$70,918**	**553**	**284**	**$87,887**	**$3,634**	**584**
2004								
Operations	4,621	2,541	$82,571	701	394	$72,864	$4,968	783
Construction*	0	0	$0	0	0	$0	$0	0
Total	**4,621**	**2,541**	**$82,571**	**701**	**394**	**$72,864**	**$4,968**	**783**

Source: EIFS Model.

*The designated activity is not anticipated to occur in this year.

Employment. Implementing the proposed action at NAS Lemoore would result in a beneficial impact on employment. The largest increase in direct and indirect employment (almost 1 percent above the baseline) would be 2,541 workers associated with construction and operations activities in 2004. This change would be within the historic RTV range and would not be considered significant. No mitigation would be required.

Income. Implementing the proposed action at NAS Lemoore would result in a beneficial impact to income. In 2004, aggregate income would increase by $82,571,000, the largest increase during the first 6 years of activities. This change

would be within the historic RTV range and would not be considered significant. No mitigation would be required.

Housing. Implementing the proposed action at NAS Lemoore would result in a less than significant impact on housing. In the year with the most activity (2004), 701 rental units and 394 owner-occupied units would be needed for operations and construction personnel and their family members. In 1994, 13,780 units were vacant, and the project area had a vacancy rate of 5.1 percent. The vacancy rate is projected to be similar in 2004. Base family housing units would be constructed in 2000 and 2001 for an additional 480 units, and bachelor quarters would be expanded. The housing units required could be provided with this alternative. This demand would not be considered substantial given the availability of housing in the project area. No mitigation would be required.

Business Volume. Implementing the proposed action at NAS Lemoore would result in a beneficial impact to business volume. Changes in local business activity resulting from siting the F/A-18E/F aircraft and personnel include direct business volume and induced business volume. Direct business volume is the change in the dollar value of sales in the retail and wholesale trade sector and receipts in the service sector, resulting from local purchases by civilian and military personnel, as well as construction and procurement expenditures. Induced business volume is the additional business activity generated as a result of the direct change in sales. Business volume for the project area would increase by $103,518,000 in 2001, the year with the greatest change. This reflects an increase of less than 1 percent over the baseline. This change would be within the historic RTV range and would not be considered significant. No mitigation would be required.

Net Government Revenues. Implementing the proposed action at NAS Lemoore would result in a beneficial impact to net government revenues. Government revenues would increase by $4,995,000 in 2003, which would be less than 1 percent of the total revenue sources of Kings and Fresno counties. This change would not be considered substantial, and no mitigation would be required.

Recreational and Community Facilities. The current recreational and community facilities at NAS Lemoore are not adequate to support the additional military personnel (Mitchell 1997). However, a gymnasium addition is planned to supplement existing facilities that would make the level of service adequate for the needs of the military personnel. Outdoor recreation facilities on and off base would be adequate. No significant impacts would be expected, and no mitigation would be required.

4.3.2 NAF El Centro Alternative

Implementing the proposed action at NAF El Centro would require constructing facilities to support the F/A-18E/F squadrons and associated personnel. Constructing facilities would cost approximately $458.1 million. Table 4-7 lists the projected personnel build-up.

Table 4-7
Projected Personnel Build-up at NAF El Centro

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Military	153	802	970	1,244	1,518	2,525	2,984	2,984	3,443
Civilian	200	200	200	200	200	200	200	200	200

Source: US Navy 1997b

Less than Significant Impacts

Population. Implementing the proposed action at NAF El Centro would result in a substantial increase in population. The direct and indirect population increase ascribed to the F/A-18E/F aircraft activities would be the largest in 2007 at 8,573 (Table 4-8), which would be 8.3 percent above the baseline population. This change would not be within the historic RTV ranges (6.828 to -1.543). In 2005 and 2006, population changes would also be above the historic RTV for population. However, these population changes would be accompanied by beneficial impacts to the community, e.g., increases in employment, income, business volume, and net government revenues. No mitigation would be required.

Employment. Implementing the proposed action at NAF El Centro would result in a beneficial impact on employment. Employment increases in the project area would be 4,293 in 2007, or almost 10 percent above the baseline. This change would be within the historic RTV range and would not be considered significant. No mitigation would be required.

Income. Implementing the proposed action at NAF El Centro would result in a beneficial significant impact to income. At $145,165,000 income would increase more than 9 percent over the baseline income in 2007. This change would not be within the historic RTV range (8.138 to -3.499) and would be considered significant. No mitigation would be required, however, because of the beneficial nature of the impact.

Housing. Implementing the proposed action at NAF El Centro would result in a less than significant impact on housing. The siting of F/A-18E/F aircraft at NAF El Centro would create a demand for 1,300 rental and 731 owner-occupied units in the year of greatest activity (2007). In 1994, almost 4,000 units were available in Imperial County, and availability is projected to be similar in 2007. In 2000, 1,327 on-base family housing units would be constructed. In addition, bachelor quarters would be built to accommodate F/A-18E/F personnel. The demand would not be considered substantial when compared to the available housing units, and no mitigation would be required.

Business Volume. Implementing the proposed action at NAF El Centro would result in a significant impact to business volume in 2000. Realignment activities

Table 4-8
Socioeconomic Effects at NAF El Centro

	Population	Employment	Income ($1,000)	Housing		Business Volume ($1,000)	Net Government. Revenues ($1,000)	School Children
				Rental	Owner-Occupied			
1999								
Operations	381	438	$13,276	58	32	$11,338	$1,893	65
Construction	263	753	$18,859	116	0	$50,074	$1,956	48
Total	**644**	**1,191**	**$32,135**	**174**	**32**	**$61,412**	**3,849**	**113**
2000								
Operations	1,997	1,198	$39,293	303	170	$26,272	$6,369	345
Construction	881	2,520	$63,140	389	0	$167,652	$6,550	161
Total	**2,878**	**3,718**	**$102,433**	**692**	**170**	**$193,924**	**12,919**	**506**
2001								
Operations	2,415	1,395	$46,028	366	206	$30,138	$7,528	418
Construction	252	720	$18,041	111	0	$47,904	$1,872	46
Total	**2,667**	**2,115**	**$64,069**	**477**	**206**	**$78,042**	**9,400**	**464**
2002								
Operations	3,098	1,716	$57,012	470	264	$36,443	$9,418	536
Construction*	0	0	$0	0	0	$0	$0	0
Total	**3,098**	**1,716**	**$57,012**	**470**	**264**	**$36,443**	**9,418**	**536**
2003								
Operations	3,780	2,037	$67,996	573	322	$42,749	$11,308	654
Construction*	0	0	$0	0	0	$0	$0	0
Total	**3,780**	**2,037**	**$67,996**	**573**	**322**	**$42,749**	**11,308**	**654**
2004								
Operations	6,287	3,217	$108,365	953	536	$65,921	$18,254	1,088
Construction*	0	0	$0	0	0	$0	$0	0
Total	**6,287**	**3,217**	**$108,365**	**953**	**536**	**$65,921**	**18,254**	**1,088**
2005								
Operations	7,430	3,755	$126,765	1,127	634	$76,484	$21,420	1,286
Construction*	0	0	$0	0	0	$0	$0	0
Total	**7,430**	**3,755**	**$126,765**	**1,127**	**634**	**$76,484**	**$21,420**	**1,286**
2006								
Operations	7,430	3,755	$126,765	1,127	634	$76,484	$21,420	1,286
Construction*	0	0	$0	0	0	$0	$0	0
Total	**7,430**	**3,755**	**$126,765**	**1,127**	**634**	**$76,484**	**$21,420**	**1,286**
2007								
Operations	8,573	4,293	$145,165	1,300	731	$87,046	$24,586	1,484
Construction*	0	0	$0	0	0	$0	$0	0
Total	**8,573**	**4,293**	**$145,165**	**1,300**	**731**	**$87,046**	**$24,586**	**1,484**

Source: EIFS Model.

*The designated activity is not anticipated to occur in this year.

would directly and indirectly create an additional $193,924,000 in business volume, or over 12 percent above the baseline. This change would not be within the historic RTV range (8.275 to -6.266) and would be considered a significant beneficial impact. No mitigation would be required.

Net Government Revenues. Implementing the proposed action at NAF El Centro would result in a significant impact to net government revenues. Revenues are projected to increase by $24,586,000 in 2007. The increase in government revenue sources would be over 10 percent in the following years: 2000 (because of the

anticipated construction activity), 2004, 2005, and 2006. This would result in an almost 20 percent increase in revenue sources over the baseline. This change would be considered a significant beneficial impact, and no mitigation would be required.

Schools. The affected schools near NAF El Centro are below capacity. With this alternative, approximately 1,484 school children would be added to local schools in 2007. The local schools have the capacity to accommodate the increase in students. School districts also may be eligible for impact aid (similar to the mitigation described for the NAS Lemoore alternative) because the additional students would be federally-connected children. No mitigation would be required.

Recreation and Community Facilities. NAF El Centro has just renovated the existing on-base recreation facilities to meet its existing needs; however, additional personnel and family members would exceed the facilities' capacities. This alternative proposes constructing a gymnasium addition to accommodate the new personnel. Outdoor recreation facilities on and off base would be adequate. No significant impacts would be expected, and no mitigation would be required.

4.4 CULTURAL RESOURCES

This section identifies potential impacts to cultural resources that may result from implementing the proposed action at NAS Lemoore or NAF El Centro. Impact assessments focus mainly on those properties likely to be eligible for the National Register of Historic Places (NRHP). In addition to identifying the number and kinds of resources to be affected, the following issues were considered:

- Evaluation of the relative importance of a resources type in the regional context;
- The depositional or architectural integrity of a given resource; and
- The relative degree of protection afforded similar off-base resources in the region.

Section 106 of the National Historic Preservation Act (NHPA) requires identification, evaluation and assessment of effects of planned federal undertakings on cultural resources in consultation with the State Historic Preservation Officer (SHPO). The regulations implementing Section 106 state that an undertaking has an effect on a historic property (i.e., NRHP-eligible resource) when that undertaking may alter those characteristics of the property that qualifies it for inclusion in the NRHP. An undertaking is considered to have an adverse effect on a historic property when it may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects include, but are not limited to the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property or alteration of the character of the property's setting when that character contributes to the property's qualifications for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or changes that may alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of a property without adequate provisions to protect its historic integrity.

Other types of disturbances may occur that would be of concern to Native American groups. Such concerns could include inadvertent discovery of Native American remains and objects. Specific types of Native American resources and provisions for notification and consultation are identified under the Native American Graves Protection and Repatriation Act (NAGPRA).

Impacts to cultural resources consist of ground-disturbing activities, modification and alteration to historic structures, visual intrusion on a historic setting, and unauthorized artifact collecting. Direct impacts are those that would occur during project construction, development, and operation that would directly impinge on or destroy cultural resources, such as all activities that entail earthmoving. Impacts can occur directly to a site by loss of all or part of the site through grading, filling, or other construction. Ground-disturbing activities may affect the physical integrity of cultural resources, destroying their research potential and subsequently, their eligibility for the NRHP, or importance to Native American groups.

Modification or alteration of historic buildings may disturb the architectural integrity that contributes to their NRHP eligibility. Increased pedestrian activity provides opportunities for unauthorized artifact collection and vandalism of cultural resources; these activities affect the integrity of sites and subsequent eligibility.

Impacts can occur indirectly through the alteration of the character of the site setting and the introduction of visual, audible, or atmospheric elements that change the character of the site or its setting. If setting is a critical factor in the eligibility of an NRHP District, construction of incompatible architectural styles would disturb the setting and cohesiveness of the district.

Although the construction phase of the proposed project is of a relatively short duration, adverse effects to NRHP-eligible cultural resources might be long-term and permanent. Project-related activities may have an indirect impact, specifically unauthorized artifact collecting and vandalism, on all cultural resources in the Area of Potential Effect (APE).

Significance Criteria

Impact assessments for prehistoric and historic resources are based on the type of site, NRHP eligibility status, the type of impact, and the extent of disturbance from the project. Impacts to prehistoric and historic resources are considered significant if the project could adversely affect those sites eligible for or potentially eligible for the NRHP.

Impact assessments for traditional cultural properties are based on the type of resource, its importance in the community's belief system, the type of impact, and the extent of disturbance from the project. Impacts to traditional cultural properties are considered significant if the project has the potential to affect locations important to Native Americans or other communities, has the possibility to reduce access to sacred or sensitive sites, or to affect NRHP-eligible resources of historic value to a specific community.

Table 4-9 summarizes the potential impacts to cultural resources that have been identified in this analysis.

Table 4-9
Summary of Cultural Resources Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Prehistoric archeological resources	○	○
Traditional cultural properties	○	○
Historic archeological resources	○	○
Historic architectural resources	○	○
Prehistoric subsurface deposits	○	⦶
Historic subsurface deposits	○	⦶

LEGEND:
● = Significant and not mitigable impact
◑ = Significant but mitigable impact
⦶ = Less than significant impact
○ = No impact

4.4.1 NAS Lemoore Alternative

Less than Significant Impacts

Prehistoric and Historic Archeological Resources. No impacts to archeological resources would result from implementing the proposed action at NAS Lemoore. Because no prehistoric or historic archeological sites have been identified within the APE, and because the APE falls within a low-sensitivity zone where prehistoric and historic archeological sites are not expected to exist, there would be no impact to these types of resources as a result of this alternative. No mitigation would be required.

Traditional Cultural Properties. No impacts to traditional cultural properties would occur from implementing the proposed action at NAS Lemoore. Because no traditional cultural properties have been identified within the APE on NAS Lemoore, there would be no impact to these types of resources as a result of this alternative. No mitigation would be required.

Historic Architectural Resources. No impacts to historical architectural resources would occur from implementing the proposed action at NAS Lemoore. Because none of the buildings scheduled for modification are considered eligible for the NRHP, there would be no impact to these types of resources as a result of the proposed action. Although the Neutra School is considered potentially eligible for the NRHP, there would be no impact to the school as a result of this alternative. No mitigation would be required.

Prehistoric Subsurface Deposits. No impacts to prehistoric subsurface deposits would result from implementing the proposed action at NAS Lemoore. Because prehistoric subsurface deposits are only likely to exist at depths below two meters (6 feet), and because ground disturbing activities associated with implementation of the proposed action at NAS Lemoore are not anticipated to occur at these depths, there will be no impacts to these types of resources at NAS Lemoore. However, if

subsurface deposits are encountered during construction activities, all work should stop and the procedures specified in the Historic Archeological Resources Protection Plan (Milliken and Mikesell 1997) should be followed.

Historic Subsurface Deposits. No impacts to historic subsurface deposits would result from implementation of the proposed action at NAS Lemoore. Because the potential for historic subsurface deposits to exist is low, no impacts to these types of resources are anticipated as a result of the implementation of the proposed action at NAS Lemoore. However, if subsurface deposits are encountered during construction activities, all work should stop and the procedures specified in the Historic Archeological Resources Protection Plan (Milliken and Mikesell 1997) should be followed.

4.4.2 NAF El Centro Alternative

Less than Significant Impacts

Prehistoric Resources. No impacts to prehistoric resources would result from implementing the proposed action at NAF El Centro. Because only one prehistoric site has been identified on NAF El Centro and this site is not considered eligible to the NRHP, there would be no impacts to these types of resources as a result of this alternative. No mitigation would be required.

Traditional Cultural Properties. No impacts to traditional cultural properties would result from implementing the proposed action at NAF El Centro. Because no traditional cultural properties or other Native American resources have been identified at NAF El Centro, there would be no impact to these types of resources as a result of this alternative. No mitigation would be required.

Historic Archeological and Architectural Resources. No impacts to historic archeological and architectural resources would result from implementing the proposed action at NAF El Centro. Because no NRHP-eligible historic archeological sites have been identified on NAF El Centro, there would be no impact to these types of resources as a result of this alternative. Because none of the structures scheduled for modification are considered eligible for the NRHP, there would be no impact to these types of resources as a result of this alternative. No mitigation would be required.

Subsurface Deposits. Less than significant impacts to subsurface deposits would result from implementing the proposed action at NAF El Centro. Because the potential for subsurface deposits to occur within the APE is considered low, impacts to these resources are unlikely and no mitigation would be required. However, if NRHP-eligible subsurface deposits are encountered during construction activities, impacts to them would be considered significant and mitigable. If prehistoric or historic subsurface deposits are encountered, all work should stop pending documentation and evaluation of the resource by a qualified archeologist.

4.5 TRAFFIC AND CIRCULATION

This section identifies potential impacts to traffic and circulation that may result from implementing the proposed action at each of the alternative bases. The traffic and circulation analysis is an evaluation of the nature and extent of change to the projected 1999 traffic conditions as indicated by the levels of service for intersections and roadways within the affected area for each alternative base. Specific impacts and mitigation measures are identified.

Significance Criteria

For the purposes of this analysis, significance criteria were developed from local standards. For NAS Lemoore, Caltrans District 6 has significance criteria in its April 1993 publication *A Guide For Traffic Impact Studies,* which states that LOS C is the minimum acceptable level of service, except where the existing traffic condition is LOS D or worse. Where existing traffic conditions are LOS D or worse, the existing LOS and volume-to-capacity (V/C) ratio should be maintained through mitigation. Imperial County does not have an existing standard for traffic operations. Since NAS Lemoore and NAF El Centro are both located in semi-rural areas, the Caltrans standard has been applied to both installations as described below:

- If LOS is A, B, or C before the project traffic is added, then the impact of the added traffic would be significant if the LOS changes to D or worse with the added traffic.
- If LOS is D or worse before the project traffic is added, then the traffic impact of the added traffic would be significant if any change in LOS to a worse service level or any change in V/C occurs with the added traffic.

For street segments, the significance criteria are as follows:

- If LOS is A, B, or C before the project traffic is added, then the impact of the added traffic would be significant if the LOS changes to D or worse with the added traffic.
- If LOS is D or worse before the project traffic is added, then the traffic impact of the added traffic would be significant if any change in LOS to a worse service level or any change in V/C occurs with the added traffic.

Impacts that are identified as significant would require measures to mitigate impacts to acceptable levels (LOS C or better) or to the service level before the project traffic is added.

Table 4-10 summarizes the potential impacts to traffic and circulation that have been identified in this analysis.

Table 4-10
Summary of Traffic Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Signalized intersection LOS	◑	○
Unsignalized intersection LOS	⦶	◑
Street segment LOS	⦶	⦶

LEGEND:
● = Significant and not mitigable impact
◑ = Significant but mitigable impact
⦶ = Less than significant impact
○ = No impact

Analysis Approach

The general approach to the impact analysis included estimating the trip generation for each alternative, distributing and assigning project trips to the roadway network, and calculating levels of service. Additional details on the assumptions are provided with each alternative. Potential impacts were evaluated for intersections and roadways in the affected area. Since the affected area for the traffic analysis differs for each alternative, the area is described with the discussion of each alternative below. Appendix D provides print-outs of the LOS calculation sheets.

Added traffic would result from the military personnel and family members associated with proposed action located at the receiving installation. The amount of vehicular traffic estimated to be generated at each alternative location was determined based on information concerning the number of additional personnel that would be relocated to each base. The amount of traffic generated by the proposed action depends on the distribution of the F/A-18E/F personnel to on-base and off-base housing.

Since the travel characteristics would differ by location of residence, the trip generation was divided into the following three distinct groups: personnel residing on base, personnel residing off base, and spouses residing on base. Since the off-base personnel would be dispersed throughout the surrounding community, the trips generated by off-base family members are included as part of the background growth. The following assumptions were made to translate the personnel amounts into traffic generation figures:

- All additional single enlisted personnel would reside on base in the BEQ;
- All additional single officers would reside on base in the BOQ;
- All married officers and senior enlisted personnel and their families would reside off base;

- For the married junior enlisted personnel, half of the families would live on base and half would live off base;
- An adjustment was made for squadron personnel who would be deployed and not at the base at any given time; and
- Traffic would increase nominally due to deliveries, visitors, and other periodic activities.

Different trip generation rates were developed for each group. Table 4-11 summarizes the daily and AM and PM peak-hour trip generation rates. The trip rates reflect a one-way trip with one end of the trip on base. The trip generation rates reflect vehicle trips traveling off base that would affect the surrounding roadway network. Trips that remain on base are not included in the trip generation rates.

Table 4-11
Trip Generation Rates for F/A-18E/F Personnel

	Daily	AM In	AM Out	PM In	PM Out
F/A 18 Personnel					
on-base	0.40	0.02	0.02	0.04	0.04
off-base	2.40	1.00	0.03	0.03	1.00
Spouses/Family members					
on-base	2.00	0.00	0.30	0.30	0.00
Support Personnel					
off-base	2.40	1.00	0.03	0.03	1.00

Source: Dowling Associates 1997

For the on-base personnel, the trip generation rate assumed that 20 percent would drive off base during the day, resulting in a rate of 0.40 trip ends per day. Of the daily trips, 10 percent would occur during the AM peak hour and 20 percent would occur during the PM peak hour.

For off-base personnel, the trip generation rate assumed that each person would make one trip onto the base and one trip off of the base each day and that 20 percent would drive off base during the day, resulting in a daily rate of 2.4 person trips.

For on-base spouses, the trip rate assumes the spouse of each married person residing on base would drive off base once during the day. The AM and PM peak hour rates assume that 30 percent would leave base during the AM peak hour for jobs or errands off base and a similar percentage would return during the PM peak hour.

Given the limited transit services and the existing travel behavior of base personnel, the traffic analysis does not assume a reduction in vehicle trip generation due to transit or ridesharing. Transit is not considered as an alternative

transportation means in this analysis. Ridesharing was assumed to be limited, based on the locations and surrounding traffic conditions of the sites being considered.

4.5.1 NAS Lemoore Alternative

The analysis of traffic impacts at NAS Lemoore included an estimate of vehicle trips generated by the F/A-18E/F personnel and their family members and how those trips are distributed and assigned to the local roadways. The personnel numbers are adjusted to account for the deployment of one F/A-18E/F squadron (275 personnel). Table 4-12 summarizes the vehicle trip generation at NAS Lemoore for the proposed project. The proposed action would add an estimated 2,908 average daily trips to the surrounding roadway network.

Table 4-12
Vehicle Trip Generation for F/A-18E/F Personnel at NAS Lemoore

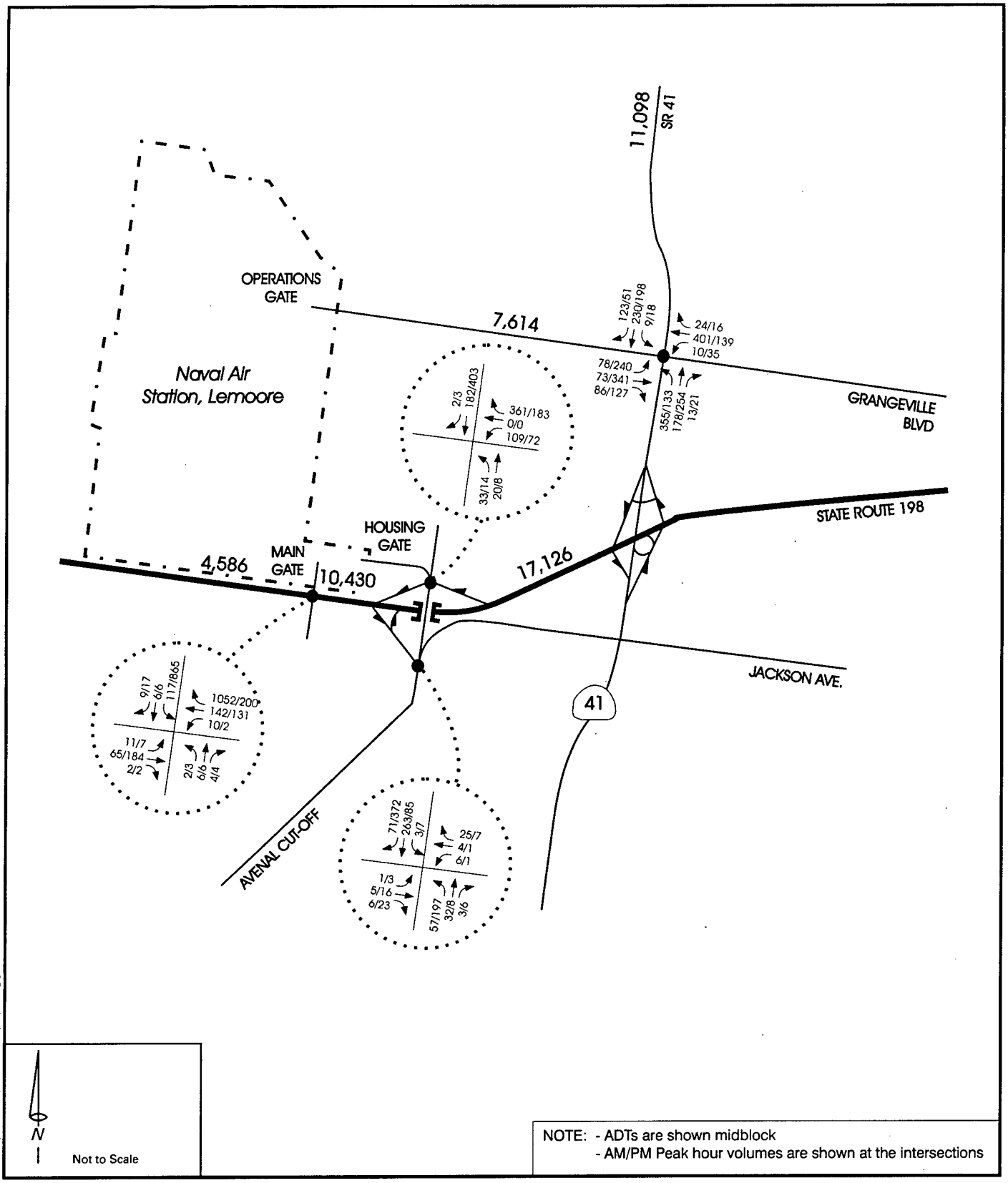
	Daily	AM In	AM Out	PM In	PM Out
1,581 F/A 18 Personnel [1]					
986 on-base	394	20	20	39	39
595 off-base	1,428	595	18	18	595
Spouses/Family members					
399 on-base	798	0	120	120	0
Support Personnel					
120 off-base	288	120	4	4	120
Total	*2,908*	*735*	*162*	*181*	*754*

[1]The F/A-18 personnel numbers assume one of the four squadrons (275 personnel) would be on deployment at any one time.

Source: Dowling Associates 1997

To assess the traffic impacts at NAS Lemoore, project traffic was distributed to the street system based on existing gate usage, existing traffic counts, the location of local residential developments, and conversations with base planning and engineering staff. Most of project traffic (46 percent) would be expected to use SR-198 (from the east) to access the base; 43 percent would use the operations gate; and the balance of the traffic (11 percent) would use the housing gate. This pattern is expected to continue in the future (O'Donnell 1996). Figure 4-5 shows the future with project traffic volumes.

The impacts of these additional trips to the street and roadway network were determined at four intersections during the AM and PM peak hours and at four roadway segments. Summaries of the LOS analysis are shown in Tables 4-13 through 4-15.



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Future traffic volumes do not exceed roadway capacities.

NAS Lemoore: Future with Project Traffic Volumes AM/PM Peak Hours & ADTs

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

LEGEND:

- ● Analysis Intersections
- AM/PM Peak Hour Volumes
- 1,000 Average Daily Trips

Source: Linscott, Law, & Greenspan 1997, Dowling Associates 1997.

Figure 4-5

Table 4-13
Signalized Intersection Operations at NAS Lemoore

Intersection	Peak Hour	Projected 1999		Projected 1999 plus Project	
		Delay (seconds)	LOS	Delay (seconds)	LOS
Grangeville Road/SR-41	AM	13.6	B	16.3	C
	PM	13.0	B	43.6	E
SR-198/Main Gate	AM	5.0	A	17.1	C
	PM	11.5	B	18.4	C

Delay (seconds)	LOS
0.0 < 5.0	A
5.1 to 15.0	B
15.1 to 25.0	C
25.1 to 40.0	D
40.1 to 60.0	E
> 60.0	F

Source: Dowling Associates 1997

Table 4-14
Unsignalized Intersection Operations at NAS Lemoore

Intersection	Peak Hour	Movement	Projected 1999		Projected 1999 plus Project	
			Delay (seconds)	LOS	Delay (seconds)	LOS
Avenal Cutoff/EB SR-198 ramps	AM	EB - L/T	5.6	B	5.8	B
		EB – R	3.7	A	3.7	A
		WB - L/T	5.8	B	6.1	B
		WB – R	2.7	A	2.8	A
		NB – L	3.0	A	3.0	A
		SB – L	2.1	A	2.2	A
	PM	EB - L/T	6.0	B	6.1	B
		EB – R	2.9	A	3.0	A
		WB - L/T	5.9	B	6.2	B
		WB – R	2.6	A	2.6	A
		NB – L	2.7	A	2.7	A
		SB – L	2.1	A	2.1	A
Avenal Cutoff/WB SR-198 ramps	AM	WB – L	5.4	B	6.0	B
		WB – R	3.5	A	3.8	A
		NB – L	2.6	A	2.7	A
	PM	WB – L	6.5	B	7.6	B
		WB – R	3.0	A	3.1	A
		NB – L	3.1	A	3.5	A

Source: Dowling Associates 1997

Table 4-15
Daily Street Segment Operations at NAS Lemoore

Street Segment	Capacity*	Projected 1999 Volume	V/C	LOS	Projected 1999 plus Project Volume	V/C	LOS
SR-198							
West of Main Gate	14,000	4,560	0.33	B	4,586	0.33	B
East of Main Gate	31,000	9,110	0.29	A	10,430	0.34	B
Grangeville Boulevard							
West of SR-41	14,000	6,360	0.45	B	7,614	0.54	C
SR-41							
North of Grangeville Boulevard	43,000	10,810	0.25	A	11,098	0.26	A

Source: Dowling Associates 1997

* Capacities and V/C ratio thresholds based on Caltrans Standards

LOS = Level of Service
L = Left-turn
R = Right-turn
T = Through movement
EB = Eastbound
WB = Westbound
NB = Northbound
SB = Southbound

Delay (seconds)	LOS	V/C Ratio	LOS
0.0 < 5.0	A	0.00 - 0.30	A
5.1 to 10.0	B	0.31 - 0.50	B
10.1 to 20.0	C	0.51 - 0.75	C
20.1 to 30.0	D	0.76 - 0.90	D
30.1 to 45.0	E	0.91 - 1.00	E
> 45.0	F	> 1.00	F

Significant Impacts

Impact 1. A significant but mitigable impact would occur at the signalized intersection of Grangeville Road and SR-41 during the PM peak hour, which would change from LOS B to LOS E due to the increase in traffic from the proposed action. Eastbound project traffic coming from the operations gate would be the primary contributor of traffic to the intersection.

Mitigation 1. Increase the signal cycle length during the PM peak hour. With the change in cycle length from 80 to 90 seconds, the intersection of Grangeville Road/SR-41 would operate at LOS C during the PM peak hour. Implementing this mitigation would reduce the impact to a less than significant level.

Less than Significant Impacts

Signalized Intersection LOS. A less than significant impact would occur at the signalized intersection of SR-198/Main Gate. This intersection would operate at LOS C or better with and without the project during the AM and PM peak hours.

Unsignalized Intersection LOS. A less than significant impact would occur at the unsignalized intersection in the project area. The unsignalized intersections at Avenal Cutoff/EB SR-198 ramps and Avenal Cutoff/WB SR-198 ramps would continue to operate at LOS B or better during both the AM and PM peak hours (Table 4-14). No mitigation would be required.

Street Segment LOS. A less than significant impact would occur at key street segments in the project area. With the addition of project traffic, these streets

would continue to operate at LOS C or better on a daily basis (Table 4-15). No mitigation would be required.

4.5.2 NAF El Centro Alternative

The analysis of traffic impacts at NAF El Centro included an estimate of vehicle trips generated by the F/A-18E/F personnel and their family members and how those trips are distributed and assigned to the local roadways. The personnel numbers are adjusted to represent deployment of two of the ten F/A-18E/F squadrons (496 personnel). Table 4-16 summarizes the vehicle trip generation at NAF El Centro for the proposed action. The proposed action would add an estimated 5,339 average daily trips to the surrounding roadway network.

To assess the traffic impacts, project traffic was distributed to the street system based on the existing intersection traffic counts in the area and the location of area residential developments. Most of the project traffic (45 percent) was assumed to use Evan Hughes Highway from the east to access the naval base. The remaining traffic was distributed to the other local roadways. Figure 4-6 shows the future with project traffic volumes.

Table 4-16
Vehicle Trip Generation for F/A-18E/F Personnel at NAF El Centro

	Daily	AM In	AM Out	PM In	PM Out
2,947 F/A 18 Personnel [1]					
1,882 on-base	753	38	38	75	75
1,065 off-base	2,556	1,065	32	32	1,065
Spouses/Family members					
795 on-base	1,550	0	233	233	0
Support Personnel					
200 off-base	480	200	6	6	200
Total	*5,339*	*1,303*	*309*	*346*	*1,340*

[1]The F/A-18 personnel numbers assume two of the ten squadrons (496 personnel) would be on deployment at any one time.

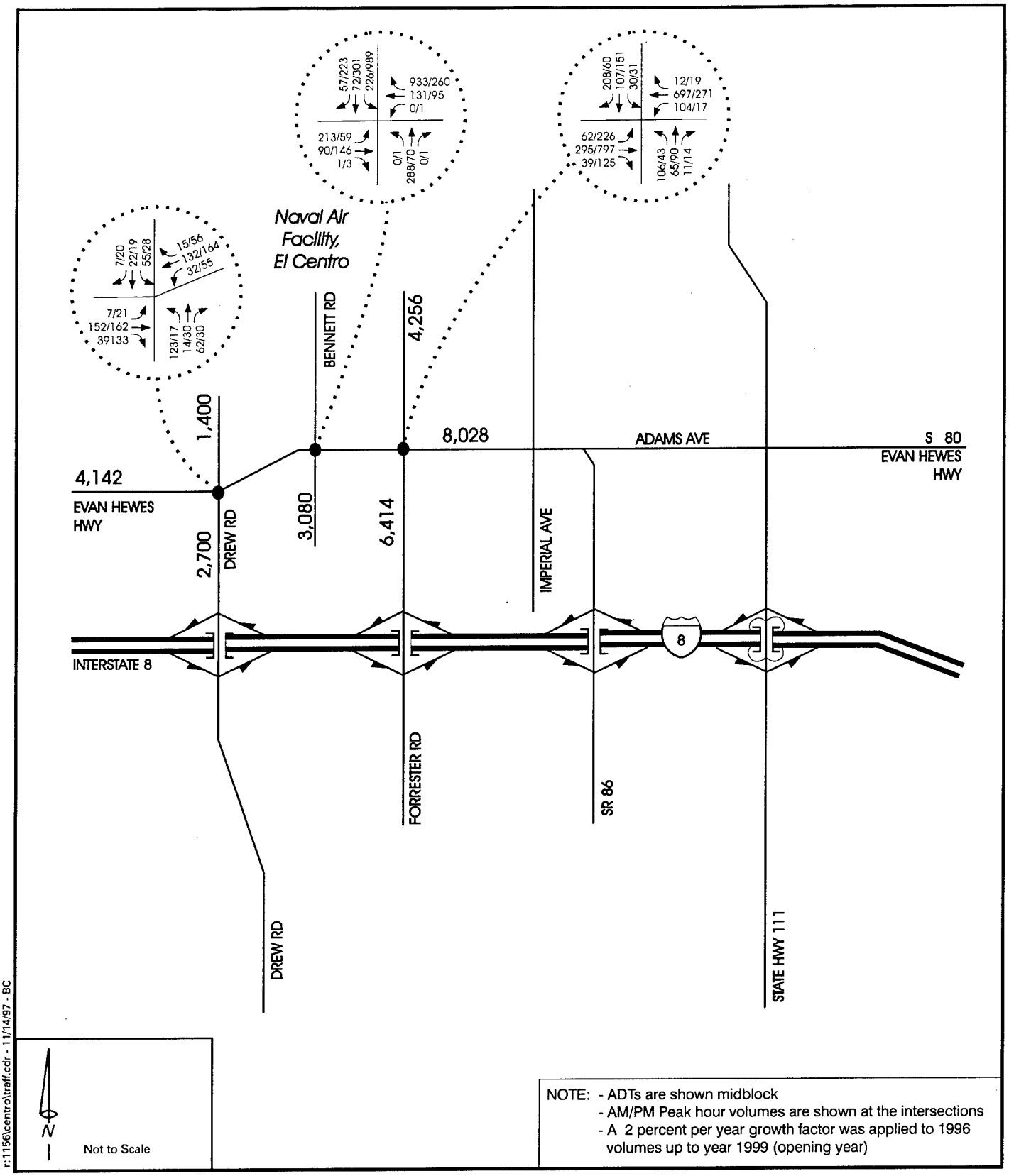
Source: Dowling Associates 1997

The impacts of these additional trips to the street and roadway network were analyzed at three unsignalized intersections and seven roadway segments. The LOS analysis is summarized in Tables 4-17 and 4-18.

Table 4-17
Unsignalized Intersection Operations at NAF El Centro

Intersection	Peak Hour	Projected 1999 Delay (seconds)	Projected 1999 LOS	Projected 1999 plus Project Delay (seconds)	Projected 1999 plus Project LOS
Drew Road/Evan Hewes	AM	2.9	A	6.8	B
	PM	3.0	A	3.8	A
Bennett Road/Evan Hewes	AM	2.5	A	Overflow	F
	PM	2.8	A	Overflow	F
Forrester Road/Evan Hewes	AM	4.9	A	Overflow	F
	PM	4.9	A	Overflow	F

Source: Dowling Associates 1997



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Future traffic levels do not exceed roadway capacities.

NAF El Centro: Future with Project Traffic Volumes AM/PM Peak Hours & ADTs

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

LEGEND:

- ● Analysis Intersections
- AM/PM Peak Hour Volumes
- 1,000 Average Daily Trips

Source: Linscott, Law, & Greenspan 1997, Dowling Associates, 1997.

Figure 4-6

Table 4-18
Daily Street Segment Operations at NAF El Centro

Street Segment	Capacity*	Projected 1999 Volume	V/C	LOS	Projected 1999 plus Project Volume	V/C	LOS
Evan Hewes (S-80)							
West of Drew Road	14,000	3,660	0.26	A	4,142	0.30	A
East of Forrester Road	14,000	5,620	0.40	B	8,028	0.57	C
Drew Road							
North of Evan Hewes	14,000	1,240	0.09	A	1,400	0.10	A
South of Evan Hewes	14,000	2,540	0.18	A	2,700	0.19	A
Bennett Road							
South of Evan Hewes	14,000	2,010	0.14	A	3,080	0.22	A
Forrester Road							
North of Evan Hewes	14,000	3,560	0.25	A	4,256	0.30	A
South of Evan Hewes	14,000	6,040	0.43	B	6,414	0.46	B

Source: Dowling Associates 1997

* Capacities and Volume/Capacity ratio thresholds based on Caltrans Standards

LOS = Level of Service
L = Left-turn
R = Right-turn
T = Through movement

EB = Eastbound
WB = Westbound
NB = Northbound
SB = Southbound

Delay (seconds)	LOS
0.0 < 5.0	A
5.1 to 10.0	B
10.1 to 20.0	C
20.1 to 30.0	D
30.1 to 45.0	E
> 45.0	F

V/C Ratio	LOS
0.00 - 0.30	A
0.31 - 0.50	B
0.51 - 0.75	C
0.76 - 0.90	D
0.91 - 1.00	E
> 1.00	F

Significant Impacts

Impact 1. A significant but mitigable impact would occur at the unsignalized intersection of Bennett Road and Evan Hewes Highway, which would change from LOS A to LOS F during the AM and PM peak hours (Table 4-17). Since this intersection is the primary access to the only gate at NAF El Centro, all project-generated trips would pass through it. Impacts at this intersection would result from the westbound right turn movement from Evan Hewes onto the base and the southbound left turn movement onto Evan Hewes from the base. The project traffic at this stop sign-controlled intersection would increase delays to unacceptable levels.

Mitigation 1. Install a signal at the intersection of Bennett Road and Evan Hewes Highway. The improvement would result in LOS B and C at this intersection during the AM and PM peak hours, respectively. The intersection would meet Caltrans peak-hour signal warrants. Implementing this mitigation would reduce the impact to a less than significant level.

Impact 2. A significant but mitigable impact would occur at the unsignalized intersection of Forrester Road and Evan Hewes Highway, which would change from LOS A to LOS F during the AM and PM peak hours (Table 4-17). The change to level of service at this intersection would result from the increase in traffic due to the proposed project. The project traffic at this stop sign-controlled intersection would increase delays to unacceptable levels.

Mitigation 2. Install a signal at the intersection of Forrester Road and Evan Hewes Highway. This would improve intersection operation to LOS C and B during the

AM and PM peak hours, respectively. The intersection would meet Caltrans peak-hour signal warrants. Implementing this mitigation would reduce the impact to a less than significant level.

Less than Significant Impacts

Unsignalized Intersection LOS. Less than significant traffic impacts would occur at the unsignalized intersection of Drew Road and Evan Hewes Highway. This intersection would operate at LOS B or better during both the AM and PM peak hours (Table 4-17) with the addition of project traffic. No mitigation would be required.

Street Segment LOS. A less than significant traffic impact would occur at street segments in the project area. Each key street segment would continue to operate at LOS C or better on a daily basis (Table 4-18) with the addition of project traffic. No mitigation would be required.

4.6 AIR QUALITY

This section identifies potential impacts to air quality that may result from F/A-18E/F facility construction and aircraft operations at NAS Lemoore and NAF El Centro. Impact significance evaluations are based primarily on estimated direct and indirect emissions associated with the proposed action. Carbon monoxide dispersion modeling has been used to evaluate air quality impacts of added traffic on major access roads. Technical analyses supporting the impact significance evaluations are presented in Appendix E.

Significance Criteria

An alternative would have significant air quality impacts if its implementation would directly or indirectly result in the following:

- Produce emissions that would cause or contribute to a violation of state or federal ambient air quality standards;
- Cause an increase in pollutant or pollutant precursor emissions that exceeds relevant emission significance thresholds (such as CAA conformity de minimis levels or the numerical value of major source thresholds for nonattainment pollutants);
- Conflict with specific air quality management plan policies or programs; or
- Foster or accommodate development in excess of levels assumed by the applicable air quality management plan.

The significance criteria for physical air quality impact issues are set largely by the technical procedures used for the impact assessment. Because dispersion modeling analyses have been performed, the most appropriate impact significance criteria for carbon monoxide is the potential for causing or contributing to violations of federal or state carbon monoxide air quality standards. Emission thresholds are used to determine impact significance for pollutants (such as ozone precursors and PM_{10}) that cannot be evaluated with dispersion modeling analyses. Table 4-19 summarizes the air quality impacts of the alternatives.

Table 4-19
Summary of Air Quality Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Clean Air Act Conformity	◑	◑
Increased emissions	◑	◑
Intersection carbon monoxide concentrations	◔	◔

LEGEND:
● = Significant and not mitigable impact
◑ = Significant but mitigable impact
◔ = Less than significant impact
○ = No impact

4.6.1 NAS Lemoore Alternative

Significant Impacts

Impact 1: Clean Air Act Conformity. Significant but mitigable increases in the emissions of ozone and PM_{10} precursors would occur from implementing the proposed action at NAS Lemoore. Emission sources under Navy control would result in incremental increases in nitrogen oxides, reactive organic compounds and PM_{10} that exceed the relevant de minimis thresholds for the San Joaquin Valley. Consequently, a conformity determination is required.

Tables 4-20 and 4-21 summarize emissions associated with the NAS Lemoore Alternative. Table 4-20 provides emission estimates for the Phase 1 aircraft arrivals. Table 4-21 provides emission estimates for Phase 2 conditions, when existing F/A-18C/D aircraft will be replaced by F/A-18E/F aircraft. The main part of both Tables 4-20 and 4-21 is organized to present emission estimates for those sources considered in Clean Air Act (CAA) conformity analyses. The bottom portion of each table addresses additional emission sources excluded for CAA conformity analyses, but requiring consideration in a NEPA impact assessment context.

Aircraft operations would be the largest source of long term emissions associated with the proposed action. Emissions associated with aircraft operations would come from actual flight activity plus in-frame engine run-up tests performed after engine maintenance. Additional emissions would come from the use of aircraft support equipment. Airfield facilities constructed at NAS Lemoore would include fixed point utility systems, thus minimizing the use of ground support equipment.

No expansion of aviation fuel handling facilities is anticipated, although annual aviation fuel use would be about 4 million gallons per year. Because JP-5 fuel has a very low volatility, resulting emission quantities would be small.

The middle portion of Table 4-21 summarizes the major components of the conformity analysis for NAS Lemoore. Conformity-related ozone precursor emissions would be 306 tons (278 metric tons) per year of reactive organic compound and 307 tons (278 metric tons) per year of nitrogen oxides. PM_{10} emissions would increase by 164 tons (148 metric tons) per year. These emission quantities exceed the relevant de minimis thresholds for San Joaquin Valley.

The closure of Castle Air Force Base eliminated a significant source of aircraft and other mobile source emissions in the San Joaquin Valley. A portion of those eliminated emissions were transferred to NAS Lemoore for use in meeting CAA conformity requirements. As indicated in Table 4-21, the transferred emission quantities do not fully offset conformity-related emission of reactive organic compounds and PM_{10}, but do exceed the estimated increase in conformity-related nitrogen oxide emissions.

Table 4-20
Annual Emissions for Phase 1 F/A-18E/F Squadron Activity, NAS Lemoore Alternative

Year	Emissions Component	Estimated Annual Emissions, Tons per Year				
		Reactive Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	PM_{10}
1999	Construction Activity	1.42	20.74	9.71	2.08	14.35
	1999 CAA Conformity Total	1.42	20.74	9.71	2.08	14.35
2000	Construction Activity	0.89	12.83	6.37	1.29	8.20
	F/A-18 E/F Operations	116.99	121.20	501.01	3.90	62.93
	F/A-18 E/F Engine Run-Ups	5.11	4.75	25.08	0.17	2.65
	Aircraft Refueling	0.21	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	5.14	2.55	107.84	0.01	0.07
	Other Permit-Exempt Equipment	0.10	1.40	0.75	0.09	0.13
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	4.01	3.49	55.72	0.10	9.96
	2000 CAA Conformity Total	132.45	146.22	696.78	5.56	83.95
2001	Construction Activity	0.84	12.39	5.55	1.26	7.64
	F/A-18 E/F Operations	214.79	221.50	919.83	7.13	115.20
	F/A-18 E/F Engine Run-Ups	9.62	8.94	47.21	0.32	4.98
	Aircraft Refueling	0.38	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	9.44	4.68	198.01	0.03	0.14
	Other Permit-Exempt Equipment	0.19	2.63	1.41	0.16	0.24
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	5.22	4.54	72.43	0.12	12.95
	2001 CAA Conformity Total	240.47	254.68	1,244.44	9.02	141.16
2003	F/A-18 E/F Operations	256.93	254.98	1,099.83	8.28	134.42
	F/A-18 E/F Engine Run-Ups	13.82	12.85	67.86	0.45	7.17
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	11.29	5.60	236.93	0.03	0.16
	Other Permit-Exempt Equipment	0.28	3.79	2.03	0.24	0.34
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	8.02	6.99	111.44	0.19	19.93
	2003 CAA Conformity Total	290.84	284.29	1,518.09	9.19	162.02
Phase 1	CAA Conformity Analysis Emissions	290.84	284.20	1,518.09	9.19	162.02
	Engine Test Cell	3.92	25.10	89.59	0.45	2.75
	Other On-Base Permit Sources	1.86	3.87	2.92	0.03	0.60
	Off-Base Natural Gas Use	0.72	9.37	3.99	0.06	1.11
	Additional Household Travel	21.01	19.27	251.26	0.58	59.93
	Maximum Phase 1 Annual Emissions	317.45	328.71	1,859.05	10.22	224.76

Notes: Technical details concerning emissions analyses are presented in Appendix E.
Emissions associated with Phase 2 conditions are presented in Table 4-21.
Construction emission estimates assume all aircraft-related facilities, one BEQ, and 100 units of family housing will be constructed in 1999. Other housing and personnel support facility construction is assumed to occur in stages during 2000-2002.
Analyses assume that 20 FRS aircraft will arrive in 2000 and 16 FRS aircraft will arrive in 2001; one fleet squadron will arrive each year from 2000 through 2003.
In-frame engine run-up emission estimates assume 57.4 low power run-ups (10 minutes) per aircraft per year plus 3.2 high power run-ups (28.5 minutes) per aircraft per year. Each run-up event tests a single engine.
Aircraft refueling emission estimates reflect monthly temperature patterns at NAS Lemoore.
Aircraft support equipment includes tow tractors and weapons loaders.
Other permit-exempt equipment includes portable or stationary engines used for pumps, compressors, hydraulic test stands, etc.
On-base natural gas use includes space heating and water heating for residential, office, and industrial buildings that do not have central boilers large enough to require APCD permits.
Base-related vehicle traffic includes only work-related trips.
Engine test cell emission estimates assume 4.77 single engine tests per aircraft per year, 53% schedule checks (14 minutes) and 47% break-in tests (84.5 minutes).
Other on-base permit sources include boilers in hangars and BEQs; paint, solvent, and abrasive blasting facilities; and the Navy exchange gas station.
Off-base natural gas use includes space heating and water heating for off-base housing. Emissions are less than 0.005 tons per year for any pollutant.
Additional household vehicle travel is not related to on-base land uses, and includes all shopping and other trips.
Base-related and additional household vehicle travel emission estimates were calculated for full Phase 1 conditions; intermediate year vehicle emissions were estimated as a percent of 2003 emissions: 50% for 1999 and 2000, 65% for 2001, and 80% for 2002. Phase 2 aircraft arrivals will not produce further increases in personnel.

Table 4-21
Annual Emissions for Phase 2 F/A-18E/F Squadron Activity, NAS Lemoore Alternative

Year	Emissions Component	Estimated Annual Emissions, Tons per Year: Reactive Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	PM_{10}
2005	Added E/F less Replaced C/D Operations	259.35	258.68	1,136.18	8.29	134.64
	Added E/F less Replaced C/D Run-Ups	13.96	12.90	67.25	0.46	7.23
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	11.29	5.60	236.93	0.03	0.16
	Other Permit-Exempt Equipment	0.28	3.79	2.03	0.24	0.34
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	8.02	6.99	111.44	0.19	19.93
	2005 CAA Conformity Total	293.40	287.95	1,553.83	9.20	162.30
2006	Added E/F less Replaced C/D Operations	261.77	262.38	1,172.53	8.30	134.85
	Added E/F less Replaced C/D Run-Ups	14.10	12.96	66.63	0.46	7.29
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	11.29	5.60	236.93	0.03	0.16
	Other Permit-Exempt Equipment	0.28	3.79	2.03	0.24	0.34
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	8.02	6.99	111.44	0.19	19.93
	2006 CAA Conformity Total	295.96	291.70	1,589.55	9.21	162.57
2010	Added E/F less Replaced C/D Operations	271.46	277.18	1,317.92	8.34	135.72
	Added E/F less Replaced C/D Run-Ups	14.66	13.18	64.16	0.46	7.53
	Aircraft Refueling	0.49	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	11.29	5.60	236.93	0.03	0.16
	Other Permit-Exempt Equipment	0.28	3.79	2.03	0.24	0.34
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	8.02	6.99	111.44	0.19	19.93
	2010 CAA Conformity Total	306.20	306.74	1,732.48	9.26	163.68
2010+	Maximum CAA Conformity Analysis Emissions	306.20	306.74	1,732.48	9.64	163.68
	De Minimis Threshold	50.00	50.00	na	na	70.00
	Above De Minimis Level?	YES	YES	NO	NO	YES
	Reserved Conformity Offsets	100.00	367.10	na	na	151.60
	Other Available Offsets	0.00	0.00	0.00	0.00	0.00
	Net Conformity Emissions Change	206.20	-60.36	1,732.48	9.64	12.08
	Conformity Offset Requirements	206.20	-60.36	na	na	12.08
Phase 2	Base-Related CAA Conformity Analysis Emissions	306.20	306.74	1,732.48	9.26	163.68
	Engine Test Cell	4.91	33.31	149.21	0.53	2.70
	Other On-Base Permit Sources	1.68	0.15	0.11	0.00	0.05
	Off-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Additional Household Travel	21.01	19.27	251.26	0.58	59.93
	Maximum Annual Total Emissions	333.80	359.47	2,133.06	10.36	226.36

Notes: na = not applicable; conformity requirements apply only to nonattainment pollutants.
See footnotes to Table 4-20. Additional technical details are presented in Appendix E.
Phase 2 aircraft arrivals will be one-for-one replacements of F/A-18C/D aircraft that are already based at NAS Lemoore, with aircraft for one squadron replaced each year from 2005 through 2010.
Reserved conformity offsets were established when Castle Air Force Base closed.
Engine test cell emissions for 2010 include testing of Phase 1 aircraft engines plus the change in emissions when Phase 2 F/A-18E/F aircraft are substituted for F/A-18C/D aircraft.

Mitigation 1a: To compensate for the increase in ozone precursor emissions at NAS Lemoore, negotiate an additional transfer of conformity-related emission reductions generated by the closure of Castle Air Force Base.

Mitigation 1b: To compensate for the increase in PM_{10} emissions at NAS Lemoore, obtain concurrence from the San Joaquin Valley Unified Air Pollution Control District to use interpollutant offsets of reactive organic compounds and/or nitrogen oxides as precursors to PM_{10}. The Navy would negotiate an additional transfer of conformity-related emission reductions generated by the closure of Castle Air Force Base. Developing on-base fugitive dust control measures that are in addition to those required by the district could further reduce the PM_{10} conformity offset requirements.

Mitigation 1c: As an alternative to Mitigation 2a and Mitigation 2b, formally request the San Joaquin Valley Unified APCD to modify the ozone and PM_{10} SIPs to account for increased aircraft operations at NAS Lemoore.

Impact 2: Increased Emissions. Significant but mitigable increases in the overall emissions of ozone precursors would occur from implementing the proposed action at NAS Lemoore. The bottom part of Table 4-20 identifies emission sources excluded from conformity determination analyses, but still associated with the F/A-18E/F action, including stationary sources operating under permits issued by the San Joaquin Valley Unified Air Pollution Control District and indirect emission sources that the Navy cannot influence or control. Emission sources operating under air quality permits include on-base service stations, engine and airframe maintenance facilities (paint, solvent, and abrasive blasting equipment), central boilers for hangars and BEQ facilities, and engine test cells. Important indirect emission sources not under Navy control include household vehicle travel for non-work purposes and natural gas use by off-base households.

Modifications to existing maintenance facilities may require new or amended air quality permits. New central boilers and the new engine test cell would require air quality permits. Some new or replacement equipment (such as standby generators, compressors, etc.) might require new permits from the San Joaquin Unified Air Pollution Control District. Requirements for permits or permit modifications are not in themselves significant impacts.

As indicated by the bottom portion of Table 4-21, overall emissions of ozone and PM_{10} precursors associated with the F/A-18E/F action would be 333 tons (304 metric tons) per year of reactive organize compounds, 359 tons (328 metric tons) per year of nitrogen oxides, and 226 tons (211 metric tons) per year of PM_{10}. These emission increases exceed the numerical values used to define a major source under the SJVUAPCD Rule 2201 and represent a significant impact in a nonattainment area.

Mitigation 2a: To compensate for the increase in ozone precursor emissions at NAS Lemoore, negotiate an additional transfer of conformity-related emission reductions generated by the closure of Castle Air Force Base.

Mitigation 2b: To compensate for the increase in PM_{10} emissions at NAS Lemoore, obtain concurrence from the San Joaquin Valley Unified Air Pollution Control District to use interpollutant offsets of reactive organic compounds and/or nitrogen oxides as precursors to PM_{10}. The Navy would negotiate an additional transfer of conformity-related emission reductions generated by the closure of Castle Air Force Base. Developing on-base fugitive dust control measures that are in addition to those required by the district could further reduce the PM_{10} conformity offset requirements.

Mitigation 2c: As an alternative to Mitigation 1a and Mitigation 1b, formally request the San Joaquin Valley Unified APCD to modify the ozone and PM_{10} SIPs to account for increased aircraft operations at NAS Lemoore.

Less than Significant Impacts

Carbon Monoxide Concentrations at Major Intersections. Traffic associated with the NAS Lemoore Alternative would not significantly effect ambient carbon monoxide concentrations at the main gate and Grangeville access points to NAS Lemoore. Dispersion modeling analyses indicate that peak 1-hour carbon monoxide concentrations at the major access gates would be less than 4 ppm, with peak 8-hour carbon monoxide concentrations being about 3 ppm. These concentrations are well below the impact significance thresholds set by federal and state ambient standards (35 ppm for the federal 1-hour standard, 20 ppm for the state 1-hour standard, and 9 ppm for the federal and state 8-hour standards).

4.6.2 NAF El Centro Alternative

Significant Impacts

Impact 1: Clean Air Act Conformity. Significant but mitigable increases in the emissions of ozone and PM_{10} precursors would occur from implementing the proposed action at NAF El Centro. Emission sources under Navy control would result in incremental increases in reactive organic compounds, nitrogen oxides, and PM_{10} that exceed the relevant de minimis thresholds for the Salton Sea Air Basin. Consequently, a conformity determination is required.

Tables 4-22 and 4-23 summarize emissions associated with the NAF El Centro Alternative. Table 4-22 provides emission estimates for Phase 1 aircraft arrivals. Table 4-23 provides emission estimates for Phase 2 aircraft arrivals. The main part of both Tables 4-22 and 4-23 is organized to present emission estimates for those sources requiring consideration in CAA conformity analyses. The bottom portion of each table addresses additional emission sources excluded from CAA

Table 4-22
Annual Emissions for Phase 1 F/A-18E/F Squadron Activity, NAF El Centro Alternative

Year	Emissions Component	Estimated Annual Emissions, Tons per Year				
		Reactive Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	PM_{10}
1999	Construction Activity	3.52	51.00	24.42	5.09	29.99
	1999 CAA Conformity Total	3.52	51.00	24.42	5.09	29.99
2000	Construction Activity	1.56	22.78	10.41	2.30	13.30
	F/A-18 E/F Operations	116.99	121.20	501.01	3.90	62.93
	F/A-18 E/F Engine Run-Ups	5.11	4.75	25.08	0.17	2.65
	Aircraft Refueling	0.30	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	5.14	2.55	107.84	0.01	0.07
	Other Permit-Exempt Equipment	0.10	1.40	0.75	0.09	0.13
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	3.88	2.86	35.79	0.08	8.02
	2000 CAA Conformity Total	133.08	155.53	680.89	6.54	87.11
2001	Construction Activity	0.91	13.42	6.06	1.36	6.96
	F/A-18 E/F Operations	214.79	221.50	919.83	7.13	115.20
	F/A-18 E/F Engine Run-Ups	9.62	8.94	47.21	0.32	4.98
	Aircraft Refueling	0.56	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	9.44	4.68	198.01	0.03	0.14
	Other Permit-Exempt Equipment	0.19	2.63	1.41	0.16	0.24
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	5.04	3.72	46.52	0.10	10.43
	2001 CAA Conformity Total	240.56	254.89	1,219.04	9.10	137.94
2003	F/A-18 E/F Operations	256.93	254.98	1,099.83	8.28	134.42
	F/A-18 E/F Engine Run-Ups	13.82	12.85	67.86	0.45	7.17
	Aircraft Refueling	0.73	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	11.29	5.60	236.93	0.03	0.16
	Other Permit-Exempt Equipment	0.28	3.79	2.03	0.24	0.34
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	7.76	5.72	71.57	0.15	16.04
	2003 CAA Conformity Total	290.81	282.93	1,478.22	9.15	158.13
Phase 1	CAA Conformity Analysis Emissions,					
	End of Phase 1	290.81	282.93	1,478.22	9.15	158.13
	Engine Test Cell	3.92	25.10	89.59	0.45	2.75
	Other On-Base Permit Sources	3.04	0.52	0.39	0.00	0.13
	Off-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Additional Household Travel	22.81	20.09	208.32	0.60	62.66
	Maximum Phase 1 Annual Emissions	320.58	328.64	1,776.52	10.21	223.68

Notes: Technical details concerning emissions analyses are presented in Appendix E.
Emissions associated with Phase 2 conditions are presented in Table 4-23.
Construction emission estimates for Phase 1 assume all aircraft-related facilities, one BEQ, the BOQ, and 100 units of family housing will be constructed in 1999. Other Phase 1 housing and personnel support facility construction is assumed to occur in stages during 2000-2002.
Phase 1 analyses assume that 20 FRS aircraft will arrive in 2000 and 16 FRS aircraft will arrive in 2001; in addition, one fleet squadron will arrive each year from 2000 through 2003.
In-frame engine run-up emission estimates assume 57.4 low power run-ups (10 minutes) per aircraft per year plus 3.2 high power run-ups (28.5 minutes) per aircraft per year. Each run-up event tests a single engine.
Aircraft refueling emission estimates reflect monthly temperature patterns at NAF El Centro.
Aircraft support equipment includes tow tractors and weapons loaders.
Other permit-exempt equipment includes portable or stationary engines used for pumps, fans, compressors, generators, hoists, hydraulic test stands, air start units, etc.
On-base natural gas use includes space heating and water heating for residential, office, and industrial buildings that do not have central boilers large enough to require APCD permits. Emissions are less than 0.005 tons per year for any pollutant.
Base-related vehicle traffic includes only work-related trips (240 days per year).
Engine test cell emission estimates assume 4.77 single engine tests per aircraft per year, 53% schedule checks (14 minutes) and 47% break-in tests (84.5 minutes).
Other on-base permit sources include boilers in hangars and BEQs; paint, solvent, and abrasive blasting facilities; and the Navy exchange gas station.
Off-base natural gas use includes space heating and water heating for off-base housing.
Emissions are less than 0.005 tons per year for any pollutant.
Additional household vehicle travel is not related to on-base land uses, and includes all shopping and other trips.
Phase 1 vehicle travel emission estimates were calculated for 2003 conditions; intermediate year vehicle emissions were estimated as a percent of 2003 emissions: 50% for 1999 and 2000, 65% for 2001, and 80% for 2002.

Table 4-23
Annual Emissions for Phase 2 F/A-18E/F Squadron Activity, NAF El Centro Alternative

Year	Emissions Component	Estimated Annual Emissions, Tons per Year: Reactive Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	PM_{10}
2005	Construction Activity	1.72	24.34	12.19	2.41	12.27
	Added E/F less Replaced C/D Operations	274.98	269.33	1,176.97	8.77	142.65
	Added E/F less Replaced C/D Run-Ups	15.03	13.86	71.09	0.50	7.89
	Aircraft Refueling	0.80	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	12.08	5.99	253.61	0.03	0.17
	Other Permit-Exempt Equipment	0.31	4.28	2.29	0.27	0.39
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	8.88	6.55	81.99	0.18	18.40
	2005 CAA Conformity Total	313.81	324.35	1,598.14	12.16	181.77
2006	Construction Activity	2.26	32.27	15.44	3.24	18.16
	Added E/F less Replaced C/D Operations	293.04	283.67	1,254.10	9.26	150.89
	Added E/F less Replaced C/D Run-Ups	16.24	14.88	74.32	0.55	8.61
	Aircraft Refueling	0.87	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	12.88	6.38	270.28	0.04	0.19
	Other Permit-Exempt Equipment	0.35	4.78	2.56	0.30	0.43
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	10.00	7.39	92.42	0.20	20.75
	2006 CAA Conformity Total	335.63	349.38	1,709.12	13.58	199.02
2010	Added E/F less Replaced C/D Operations	365.27	341.05	1,562.65	11.23	183.83
	Added E/F less Replaced C/D Run-Ups	21.07	18.95	87.23	0.73	11.48
	Aircraft Refueling	1.15	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	16.06	7.96	336.99	0.04	0.23
	Other Permit-Exempt Equipment	0.50	6.75	3.61	0.42	0.61
	On-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Added Base-Related Traffic	14.47	10.74	134.11	0.29	30.17
	2010 CAA Conformity Total	418.50	385.46	2,124.60	12.71	226.33
2010+	Maximum CAA Conformity Analysis Emissions	418.50	385.46	2,124.60	13.58	226.33
	De Minimis Threshold	50.00	50.00	na	na	70.00
	Above De Minimis Level?	YES	YES	NO	NO	YES
	Emissions Growth Included in SIP	0.00	0.00	0.00	0.00	0.00
	Other Available Offsets	0.00	0.00	0.00	0.00	0.00
	Net Conformity Emissions Change	418.50	385.46	2,124.60	13.58	226.33
	Conformity Offset Requirements	418.50	385.46	na	na	226.33
Phase 2	Base-Related CAA Conformity Analysis Emissions	418.50	385.46	2,124.60	12.71	226.33
	Engine Test Cell	7.00	44.77	159.79	0.81	4.91
	Other On-Base Permit Sources	3.04	0.52	0.39	0.00	0.13
	Off-Base Natural Gas Use	0.00	0.00	0.00	0.00	0.00
	Additional Household Travel	42.20	37.16	385.29	1.12	115.95
	Maximum Annual Total Emissions	470.75	467.91	2,670.08	14.64	347.32

Notes: na = not applicable; conformity requirements apply only to nonattainment pollutants.
See footnotes to Table 4-22. Additional technical details are presented in Appendix E.
Construction emission estimates for Phase 2 assume that additional aircraft maintenance and training facilities plus 75 units of family housing will be constructed in 2005. Other equipment storage, warehousing, administrative offices, housing, and personnel support facilities are assumed to be constructed in stages between 2009.
Phase 2 analyses assume that one fleet squadron will arrive each year from 2005 through 2010.

conformity analyses, but requiring consideration in a NEPA impact assessment context.

Aircraft operations would be the largest source of long term emissions associated with this alternative. Emissions associated with aircraft operations would come from actual flight activity plus in-frame engine run-ups performed after engine maintenance. Additional emissions considered for CAA conformity analyses would come from the use of aircraft support equipment and miscellaneous engine-powered portable or stationary equipment used for aircraft and engine maintenance. Airfield facilities at NAF El Centro include fixed point utility systems, thus minimizing the use of ground support equipment. Base-related vehicle travel would be an additional source of long term emissions.

The middle portion of Table 4-23 summarizes the major components of the conformity analysis for the NAF El Centro Alternative. Conformity-related ozone precursor emissions would be 419 tons (377 metric tons) per year of reactive organic compounds and 385 tons (325 metric tons) per year of nitrogen oxides. PM_{10} emissions would increase by 226 tons (205 metric tons) per year. These emission quantities exceed the de minimis thresholds for the Salton Sea Air Basin.

CAA conformity rules require that additional conformity offsets be arranged or that relevant SIP documents be revised to account for the added emissions before the F/A-18E/F action can be approved at NAF El Centro. A formal CAA conformity determination is required to demonstrate that net emission increases have been addressed as required by the EPA conformity rule.

Mitigation 1a: To compensate for the net increase in ozone and PM_{10} precursor emissions, formally request the Imperial County Air Pollution Control District to modify the ozone and PM_{10} SIPs to account for increased aircraft operations at NAF EL Centro.

Mitigation 1b: As an alternative to Mitigation 1a, obtain emission offsets from sources in the Salton Sea Air Basin to compensate for the net emissions increase at NAF El Centro.

Impact 2: Increased Emissions. Significant but mitigable air quality impacts would result from emissions generated by activity associated with basing F/A-18 E/F aircraft at NAF El Centro. Construction of required facilities would create temporary sources of air pollutant emissions. Aircraft operations, aircraft maintenance, and vehicle travel by added military and civilian personnel would be the major sources of long-term emissions. Emissions associated with aircraft operation would come from actual flight activity plus in-frame engine run-up tests performed after engine maintenance.

Table 4-22 summarizes emissions associated with Phase 1 of the NAF El Centro Alternative. Table 4-23 summarizes emissions associated with Phase 2 of the NAF

El Centro Alternative. Emission estimates presented in both tables are separated into those that apply to the EPA Clean Air Act general conformity regulation and additional emissions that should be addressed in a NEPA context.

Aircraft operations would be the largest source of long term emissions associated with this alternative. Emissions associated with aircraft operations would come from actual flight activity plus in-frame engine run-ups performed after engine maintenance. Additional emissions would come from the use of aircraft support equipment and miscellaneous engine-powered portable or stationary equipment used for aircraft and engine maintenance. Engine test cell operations and chemicals used for aircraft and engine maintenance would also be meaningful emission sources. Base-related vehicle travel plus other household travel associated with added personnel would be the second largest source of emissions associated with this alternative.

The aircraft engine test cell would require an air quality permit from the Imperial County Air Pollution Control District (APCD). Boilers used for space heating and water heating in hangars, housing facilities, office buildings, and personnel support facilities would also require air quality permits from the APCD. Expanded fuel storage and handling facilities might also require a permit from the APCD, although these facilities might be exempted because the volatility of jet fuel is very low. Any gasoline service station operated by NAF El Centro would also require an air quality permit.

The bottom portion of Table 4-23 summarizes the overall emissions associated with the NAF El Centro Alternative. Ozone precursor emissions would be 471 tons (427 metric tons) per year of reactive organic compounds and 468 tons (424 metric tons) per year of nitrogen oxides. PM_{10} emissions would increase by 347 tons (315 metric tons) per year. These emission quantities exceed the de minimis thresholds for the Salton Sea Air Basin, and thus represent a significant impact.

Mitigation 2a: Same as Mitigation 1a.

Mitigation 2b: Same as Mitigation 1b.

Less than Significant Impacts

Carbon Monoxide Concentrations at Major Intersections. Traffic associated with the NAF El Centro Alternative would have a less than significant effect on ambient carbon monoxide concentrations access points to NAF El Centro. Dispersion modeling analyses indicate that peak 1-hour carbon monoxide concentrations along the major access roadways would be about 3 ppm, with peak 8-hour carbon monoxide concentrations being about 2.5 ppm. These carbon monoxide concentrations are well below the impact significance thresholds set by federal and state ambient standards (35 ppm for the federal 1-hour standard, 20 ppm for the state 1-hour standard, and 9 ppm for the federal and state 8-hour standards).

4.7 NOISE

This section identifies potential noise impacts that may result from implementing the proposed action at one of the alternative receiving installations. Impact significance evaluations are based on estimated noise levels from direct and indirect noise sources associated with alternative actions. Noise modeling analyses have been used to evaluate noise impacts of construction activities, aircraft operations, and added traffic on major access roads. Technical analyses supporting the impact significance evaluations are presented in Appendix F. Additional discussion of land use compatibility issues (especially for on-base land uses) is presented in Section 4.1 (Land Use and Airspace).

Significance Criteria

Because the reaction to noise level changes involves both physiological and psychological factors, the magnitude of a noise level change can be as important as the resulting overall noise level. A readily noticeable increase in noise levels often will be considered a significant effect by local residents even if the overall noise level is still within land use compatibility guidelines. For example, most people find evening and nighttime noise the most objectionable and are more willing to accept noise sources that operate only during daytime hours. Similarly, temporary noise sources are generally tolerated more than permanent noise sources. Depending on the repetition pattern, intermittent noise sources can be either more or less objectionable than continuous noise sources.

Significant noise impacts occur by creating new sources of noise in an area or by establishing noise-sensitive land uses in locations that will be exposed to high noise levels (see Section 4.1). Land use compatibility guidelines (DOD criteria for on-base land uses, general plan noise element criteria for off-base land uses) are the most common source of criteria used to define impact significance for noise issues. Regulatory thresholds established by state and local codes (i.e., state airport noise regulations) provide additional criteria for some categories of noise sources or affected land uses.

Implementing the proposed action would have significant noise impacts if it would directly or indirectly result in the following:

- Establish noise-sensitive land uses (residential, educational, and health care uses) in areas exposed to ambient noise levels that are higher than the applicable land use compatibility criterion; or
- Increase ambient CNEL levels beyond the "normally acceptable" land use compatibility criterion (typically 60- or 65-dB CNEL for residential, educational and health care land uses). As noted in Chapter 3, California law uses the 65-dB CNEL contour to define "airport noise impact zones" for schools and other noise sensitive land uses.

Temporary noise sources that are restricted to daytime hours (such as most construction and demolition activities) would be considered a significant impact only if they affect noise-sensitive land uses and result in CNEL levels more than 10 dB above the land use compatibility criterion for the affected noise-sensitive land use.

Table 4-24 summarizes the potential impacts from noise that have been identified in this analysis.

Table 4-24
Summary of Noise Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Construction Noise	◐	◐
Aircraft Noise	◐	●
Traffic Noise	◐	◐

LEGEND:
● = Significant and not mitigable impact
◑ = Significant but mitigable impact
◐ = Less than significant impact
○ = No impact

4.7.1 NAS Lemoore Alternative

Less than Significant Impacts

Noise from Construction Activity. A less than significant noise impact would result from construction and remodeling activities at NAS Lemoore. Temporary construction activity would occur with projects to expand existing facilities or to build facilities to accommodate the F/A-18E/F aircraft and associated personnel. Most aircraft maintenance and facility construction or expansion would occur prior to the arrival of the F/A-18E/F aircraft. Housing facilities and personnel support facilities would be constructed in stages to accommodate the staggered arrival of fleet squadron aircraft and their personnel.

Table 4-25 summarizes typical noise levels during various phases of construction projects. Construction noise would exceed a CNEL of 70 dB only for locations within 300 feet of the construction site. Site grading would be most extensive at the new family housing site. Noise levels during building erection and finishing stages would be lower than those during the site and foundation preparation stages. Construction noise near existing housing areas would be minimized by restricting construction activity to normal daytime periods.

Additional Aircraft Operation Noise. A less than significant noise impact would result from increased aircraft operations at NAS Lemoore. F/A-18E/F aircraft operations would increase overall noise levels in the NAS Lemoore vicinity by as

Table 4-25
Typical Construction Noise Impacts

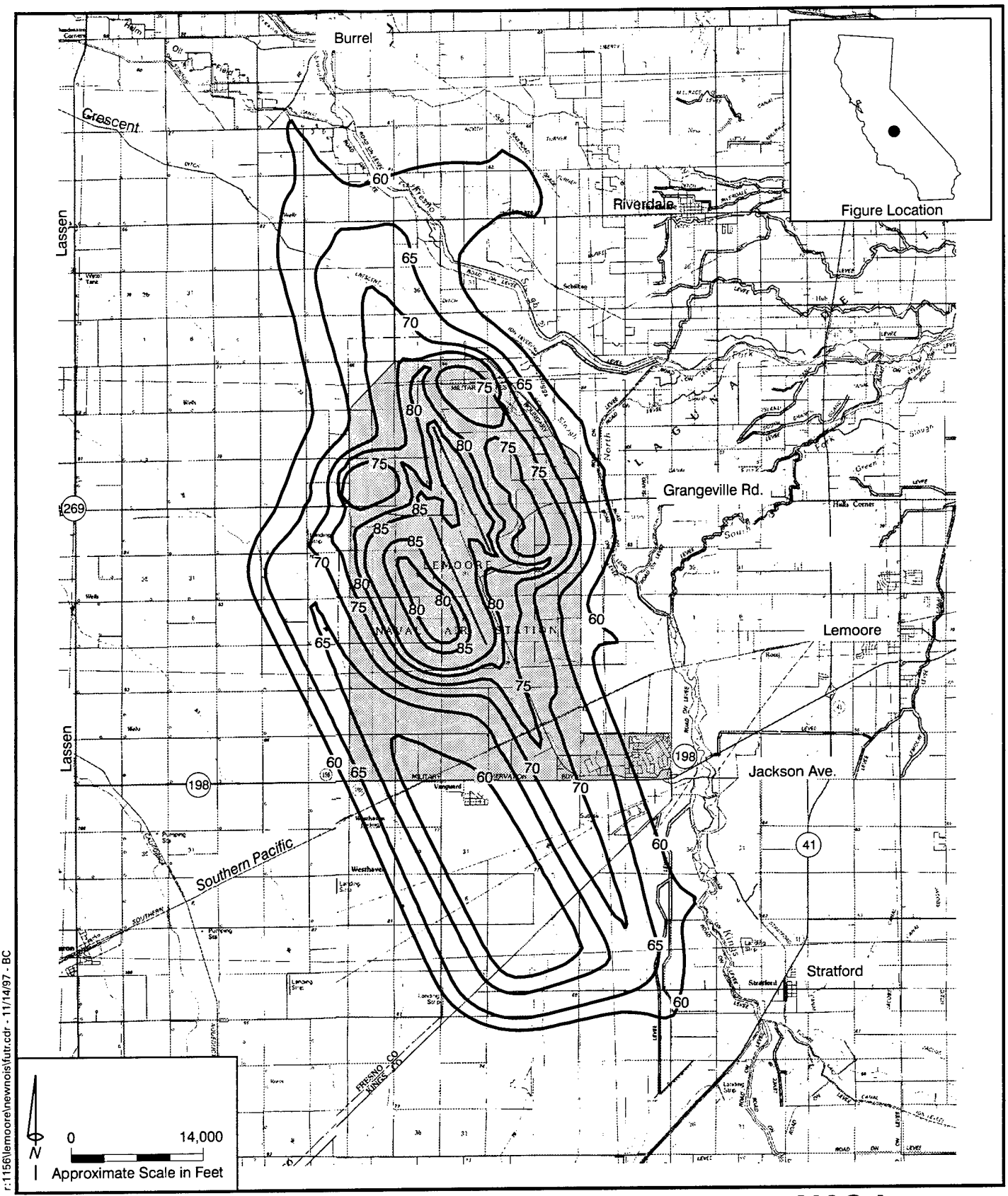
Distance From Site (feet)	CNEL Increments (dBA) from Typical Construction Phases			
	Heavy Grading	Site Preparation	Foundation Excavation	Paving
50	85.8	84.7	85.7	82.7
100	79.7	78.6	79.6	76.7
200	73.5	72.5	73.5	70.5
400	67.2	66.2	67.2	64.1
600	63.4	62.3	63.4	60.2
800	60.5	59.6	60.6	57.3
1,000	58.3	57.3	58.4	55.0
1,500	54.0	53.1	54.1	50.6
2,000	50.7	49.9	50.9	47.2
2,500	48.0	47.3	48.3	44.4
3,000	45.7	45.1	46.1	42.0
4,000	41.8	41.3	42.3	37.9
5,280	37.6	37.3	38.3	33.5
7,500	31.8	31.6	32.7	27.4
9,000	28.5	28.4	29.5	23.9
10,560	25.4	25.3	26.5	20.6

Notes:
dBA = A-weighted decibels.
CNEL = community noise equivalent level.
Noise calculations incorporate both distance attenuation and atmospheric absorption effects. Noise estimates assume variable equipment use over a 10-hour work day with no nighttime construction activity but with equipment items concentrated in a limited area. Heavy grading assumed to require 2 scrapers, 1 grader, 2 heavy trucks, 2 front-end loader, 1 compactor, and 1 water truck. Site preparation assumed to require 1 bulldozer, 1 backhoe, 1 front-end loader, 2 heavy trucks, and 1 water truck. Foundation excavation assumed to require 1 power shovel, 1 front-end loader, 2 heavy trucks, and 1 water truck. Paving operations assumed to require 1 grader, 1 heavy truck, 1 roller, 1 paver, and 1 water truck.

Data Sources: US Environmental Protection Agency 1971; Gharabegian et al. 1985; Acoustical Society of America 1978.

much as 5 dBA, but off-base land uses generally would not be exposed to incompatible noise levels. Figure 4-7 illustrates anticipated CNEL contours around NAS Lemoore after the first phase of F/A-18E/F aircraft arrivals (one FRS squadron and four fleet squadrons). Off-base noise contours would expand in all directions. Affected land uses would be primarily agricultural, with scattered rural residences. The town of Stratford would remain outside the 60-dB CNEL contour. The number of noise complaints received by NAS Lemoore would be expected to increase, with most complaints triggered by unusual individual flyover events rather than overall average noise level conditions.

The second phase of F/A-18E/F aircraft arrivals (72 additional aircraft) would be replacements for existing F/A-18C/D aircraft that are already based at NAS Lemoore. Consequently, the second phase of F/A-18E/F aircraft arrivals would



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The 65-dB CNEL contour extends off-base along major approach and departure flight paths.

LEGEND:

—75— Community Noise Equivalent Level (CNEL)

NAS Lemoore

NAS Lemoore Future Noise Contours

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 4-7

Source: Wyle 1997.

not produce any further increase in aircraft flight operations at NAS Lemoore. Because noise generation from the F/A-18E/F is similar to that from the F/A-18C/D, there would be no significant change in noise contours around NAS Lemoore.

Aircraft flying between NAS Lemoore and other installations would fly at altitudes above 10,000 feet. Aircraft would be at low altitudes only during landing approaches, initial takeoff climbs, and during landing practice operations. The large size of NAS Lemoore means that most low altitude flight activity would occur over the base. Few off-base residences would be close to the low-altitude segments of the major arrival and departure flight paths. F/A-18E/F aircraft flights would be heard as additional discrete noise events. Table 4-24 summarizes estimated peak noise levels from F/A-18E/F takeoffs, high-speed level flights, reduced-power level flights, and landing approaches. Noise levels are primarily a function of engine power setting and distance from the aircraft flight path. The use of afterburners during takeoffs or full power flight operations would increase noise levels by about 5 to 7 dBA. The noise levels listed in Table 4-24 represent maximum noise levels during a flyover event. Noise levels averaged over the complete flyover event would be 7 to 8 dBA lower than the peak noise levels listed in Table 4-26. No mitigation would be required.

Noise from individual flyover events would be audible for only a brief time (about 1 to 1.5 minutes for low-altitude flights). Consequently, noise levels for these events are not compared to the 24-hour average noise levels used for land use compatibility criteria. As a point of comparison, a typical three-axle truck driving by at 35 mph produces a peak noise level of about 82 dBA at a distance of 50 feet. No mitigation would be required.

Testing of F/A-18E/F engines after maintenance work would be an additional localized source of noise at engine test cell facilities and runway apron power check pads. Noise impacts from testing jet engines would be minimized because noise barriers and enclosures are used at engine test cells and at any power check pads near noise-sensitive land uses. No mitigation would be required.

Additional Traffic Noise on Major Access Roadways. Additional traffic associated with implementing the proposed action at NAS Lemoore would have a less than significant impact on ambient noise levels along major access roadways. It generally requires a doubling of traffic volumes to cause a 3 dBA noise level increase. Added traffic on SR-198 and Grangeville Boulevard would increase traffic noise levels by less than 1 dBA. Such small noise level changes would not be noticeable. Traffic volume changes on SR-41 would be too small to change existing traffic noise levels. No mitigation would be required.

Table 4-26
Peak Noise Levels from F/A-18E/F Aircraft Flyover Events

Aircraft Flyover Power (feet)	Distance Offset from Ground Track (feet)	Slant Distance From Flight Path (feet)	Peak Noise Level (dBA) During Flyover or Flyby Events At Various Power Settings and Air Speeds									
			Takeoff Power		Afterburner Takeoff		Cruise Power		Military Power		Approach Power	
			173 mph	201 mph	173 mph	201 mph	230 mph	288 mph	288 mph	403 mph	173 mph	230 mph
100	0	100	123	124	130	131	103	104	126	128	116	117
300	0	300	114	115	120	121	94	95	117	118	107	109
300	200	361	112	113	118	119	92	94	115	117	106	107
500	0	500	109	110	115	116	90	91	112	114	103	105
500	200	539	109	110	114	115	89	90	111	113	103	104
300	500	583	108	109	113	114	88	90	111	113	102	103
600	200	632	107	108	113	113	88	89	110	112	101	103
500	500	707	106	107	111	112	87	88	109	111	100	102
300	750	808	105	106	110	111	86	87	108	110	99	101
500	750	901	104	105	109	110	85	86	107	109	98	100
1000	200	1020	103	104	108	109	84	85	106	108	97	99
1500	200	1513	100	100	104	105	80	82	102	104	94	96
2000	100	2002	97	98	101	102	78	79	100	101	92	93
2500	100	2502	95	96	99	100	76	77	97	99	90	91
3000	100	3002	93	94	97	98	74	75	96	97	88	89
1000	4000	4123	90	90	94	95	71	72	92	94	85	86
3000	4000	5000	87	88	92	92	68	70	90	92	83	84
600	5280	5314	87	88	91	92	68	69	89	91	82	84
1500	5280	5489	86	87	91	91	67	69	89	91	82	83
3000	5280	6073	85	86	90	90	66	67	88	90	81	82
1500	7500	7649	82	83	87	88	63	64	85	87	78	79
3000	10000	10440	78	79	83	84	59	60	81	82	74	75
1000	10560	15872	71	72	77	78	52	53	74	76	67	68
3000	10560	16122	71	72	77	78	51	52	74	75	67	68

Notes:
Noise levels are estimated by converting flyover single-event noise level (SEL) data for F/A-18 aircraft (US Navy 1984) into an equivalent time history pattern, assuming event durations based on a 4-nautical-mile audible flight path at appropriate air speeds.
Time history simulations assume a reversed-sine-curve noise level rise and a declining-log-curve noise level drop from the peak value.
The duration of the approach leg of the standardized flight path was reduced to account for the difference between the speed of sound (about 768 mph for 65 degrees Fahrenheit and 60-80 percent relative humidity) and the speed of the aircraft.
Speed of sound calculations are based on data from Weast (1980).
Peak noise levels from the simulated time histories were used as input to a distace attenuation model, with drop-off rates and atmospheric absorption rates calibrated to match the distance attenuation profile for the SEL data presented in U.S. Navy (1984).
Average noise levels for a 4-nautical-mile flyover event will be 7-8 dBA lower than the peak dBA value.
As a point of comparison, the peak noise level for a single 3-axle heavy truck driving by at 35 mph is typically about 82 dBA at a distance of 50 feet, about 85 dBA at a distance of 25 feet and about 88 dBA at a distance of 10 feet.

4.7.2 NAF El Centro Alternative

Significant Impacts

Impact 1 Additional Aircraft Operation Noise. A significant and not mitigable noise impact would result from increased flight operations associated with basing F/A-18E/F aircraft at NAF El Centro. The resulting increase in flight operations would significantly increase the geographic extent of areas impacted by aircraft noise. Following the first phase of F/A-18E/F aircraft arrivals (one FRS squadron and four fleet squadrons), most areas within 3 to 5 miles of the base would experience noise level increases of 5 dB or more. As indicated in Figure 4-8, the 65-dB CNEL contour would encompass significant off-base areas. The City of Imperial would be encompassed by the 65-dB CNEL contour, and the community of Seeley would be within the 70-dB CNEL contour. One school in Seeley and possibly two of the three schools in Imperial could be impacted by CNEL values above 65 dB.

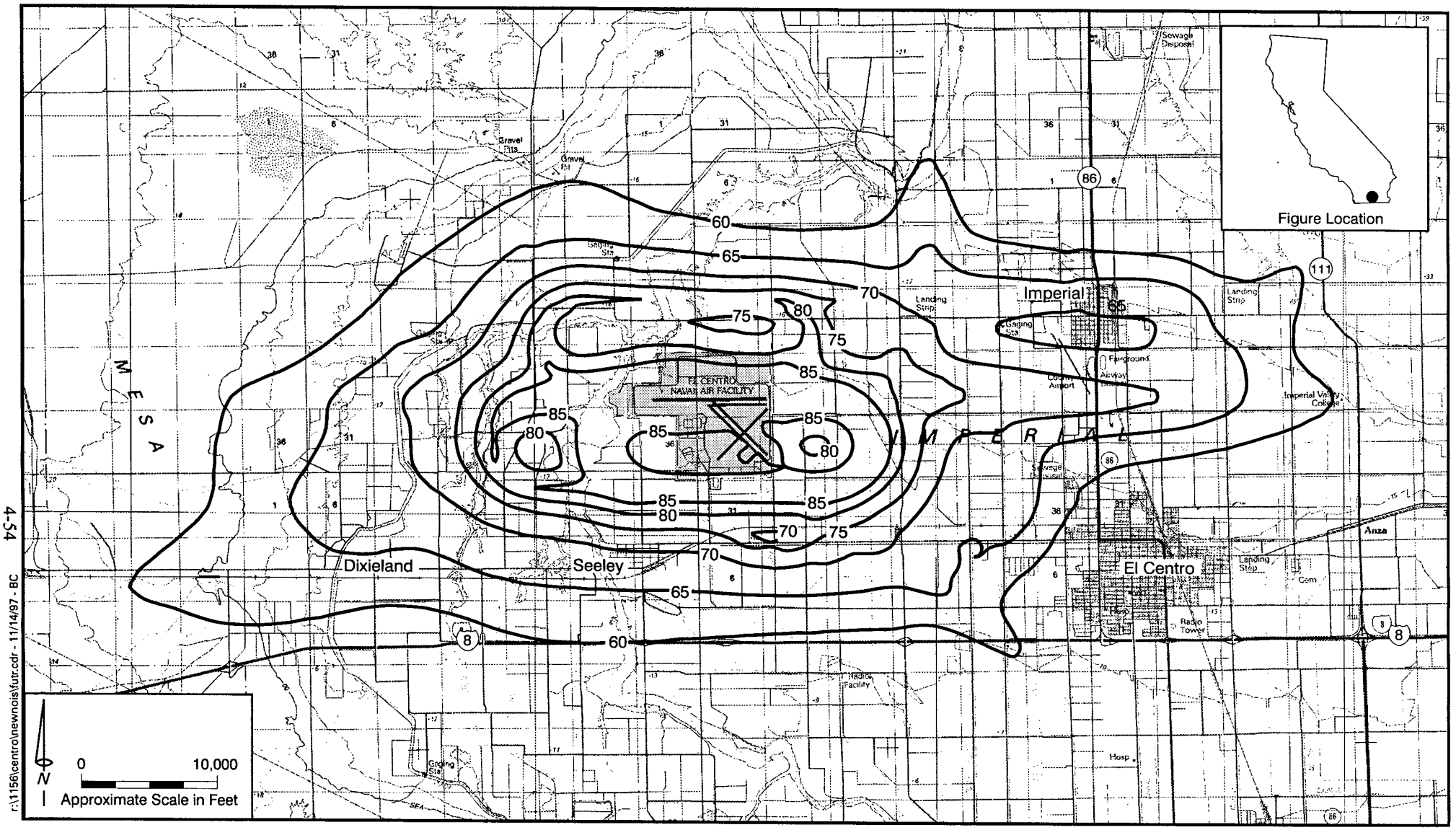
The second phase of F/A-18E/F aircraft arrivals (72 additional fleet squadron aircraft) would produce additional increases in flight operations. Because fleet squadrons would be periodically assigned to duty on aircraft carriers, total F/A-18E/F operations at NAF El Centro would be increased only 30 percent by the additional 72 aircraft. The increase in flight operations would cause the 65 and 70-dB noise contours to extend somewhat farther from NAF El Centro than indicated in Figure 4-20. Most areas within five miles of NAF El Centro would probably experience a further CNEL increase of about 1-dB. The number of noise complaints received by NAF El Centro would be expected to increase. Airfield orientation and air traffic control considerations make it infeasible to alter flight patterns in a manner that would adequately mitigate aircraft noise impacts.

Noise from individual flyover events would be as presented in Table 4-26 and would be audible only for about 1 to 1.5 minutes for low-altitude flights. Consequently, noise levels for these events are not compared to the 24-hour average noise levels used for land use compatibility criteria. As a point of comparison, a typical three-axle truck driving by at 35 mph produces a peak noise level of about 82 dBA at a distance of 50 feet. No mitigation would be required.

Testing F/A-18E/F engines after maintenance work would be an additional localized source of noise at engine test cell facilities and runway apron power check pads. Noise impacts from testing jet engines would be minimized because noise barriers and enclosures are used at engine test cells and at any power check pads near noise-sensitive land uses.

Less than Significant Impacts

Construction Activity Noise. A less than significant noise impact would result from construction activities at NAF El Centro. Construction-related noise conditions would be as shown in Table 4-25 and discussed for NAS Lemoore. Construction



Existing noise contours exceed levels associated with most noise sensitive land uses.

LEGEND:

— 75 — Community Noise Equivalent Level (CNEL)

NAF El Centro

NAF El Centro
Future Noise Contours

Facility Development for West Coast of the F/A-18E/F Aircraft

Source: Wyle 1997.

Figure 4-8

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noise near existing housing areas would be minimized by restricting construction activity to normal daytime periods.

Additional Traffic Noise on Major Access Roadways. Additional traffic generated by F/A-18E/F personnel at NAF El Centro would have a less than significant impact on ambient noise levels along major access roadways. Added traffic on Bennett Road, Evans Hewes Road, and other area roadways would increase traffic noise levels by less than 1 dBA. Such small noise level changes would not be noticeable.

4.8 BIOLOGICAL RESOURCES

This section identifies potential consequences to biological resources from implementing the proposed action at one of the alternative bases. Projected conditions resulting from the proposed action are compared to existing biological resources described in Section 3.8, Biological Resources.

Significance Criteria

Resources considered sensitive by federal, state, or local agencies for each base are the focus of this assessment. Implementing the proposed action would have a significant impact if it would:

- Substantially affect species (or their habitat) listed as threatened or endangered by state or federal resource agencies and other species specifically protected by applicable laws; or
- Substantially affect species and/or habitats, including those that are restricted at a regional scale, habitats that serve as concentrated breeding or foraging areas and are limited in availability, or habitats that support substantial concentrations of one or more special status species.

Table 4-27 summarizes the potential impacts to biological resources identified in this analysis.

Table 4-27
Summary of Biological Resources Impacts

IMPACT ISSUES	NAS Lemoore	NAF El Centro
Jurisdictional wetlands	○	○
Special status species	○	◑
Vegetation and wildlife	◔	◔
Birds protected by the Migratory Bird Treaty Act	◔	◔
Regulatory considerations	○	○

LEGEND:

- ● – Significant and not mitigable impact
- ◑ – Significant but mitigable impact
- ◔ – Less than significant impact
- ○ – No impact

4.8.1 NAS Lemoore Alternative

All proposed construction within NAS Lemoore would occur in areas of current development or disturbed landscaped areas. In the operations area the FRS hangar, fleet hangar, airframe shop, and engine maintenance shop all would be located in areas that are developed. The proposed strike fighter weapons school and aviation armament shop would be located in areas of disturbed grasslands frequently mowed or plowed. In the administration area all of the proposed construction projects would occur on disturbed grassland or landscaped areas.

Therefore, none of the proposed facilities would significantly affect biological resources.

Less than Significant Impacts

Jurisdictional Wetlands. There would be no impacts to jurisdictional wetlands due to construction or expansion of the proposed facilities. Three wetlands occur near the operations area of NAS Lemoore site, but none are in or directly adjacent to proposed project locations. No wetlands occur within the Administration/ Housing area of NAS Lemoore, so there would be no impacts from the proposed action. No mitigation would be required.

Special Status Species. There would be no impacts to special status species from construction or expansion of the proposed facilities. Little native habitat exists and few special status plants or animals occur on NAS Lemoore. No special status plants or animals have been documented within the proposed project sites on NAS Lemoore. No mitigation would be required.

Vegetation and Wildlife. There would be no significant impacts to vegetation and wildlife from proposed construction or expansion of the facilities. Approximately 52 acres (21 ha) of disturbed/ruderal habitat and landscaped area used by species commonly found in urban environments would be removed. The removal would not substantially reduce landscaped areas at the base. It is further anticipated that additional landscaping would be developed with construction. No mitigation would be required.

Birds Protected by the Migratory Bird Treaty Act. Development and operations in support of the proposed action at NAS Lemoore would have a less than significant impact on birds protected under the federal Migratory Bird Treaty Act. Each naval air base has established a Bird Air Strike Hazard (BASH) Plan to reduce potential accidents from bird collisions, which also protects birds covered by the Migratory Bird Treaty. The BASH Plan uses several strategies to reduce the birdstrike potential, such as awareness of avoidance procedures, monitoring bird activity, and controlling bird populations and movements through habitat manipulation and land use planning (US Navy 1996). Several strategies used in the past include using noise cannons, landscaping with trees and shrubs, and using unpalatable birdseed to deter birds from critical areas within flight zones. No mitigation would be required.

4.8.2 NAF El Centro Alternative

All proposed construction in the administration area would occur in areas that are currently developed, disturbed, or landscaped, with the exception of the family housing, which is proposed on agricultural outlease lands. No special status plant or animal species have been documented at any of these proposed sites (Collins 1997).

In the operations area the airframe shop, engine maintenance shop, engine test cell, avionics shop and aviation armament shop are proposed for sites that are currently paved. The rest of the facilities proposed for the operations area are on agricultural outlease lands or disturbed areas. The parallel runway and taxiway, maintenance hangar (FRS), maintenance hanger (four fleet squadrons), aviation life support system shop, battery shop, and external fuel tank storage are proposed for disturbed grassland sites, a portion of which is used by western burrowing owls, a federal and state species of concern.

Significant Impacts

Impact 1: Special Status Species. A significant but mitigable impact would occur to the western burrowing owl, a California and federal species of concern, at NAF El Centro. Western burrowing owls were observed during a July 29, 1997 site visit at the intersection of taxiway D and taxiway E, and at an area north of the main runway. These areas are adjacent to the proposed site for construction of the maintenance hangar (FRS), maintenance hangar (fleet squadrons), aviation life support system shop, battery shops, and parallel runway and associated taxiway. Increased activity may cause western burrowing owl to abandon these areas.

Mitigation 1. To avoid impacts to western burrowing owls, conduct a pre-construction survey within the disturbed habitat to ensure that no burrowing owls are nesting in the area and to determine if the site is burrowing owl habitat. If owls are nesting, move the nests to a new area with artificial nest burrows in place. Implementing these mitigation measures would reduce the impact to a less than significant level. No Section 7 consultation would be required under the Endangered Species Act.

Less than Significant Impacts

Jurisdictional Wetlands. There would be no impacts to jurisdictional wetlands from constructing or expanding the proposed facilities. Wetlands at NAF El Centro are located over 4,000 feet north of the construction sites. No mitigation would be required.

Vegetation and Wildlife. Approximately 2.1 acres (0.9 ha) of disturbed/ruderal habitat and 80 acres (32.4 ha) of agricultural habitat would be removed by constructing or expanding the proposed facilities. This vegetation is used by species commonly found in urban environments. Because of the abundance of suitable landscaped areas on the nearby developed portions of the base, the additional landscaping that would be associated with construction, and the abundance of nearby agricultural lands and open space, this impact is considered less than significant, and no mitigation would be required.

Birds Protected by the Migratory Bird Treaty Act. Potential impacts to birds protected by the Migratory Bird Treaty Act would be similar to impacts discussed for the NAS Lemoore Alternative, and no mitigation would be required.

4.9 HYDROLOGY AND SURFACE WATER QUALITY

This section identifies potential impacts to hydrology and surface water quality that may result from implementing the proposed action at NAS Lemoore and NAF El Centro. The impact analysis compares projected future conditions to the existing resources in the affected area.

Significance Criteria

Water quality involves the chemical and physical composition of water as affected by natural conditions and human activities. For this analysis, surface water quality is evaluated with respect to construction and operation of the proposed action.

Implementing the proposed action would have a significant hydrology/surface water quality impact if it would:

- Substantially degrade the quality of surface water or ground water;
- Increase flooding on or off site or subject project components to the 100-year recurrence flood;
- Increase runoff so as to exceed existing storm drainage capacity; or
- Substantially reduce availability of surface water or ground water.

Table 4-28 summarizes the potential impacts to hydrology and surface water quality that have been identified in this analysis.

Table 4-28
Summary of Hydrology and Surface Water Quality Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Exposure to flood hazards	○	◐
Exceedance of storm water drainage capacity	◐	◐
Surface water quality degradation	◐	◐

LEGEND:
● = Significant and not mitigable impact
◑ = Significant but mitigable impact
◐ = Less than significant impact
○ = No impact

4.9.1 NAS Lemoore Alternative

Less than Significant Impacts

Exposure to Flood Hazards. The proposed facilities would not be located in areas of the site subject to flooding and would therefore not be exposed to this hazard. No impact would occur and no mitigation would be required.

Exceedance of Storm Drainage Capacity. Increased impermeable surface area due to construction in unpaved areas could increase the volume of water flowing into existing storm water conveyances. The Navy will design new storm water conveyances and will upgrade existing conveyances as necessary to adequately convey peak storm water flows. No mitigation would be required.

Surface Water Quality Degradation. Proposed construction would result in less than significant impacts to surface water quality. Site preparation for construction of the facilities needed at NAS Lemoore could increase erosion and the potential for storm water runoff to mobilize existing soil contaminants, if present, or contaminants resulting from accidental spills during construction. After construction, the potential for nonpoint-source discharges or spills from industrial sites and parking areas could increase due to more intensive use of the sites. The Navy will comply with requirements of the Clean Water Act (CWA) that prohibit nonpoint-source discharges of pollutants and sediments. Construction will be performed in compliance with California's General Construction Storm Water Permit. The new project sites will be included in the installation's Storm Water Pollution Prevention Plan (SWPPP) in compliance with the state's General Industrial Storm Water Permit. A small increase in total loading of petroleum hydrocarbons in storm runoff may occur from increased parking areas and roads. However, the change would be less than significant relative to existing loading at the current level of development. No mitigation would be required.

4.9.2 NAF El Centro Alternative

Less than Significant Impacts

Exposure to Flood Hazards. Proposed development would result in a less than significant flooding impact. The child development center would be constructed on land that is currently unpaved open space. This would only marginally increase the impervious surface area of the installation and would not significantly increase the potential for flooding. No proposed facilities would be located in flood hazard areas. No mitigation would be required.

Exceedance of Storm Drainage Capacity. Increased impermeable surface area due to construction in unpaved areas could increase the volume of water flowing into existing storm water conveyances. The Navy will design new storm water conveyances and will upgrade existing conveyances as necessary to adequately convey peak storm water flows. No mitigation would be required.

Surface Water Quality Degradation. Proposed construction would result in less than significant impacts to surface water quality. Constructing and operating the new project facilities, particularly the runway, will increase the potential for nonpoint-source discharges of pollutants. The Navy will comply with provisions of the CWA and incorporate the sites into the installation's SWPPP. No mitigation would be required.

4.10 UTILITIES AND SERVICES

This section identifies potential impacts to utilities and services that may result from implementing the proposed action at NAS Lemoore and NAF El Centro. The impact analysis compares projected conditions to the affected environments and areas of influence described in Section 3.10, Utilities and Services.

Significance Criteria

An alternative may have significant impacts on a utility or service if it would:

- Increase demand in excess of the utility system or service capacity to the point that substantial expansion, additional facilities, or increased staffing levels would be necessary; or

- Violate federal, state, or local standards or requirements regulating a public utility system.

Table 4-29 summarizes the potential impacts to utilities and services that have been identified in this analysis.

Table 4-29
Summary of Utilities and Services Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Water supply	◐	◐
Wastewater collection and treatment	◐	◐
Stormwater collection and treatment	◐	◐
Solid waste collection and disposal	◐	◐
Natural gas and electric services	◐	◐
Child care services	◐	◐
Health services	◐	◐
Police services	◐	◐
Fire services	◐	◐

LEGEND:
● - Significant and not mitigable impact
◑ - Significant but mitigable impact
◐ - Less than significant impact
○ - No impact

Analysis Approach

For this analysis, utility demand projections for each facility are based on an ICF Kaiser study that determined utility usage associated with the 1993 Defense Base Closure and Realignment Commission (BRAC) recommendations (US Navy 1994f). Utility usage by family members housed on each facility also was incorporated into the utility demand projections. Based on these assumptions, projected utility demand at each Navy facility from realigning F/A-18 aircraft, associated personnel, and equipment are presented in Table 4-30.

Table 4-30
Summary of Utilities Demand

Utility System	NAS Lemoore	NAF El Centro
Water supply	420,000 gallons per day (gpd) (1.6 million liters per day [mld])	785,000 gpd (3.0 mld)
Wastewater collection and treatment	340,000 gpd (1.3 mld)	630,000 gpd (2.4 mld)
Solid waste collection and disposal	8.7 tons (7.8 tonnes) per day	16.1 (14.5 tonnes) tons per day
Natural gas	75,000 cubic feet per day (cfd) (2,000 cubic meters per day [cmd])	140,000 cfd (40,000 cmd)
Electricity	110,000 Kilowatt-hours (KWH) per day	200,000 KWH per day

Families that would not reside at Navy facilities were assumed to be distributed in surrounding communities, and therefore would affect local provider utility demand. Additionally, these off-base residents are projected to be absorbed by existing housing and development (see Section 4.3, Socioeconomics).

Projected demands for public services are based on population increases, including military and civilian personnel and their families. All personnel are assumed to use health services and recreation and community facilities in the project area for each alternative. In the case of fire protection and police services, the additional personnel and family members that would work and reside at a Navy facility would generate the increased demand at the base. Families that would reside in surrounding areas would require fire protection and police services from local providers. Similar to utilities, services for off-base residents are projected to be absorbed by existing housing and development (see Section 4.3, Socioeconomics).

4.10.1 NAS Lemoore Alternative

Less than Significant Impacts

Water supply. A less than significant impact to NAS Lemoore's water supply and distribution system would result from the proposed action. The increased demand for water would not significantly affect the water supply system at NAS Lemoore. The increased population and operations at NAS Lemoore would increase demand for potable water by approximately 420,000 gpd (1.6 mld) or 150 mgy (580 mLy), a 15 percent increase over the current usage of 2.6 mgd (9.8 mld) or 945 mgy (3,600 mly). The base's total water demand of about 3.02 mgd (11.4 mld) or 1,095 mgy (4,100 mLy) would exceed its contract with the Westlands Water District for 977 mgy (3,700 mLy) by 118 mgy (450 mLy). The existing water supply system at NAS Lemoore has a total capacity of approximately 7.5 mgd (28.4 mld) and could accommodate the increase in water required.

To accommodate this increased demand, NAS Lemoore will revise the existing water supply contract with the Westlands Water District to increase water delivery by an additional 420,000 gpd (1.6 mld) or 150 mgy (580 mly). Should the district not be able to provide the additional water from its Central Valley Project water allocation, NAS Lemoore will purchase water from other private suppliers. A separate water supply contract with the Bureau of Reclamation will also be pursued if necessary.

Additionally, water consumption at the base could be reduced through water conservation techniques, such as using low-flow bathroom fixtures and recycling gray water for nonpotable uses. Agricultural land also could be retired, and water could be transferred for use in nonagricultural sectors.

Families that would reside in the surrounding communities of Lemoore and Hanford would require approximately 310,000 gpd (1.2mld) or 110 mgy (420 mly) of water. These areas receive water from other local water suppliers that have the capacity to accommodate the water requirements (Pereira 1997, Haley 1997).

Wastewater Collection and Treatment. A less than significant impact to wastewater collection and treatment would result from the proposed action. The increased wastewater generation would not significantly affect the existing wastewater infrastructure at NAS Lemoore. The population and operations increase at NAS Lemoore would increase total wastewater generated at the base by approximately 340,000 gpd (1.3 mld) to approximately 2.04 mgd (7.7 mld), a 20 percent increase over the current average generation of 1.7 mgd (6.4 mld). This amount would not exceed the base's 2.12-mgd (8-mld) average flow capacity.

The families that would reside in the surrounding communities within the affected area would generate approximately 250,000 gpd (950,000 lpd) of wastewater. Wastewater treatment agencies in the surrounding cities of Lemoore and Hanford have sufficient capacity to accommodate the wastewater of the incoming families (Pereira 1997, Sisneroz 1997). No mitigation would be required.

Stormwater Collection and Treatment. A less than significant impact to stormwater collection and treatment would result from the proposed action. The increase in stormwater generated at NAS Lemoore from this alternative would not significantly affect the stormwater infrastructure. The volume and rate of stormwater runoff would increase slightly at NAS Lemoore because impermeable surfaces would increase by approximately 46 acres (18.7 ha) from the proposed development and expansion of current facilities. The stormwater collection system is in good condition and can withstand most storm events. The infrastructure has the capacity to accommodate the construction and development (Stewart 1997). Minor upgrades would be designed to accommodate the projected increase in stormwater flows as buildout of the alternative progresses. No mitigation would be required.

Solid Waste Collection and Disposal. A less than significant impact to solid waste collection and disposal would result from the proposed action. The increase in solid waste generation at NAS Lemoore from this alternative would not significantly affect the collection and disposal system. The population and operations increases at NAS Lemoore would increase total solid waste generation by 8.7 (7.8 tonnes) to approximately 20.7 tons (18.6 tonnes) per day, a 65 percent increase over the current generation of 12 tons (11 tonnes) per day. The current private solid waste collector could accommodate the total waste generated (Stewart 1997). The landfills that receive the solid waste generated at the base could accommodate the increase. Later this year, the Kings County Waste Management Authority is opening a new facility with a 40-year life expectancy (Adams 1997). The city of Avenal Landfill is scheduled for closure in 2012; however, it is currently expanding its industrial disposal facilities to extend the lifespan of the landfill by another 40 years (Watson 1997). Additionally, the recycling programs at NAS Lemoore would enable the base to meet its solid waste diversion goals outlined by AB 939 (Mora 1997).

The families that would reside in the surrounding communities within the affected area would generate approximately 0.6 tons (0.5 tonnes) per day of solid waste. Local waste collection and disposal agencies could accommodate the solid waste that would be generated (Adams 1997, Watson 1997). No mitigation would be required.

Natural Gas and Electric Services. A less than significant impact to natural gas and electric services would result from the proposed action. The increase in natural gas and electric consumption at NAS Lemoore from this alternative would not significantly affect the gas and electric systems. The population and operations increase at NAS Lemoore would increase total natural gas consumption by 75,000 cfd (2,000 cmd) to approximately 805,000 cfd (23,000 cmd), a 10 percent increase over the current demand of 730,000 cfd (20,400 cmd). Electricity requirements would increase by approximately 110,000 KWH to about 329,000 KWH per day, a 50 percent increase over the current demand of 219,000 KWH. The base's natural gas and electric systems are in adequate condition and have the capacity to accept the additional natural gas and electricity needed (Stewart 1997). Southern California Gas Company (SCGC) has the capacity to provide the base with the additional natural gas (Rees 1997). The 18.0 MW of electrical power from the Western Area Power Administration (WAPA) would remain the same and the increased electricity required would be acquired from PG&E. PG&E has the capacity to provide the additional required electricity to the base (Raiskup 1997).

The additional families that would reside in the surrounding communities within the affected area also would receive energy from SCGC and PG&E. These providers have the capacity to supply the required natural gas and electricity to these areas (Rees 1997, Raiskup 1997). No mitigation would be required.

Child Care Services. The increased number of children at NAS Lemoore from this alternative could not be accommodated by the existing child care facilities. This alternative includes constructing a new child development center to accommodate the additional children. This impact would not be significant. No mitigation would be required.

Health Services. A less than significant impact to health services would result from the proposed action. The additional personnel at NAS Lemoore from the F/A-18 squadron realignment would not significantly affect health services. The NAS Lemoore hospital could provide a wide range of health care, including emergency services, to all members of the F/A-18 community. Additionally, the hospital is scheduled for expansion, with construction to be completed by mid-1999 (Crosby 1997).

The three surrounding area hospitals also would accommodate the demand for health services from military family members residing in surrounding communities. Demand for healthcare would be distributed among these facilities. No mitigation is required.

Police Services. A less than significant impact would occur at NAS Lemoore to on-base police services. The additional demand for police services at NAS Lemoore from this alternative would not significantly affect the NAS Lemoore Security Department. The current staffing levels, facilities, and equipment could accommodate the increased police services requirements of the increased operations and personnel and maintain the existing level of service

The Kings County Sheriff's Department and police departments in the surrounding cities of Lemoore and Hanford have sufficient capacity to accommodate the security requirements of the incoming families that would reside off-base (Landis 1997, Carden 1997, Scott 1997). Demand for police services off-base would be distributed among these local agencies. No mitigation would be required.

Fire Services. A less than significant impact would occur to on-base fire services at NAS Lemoore. The additional demand for fire services at NAS Lemoore from this alternative would not significantly affect the NAS Lemoore Fire Department. The current staffing levels, facilities, and equipment could accommodate the increased fire protection requirements of the increased operations and personnel and maintain the existing level of service

The Kings County Fire Department and fire departments in the surrounding cities of Lemoore and Hanford have sufficient capacity to accommodate the fire protection requirements of the incoming families that would reside in the surrounding communities (Chesmore 1997, Machado 1997, Ieronimo 1997). Demand for off-base fire protection would be distributed among these local agencies. No mitigation would be required.

4.10.2 NAF El Centro Alternative

Less than Significant Impacts

Water Supply. A less than significant impact to water resources would result from the proposed action. The increased demand for water would not significantly affect the water supply of NAF El Centro. The increased population and operations at NAF El Centro would increase total demand for potable water by approximately 785,000 gpd (3.0 mld) to 1.4 mgd (5.3 mld), a 120 percent increase from the current consumption of 650,000 (250,000 lpd). The infrastructure at NAF El Centro is in adequate condition and has the capacity to accommodate the increase (Weller 1997). IID also has sufficient capacity to serve the base's increased water needs (Garcia 1997).

The families that would reside in the surrounding communities within the ROI would require approximately 515,000 gpd (1.9 mld) of potable water, and IID has the capacity to accommodate their requirements. No mitigation would be required.

Wastewater Treatment and Collection. A less than significant impact would occur at NAF El Centro to wastewater treatment and collection services. The population and operations increase at NAF El Centro would increase wastewater generated at the base by approximately 630,000 gpd (2.4 mld) to about 760,000 gpd (2.9 mld), a 580 percent increase over the current usage of 130,000 gpd (490,000 lpd). The total average wastewater generated would exceed the base's wastewater treatment plant capacity of 300,000 gpd (1.14 mld). The wastewater system would require a second wastewater treatment plant consisting of an oxidation ditch, a secondary clarifier, and sludge drying beds to expand wastewater capacity to accommodate at least a total average wastewater flow of 760,000 gpd (2.9 mld) (Flowers 1997). Additionally, the amount of discharge allowed into the New River by the base's National Pollutant Discharge Elimination System (NPDES) permit (300,000 gpd [1.14 mld]) would be exceeded.

The Navy will appropriate funding to expand the capacity of the wastewater system at NAF El Centro by upgrading the existing systems to accommodate the increased wastewater flow. The Navy also will apply to the Regional Water Quality Control Board (RWQCB) for an increase in the allowable wastewater flow into the New River regulated by their NPDES permit. These system upgrades would ensure adequate capacity for wastewater increases on base.

The families that would reside in the surrounding communities within the ROI would generate about 410,000 gpd or (1.6 mld). Local wastewater agencies in El Centro, Brawley, and Holtville have sufficient capacity to accommodate the increased wastewater requirements of the incoming families (Hines 1997, Smith 1997, Garcia 1997).

Stormwater Collection and Treatment. A less than significant impact to stormwater collection and treatment would result from the proposed action. The increase in stormwater generated at NAF El Centro from this alternative would not significantly affect the stormwater infrastructure. The volume and rate of stormwater runoff would increase slightly because impermeable surfaces would increase by approximately 86 acres (34.9 ha) from the proposed development and expansion of current facilities at NAF El Centro. The stormwater collection system is in adequate condition and has the capacity to accommodate the increase in stormwater flow due to development and expansion (Flowers 1997). Minor upgrades would be designed to accommodate the projected increase in stormwater flows during buildout of this alternative. No mitigation would be required.

Solid Waste Collection and Disposal. A less than significant impact to solid waste collection and disposal would result from the proposed action. The increase in solid waste generation at NAF El Centro from this alternative would not significantly affect the collection and disposal system. The population and operations increase at NAF El Centro would increase total solid waste generation at the base by approximately 16.1 tons (14.5 tonnes) per day to 19.1 tons (17.2 tonnes) per day, a 540 percent increase over the current generation of 3 tons (2.7 tonnes) per day. Imperial County Sanitation (ICS) has the capacity to transport the solid waste generated, and its landfill is expected to remain open until 2016 (Lau 1997). Additionally, the Pollution Prevention Management Program would be able to meet its solid waste diversion goals outlined by AB 939 (Curiel 1997).

The families that would reside in the surrounding communities would generate approximately 4.0 tons (3.6 tonnes) per day of solid waste, and ICS also has the capacity to transport and dispose of the solid waste generated in these areas (Lau 1997). No mitigation would be required.

Natural Gas and Electric Services. A less than significant impact would occur at NAF El Centro to its natural gas and electric services infrastructure. The population and operations increases at NAF El Centro would increase total natural gas consumption by approximately 140,000 cfd (40,000 cmd) to about 145,000 cmd (4,100 cmd), a 2,900 percent increase over the current demand of 5,034 cfd (468 cmd). Total electricity requirements would increase by 200,000 KWH per day to 250,000 KWH per day, a 400 percent increase over the current usage of 50,00 KWH per day. These increases would exceed the capacities of the existing infrastructure and require structural upgrades for both the natural gas and electricity distribution systems (Kear 1997). The natural gas system would require the enlargement of the central gas main from 3 inches (7.6 centimeters [cm]) to 4 inches (10.2 cm), and enlargement of all peripheral laterals to 2 inches (5.1 cm) (Kear 1997). The electrical system would require upgrades of approximately 15 transformers to 50 KVA, new transmission lines, and new switchgear (Kear 1997).

The Navy will appropriate funding to expand the capacity of the natural gas and electrical systems at NAF El Centro by upgrading the existing systems to

accommodate the increased energy demands. These system upgrades would ensure adequate natural gas and electricity for the additional operations, personnel, and family members on base.

SCGC has the capacity to provide the base with the additional natural gas for both the base and for families that would reside in the surrounding communities (Rees 1997). Imperial Irrigation District (IID), Arizona Public Service, and El Paso Electricity have the capacity to provide the additional electricity required by the base and the families residing off base (Coltrane 1997).

Health Services. A less than significant impact to health services would result from the proposed action. The additional personnel at NAF El Centro from the E-2 squadron realignment would not significantly affect health services. The on-base medical facilities at NAF El Centro and at Balboa Naval Hospital in San Diego have the capacity to accommodate the increase in personnel and family members (Rodriguez 1997, Leonard 1997). Additionally, the three surrounding area hospitals also would accommodate the additional demand for health services from military family members residing in surrounding communities. Demand for healthcare would be distributed among these facilities. No mitigation would be required.

Child Care Services. The increased number of children at NAWS Point Mugu from this alternative could not be accommodated by the existing child care facilities. Expansion of the Family Services Center would accommodate the additional children. This impact would not be significant. No mitigation would be required.

Police Services. A less than significant impact to police services would result from the proposed action. The additional demand for police services at NAF El Centro from this alternative would not significantly affect the NAF El Centro Security Department. The current staffing levels, facilities, and equipment could accommodate the increased police services requirements of the increased operations and personnel and maintain the existing level of service (Stammreich 1997).

The families that would reside in the surrounding communities within the affected area would require police services. The Imperial County Sheriff's Department and police departments in the surrounding cities of El Centro, Holtville, and Brawley have sufficient capacity to accommodate the security requirements of the incoming families (Hackett 1997, Townsel 1997, Jordan 1997, Graham 1997). Demand for police services would be distributed among these local agencies. No mitigation would be required.

Fire Services. A less than significant impact to fire services would result from the proposed action. The additional demand for fire services at NAF El Centro from this alternative would not significantly affect the NAF El Centro Fire Department. The current staffing levels, facilities, and equipment could

accommodate the increased fire protection requirements of the increased operations and personnel and maintain the existing level of service (Zurn 1997).

The families that would reside in the surrounding communities within the affected area would require fire protection. The Imperial County Fire Department and fire departments in the surrounding cities of El Centro, Holtville, and Brawley have sufficient capacity to accommodate the fire protection requirements of the incoming families (Nippins 1997, DuBois 1997, Gronstedt 1997, Zendejas 1997). Demand for fire protection would be distributed among these local agencies. No mitigation would be required.

4.11 PUBLIC HEALTH AND SAFETY

This section identifies potential impacts to public health and safety that may result from implementing the proposed action at NAS Lemoore and NAF El Centro. The impact analysis compares projected conditions to the affected environments and areas of influence. The alternative bases were evaluated for impacts to airspace safety, explosive safety, and electromagnetic radiation.

Significance Criteria

A project would have a significant impact to public health and safety if it would:

- Increase hazards to airspace safety according to air traffic control specialists; or
- Substantially increase hazards related to accident potential zones, explosive safety, and electromagnetic radiation beyond existing levels.

Table 4-31 summarizes the potential impacts to public health and safety that have been identified in this analysis.

Table 4-31
Summary of Public Health and Safety Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Airspace safety	◐	◐
Explosive safety quantity distances	◐	◐
Electromagnetic radiation	○	○

LEGEND:
● - Significant and not mitigable impact
◑ - Significant but mitigable impact
◐ - Less than significant impact
○ - No impact

4.11.1 NAS Lemoore Alternative

Less than Significant Impacts

Airspace Safety. The increase in number of flights at NAS Lemoore from the additional F/A-18E/F aircraft would not significantly affect flight operations. The addition of the F/A-18E/F aircraft would increase airfield use as well as flight operations in the airspace above the airfield by approximately 70 percent. Consultation with an air traffic control specialist at NAS Lemoore indicates that this could be accommodated within established operational procedures and flight patterns (Vaughan 1997). No changes in airfield operations or airspace designations would be necessary to operate and train the F/A-18E/F aircraft squadrons. There would be no significant impacts to public health and safety from airspace operations. No mitigation would be required.

Explosive Safety Quantity Distance Arcs. No inhabited buildings are within the NAS Lemoore explosive safety quantity distance (ESQD) arcs. No aircraft or related facilities, other than the FRS and Fleet hangar, would be within an ESQD arc. There would be no impact to public health and safety from ESQD arcs, and no mitigation would be required.

Electromagnetic Radiation. None of the proposed project locations would be within an NAS Lemoore electromagnetic radiation (EMR) arc. There would be no impact and no mitigation would be required.

4.11.2 NAF El Centro Alternative

Less than Significant Impacts

Airspace Safety. The increase in numbers of flights at NAF El Centro from the additional F/A-18E/F aircraft would not significantly affect flight operations. The addition of the F/A-18E/F aircraft would increase airfield use as well as flight operations in the airspace above the airfield by approximately 60 percent. It is anticipated that increased air operations could be accommodated within established operational procedures and flight patterns. No changes in airfield operations or airspace designations would be necessary to operate and train the F/A-18E/F aircraft squadrons. There would be no significant impacts to public health and safety from airspace operations. No mitigation would be required.

Explosive Safety Quantity Distance Arcs. No aircraft or related facilities, other than a portion of the runway area, would be within an NAF El Centro ESQD arc. There would be no impact to public health and safety from ESQD arcs, and no mitigation would be required.

Electromagnetic Radiation. No aircraft or related facilities would be within an NAF El Centro EMR arc. There would be no impact and no mitigation would be required.

4.12 HAZARDOUS MATERIALS AND WASTE

This section identifies potential impacts from hazardous materials and waste that could be generated by operations associated with the proposed action at NAS Lemoore and NAF El Centro. The impact analysis compares projected conditions to the affected environments and affected areas. The hazardous materials and waste analysis is a qualitative evaluation of the nature and extent of change to existing storage, disposal, and transportation that would occur with the proposed action.

Significance Criteria

The significance of impacts associated with hazardous wastes and materials is based on the toxicity, transportation risk, storage risk, and method of disposal of the substance. Generally, impacts are significant if the storage, use, transportation, or disposal of hazardous materials and wastes significantly increases risks to human health or the environment.

An impact was considered significant if it would cause a violation of federal, state, or local standards; or result in a significant threat to persons, protected species, or ecosystems due to exposure to hazardous substances.

Table 4-32 summarizes the potential impacts from hazardous materials and wastes, which have been identified in this analysis.

Table 4-32
Summary of Hazardous Materials and Waste Impacts

Impact Issues	NAS Lemoore	NAF El Centro
Hazardous materials management	◐	◐
Hazardous waste management	◐	◐
Installation Restoration Program sites	◐	◐
Asbestos	◐	◐
Polychlorinated biphenyls	○	○
Storage tanks	◑	◑
Pesticides	○	○
Lead	◐	◐
Ordnance	◐	◐
Radon	○	○

LEGEND:
- ● - Significant and not mitigable impact
- ◑ - Significant but mitigable impact
- ◐ - Less than significant impact
- ○ - No impact

4.12.1 NAS Lemoore Alternative

Significant Impacts

Impact 1. A significant but mitigable impact would occur at NAS Lemoore from storage tanks. NAS Lemoore presently has a base-wide program for jet fuel transportation and storage, as well as refueling facilities for naval aircraft using JP-5

fuel. Based on the 19,925,957 gallons (75,419,747 liters) per year requirement for four squadrons and a FRS, the F/A-18E/F squadrons realignment would require additional fuel storage and supply. The tank capacity at NAS Lemoore is not adequate to meet current and anticipated fuel requirements for the F/A-18E/F aircraft. The existing external fuel tank storage racks are not well suited for use with the larger 480-gallon (1,817-l) versus 330-gallon (1,249-l) external fuel tanks utilized by the F/A-18E/F. Plans and programs for managing the additional fuel storage would be necessary. New operation requirements and services also would be necessary and the potential for exposure of the public or environment to hazardous substances would be a concern.

Mitigation 1. Construction of external fuel tank racks would be necessary for secure storage of the 480-gallon (1,817-l) external fuel tanks used by the F/A-18E/F. The base implements plans and programs for fuel storage, but an amendment to these plans and programs would be necessary to include this additional area. Operational requirements and services for fuel storage at the base also would be amended to include the additional area. Following the regulatory requirements for proper installation and monitoring of the additional fuel storage area will decrease the potential exposure of the public or environment to hazardous substances. Implementing this mitigation would reduce the impact to a less than significant level.

Less than Significant Impacts

Hazardous Materials Management. Locating the F/A-18E/F squadrons at NAS Lemoore would not significantly increase hazardous materials usage. Construction activities would be temporary, and any additional hazardous materials would be removed once the construction was complete. Aircraft operations at NAS Lemoore would not significantly increase the total amount of hazardous materials at the base and the addition of the hazardous materials used by the F/A-18 squadrons would not result in a significant increase to the total amount of hazardous materials managed at the base. No mitigation would be required.

Hazardous Wastes Management. Construction activities related to the proposed action at NAS Lemoore would not significantly increase hazardous waste management. Temporary hazardous waste storage areas would be designated and operated according to Resource Conservation and Recovery Act (RCRA) and state regulations. Construction activities would be temporary, and any additional hazardous wastes generated would be removed once the construction was complete. Operational activities associated with the proposed action to NAS Lemoore would not significantly affect hazardous waste management. The additional wastes generated by the F/A-18E/F squadrons would result in a less than 5-percent increase in hazardous waste generation at the base. This would not result in a significant increase in the total amount of hazardous wastes managed and disposed of from the base. No mitigation would be required.

Installation Restoration Program Sites. Activities associated with implementing the proposed action at NAS Lemoore would not significantly affect Installation Restoration Program (IRP) sites. There are no IRP sites identified within or adjacent to the proposed project locations. Operation activities for the F/A-18E/F squadrons would include managing and disposing of hazardous materials/wastes in accordance with regulations and basewide protocol. There would be no significant impacts and no mitigation would be required.

Asbestos. Less than significant impacts related to asbestos would result from implementing the proposed action at NAS Lemoore. Asbestos-containing material (ACM) encountered during construction activities would be properly abated. Operations would not require using asbestos in construction. No mitigation would be required.

Polychlorinated Biphenyls. Polychlorinated biphenyls (PCBs) are not present at any of the sites proposed for construction, and no new PCB-containing equipment would be installed as part of the F/A-18E/F squadrons realignment. There would be no impact from PCBs and no mitigation would be required.

Pesticides. Less than significant impacts associated with pesticides would result from implementing the proposed action at NAS Lemoore. Although pesticide use may increase incrementally under the proposed action, all pesticide use would be implemented under the base's pesticide management plan. No mitigation would be required.

Lead. Less than significant impacts associated with lead would result from the proposed action at NAS Lemoore. Construction and expansion activities in support of the proposed action could occur in buildings containing lead. If lead-based paint (LBP) is suspected in a building due to its age (built prior to 1978), proper cautionary and abatement procedures should be implemented when renovations are conducted. Operational activities associated with the F/A-18 squadrons' realignment to NAS Lemoore would not involve the use of lead. No mitigation would be required.

Ordnance. Less than significant impacts associated with ordnance would occur from implementing the proposed action at NAS Lemoore. Construction activities associated with the proposed action would not occur in areas containing ordnance. No ordnance manufacture, handling, storage, or disposal activities would occur during implementation of the proposed action. No mitigation would be required.

Radon. No significant impacts associated with radon would result from implementing the proposed action at NAS Lemoore. No radon hazards have been identified at any of the proposed project locations. No mitigation would be required.

4.12.2 NAF El Centro Alternative

Significant Impacts

Impact 1. A significant but mitigable impact would occur at NAF El Centro from storage tanks. Construction of an aircraft direct fueling station may be necessary to accommodate the 33,301,139 gallons (126,058,130-l) per year requirement for ten F/A-18E/F squadrons and one FRS. The existing external fuel tank storage racks are not well suited for use with the larger 480-gallon (1,817-l) versus 330-gallon (1,249-l) external fuel tanks utilized by the F/A-18E/F. Plans and programs for managing the additional fuel storage would be necessary. New operation requirements and services also would be necessary, and the potential for exposure of the public or environment to hazardous substances would be a concern.

Mitigation 1. The construction of external fuel tank storage racks would be necessary for secure storage of the 480-gallon (1,817-l) drop tanks, along with the construction of an aircraft direct fueling station. The base implements plans and programs for fuel storage, but an amendment to these plans and programs would be necessary to include these additional areas. Operational requirements and services for fuel storage at the base also would be amended to include the additional area. Following the regulatory requirements for proper installation and monitoring of the external fuel tank storage area will decrease the probability of potential exposure of the public or environment to hazardous substances. Implementing this mitigation would reduce the impact to a less than significant level.

Less than Significant Impacts

Hazardous Materials Management. Locating the F/A-18E/F squadrons and associated personnel to NAF El Centro would not significantly increase hazardous materials usage. Construction activities would be temporary, and any additional hazardous materials would be removed once the construction was complete. The addition of the hazardous materials used by the F/A-18E/F squadrons would not significantly increase the total amount of hazardous materials managed at the base. No mitigation would be required.

Hazardous Wastes Management. Construction activities in support of the proposed action at NAF El Centro would not significantly increase hazardous waste management. Construction activities would be temporary, and any additional hazardous wastes generated would be removed once the construction was complete. The additional wastes generated by the F/A-18E/F squadron operations would result in an approximate 6.2-percent increase in hazardous waste generation at the base (based on NAF El Centro's 1989 reported quantities). This would not significantly increase the total amount of hazardous wastes managed and disposed from the base. No mitigation would be required.

Installation Restoration Program Sites. Less than significant impacts related to installation restoration program sites would result from the proposed action.

There are no IRP sites identified within or adjacent to the proposed project locations. Operations activities for the F/A-18E/F squadrons would include managing and disposing of hazardous materials and wastes in accordance with regulations and basewide protocol. No mitigation would be required.

Asbestos. Less than significant impacts would occur from construction and operation activities because they would not significantly expose people to asbestos. ACM encountered during construction activities would be properly abated. Aircraft operations would not require the use of asbestos. No mitigation would be required.

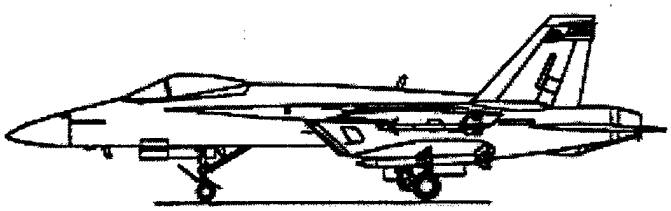
Polychlorinated Biphenyls. PCBs are not present at any of the sites proposed for construction, and no new PCB-containing equipment would be installed as part of the proposed action. There would be no impact from PCBs and no mitigation would be required.

Pesticides. Less than significant impacts related to pesticides would result from implementing the proposed action at NAF El Centro. Although pesticide use may increase incrementally under the proposed action, all pesticide use would be implemented under the base's pesticide management plan. No mitigation would be required.

Lead. Less than significant impacts related to lead would result from construction and operation activities. Construction and expansion of facilities in support of the proposed action could expose workers to lead. If LBP is suspected in a building due to its age (built prior to 1978), proper cautionary and abatement procedures would be implemented when renovations are conducted. Operational activities associated with the F/A-18E/F squadrons would not involve the use of lead. No mitigation would be required.

Ordnance. Less than significant impacts related to ordnance would result from the proposed action. Construction activities associated with the F/A-18 squadrons realignment to NAF El Centro would not occur in areas containing ordnance. No ordnance manufacture, handling, storage, or disposal activities would occur during implementation of the proposed action. No mitigation would be required.

Radon. No radon hazards have been identified at any of the proposed project locations. There would be no impact from radon and no mitigation would be required.



5.0 CUMULATIVE IMPACTS

5.1 NAS LEMOORE ALTERNATIVE 5-1

5.2 NAF EL CENTRO ALTERNATIVE 5-12

CHAPTER 5
CUMULATIVE IMPACTS

The Council on Environmental Quality's (CEQ) regulations (40 Code of Federal Regulations (CFR) § 1500–1508) implementing the procedural provisions of the National Environmental Policy Act (NEPA) of 1969, as amended (42 US Code (USC) § 4321 *et sec.*) define cumulative effects as:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR § 1508.7).

Cumulative effect analyses may be approached in a variety of ways. In this document, it is approached by identifying other projects both on and off-base that are expected to be implemented during the same time period as the proposed action. In general, only cumulative effects that are significant are discussed. No significant cumulative effects were identified for aesthetics/visual resources, cultural resources, biological resources, hydrology and water quality, or utilities and services. Cumulative effects that are potentially significant under one or more alternatives were identified and are discussed for land use and airspace, socioeconomics, traffic and circulation, air quality, noise, public health and safety, and hazardous materials and waste.

5.1 NAS LEMOORE ALTERNATIVE

The Navy is planning other actions that would increase the air operations and population at Naval Air Station (NAS) Lemoore. The closure of Castle Air Force Base (AFB), also located in the San Joaquin Valley, may counterbalance the potential impacts resulting from the expansion of NAS Lemoore, specifically with regard to air emissions. Table 5-1 presents the projected actions for NAS Lemoore, the neighboring communities of Lemoore, and unincorporated Kings County. All of these actions would involve the development of new facilities on-base or

Table 5-1
List of Cumulative Projects: NAS Lemoore

Project Name	Location/Schedule	Description
P-156T	On-base 1997–1998	Wing/CVW Administration Bldg. (99 personnel)
P-845	On-base 1997–1998	14 bed Hospital/Medical facilities
P-024	On-base 1997–1998	Explosive handling facility
P-139	On-base 1997–1998	Gym and addition
	On-base 1999-2000	Potential for realignment of E-2 squadrons, operations, and personnel support facilities (988 personnel, 1500 family members, and 16 aircraft)
	On-base 2010+	Potential for locating additional F/A-18E/F aircraft or Joint Strike Fighters. The exact number of aircraft and personnel numbers is not presently known.
Avalon Subdivision (City of Lemoore)	SE of Cinnamon Dr./ Hwy. 41 (5 miles off-base)	156 single family units, to be constructed in 3 phases
TR 567 (City of Lemoore)	Cinnamon Dr. (5 miles off-base)	136 single/multi-family units, to be constructed in phases
TR 739 (City of Lemoore)	E of Cinnamon Dr./ Hwy. 41 (5 miles off-base)	367 single family units
Hwy. 41 Expansion (Caltrans)	2.5 miles N of SR 198/ Hwy. 41 (5 miles off-base)	Expansion of 2-lane highway to 4 lanes
West Hills Community College (Kings Co.)	NW of Hwy. 41/ SR 198 (5 miles off-base)	100-acre new campus, in planning stage

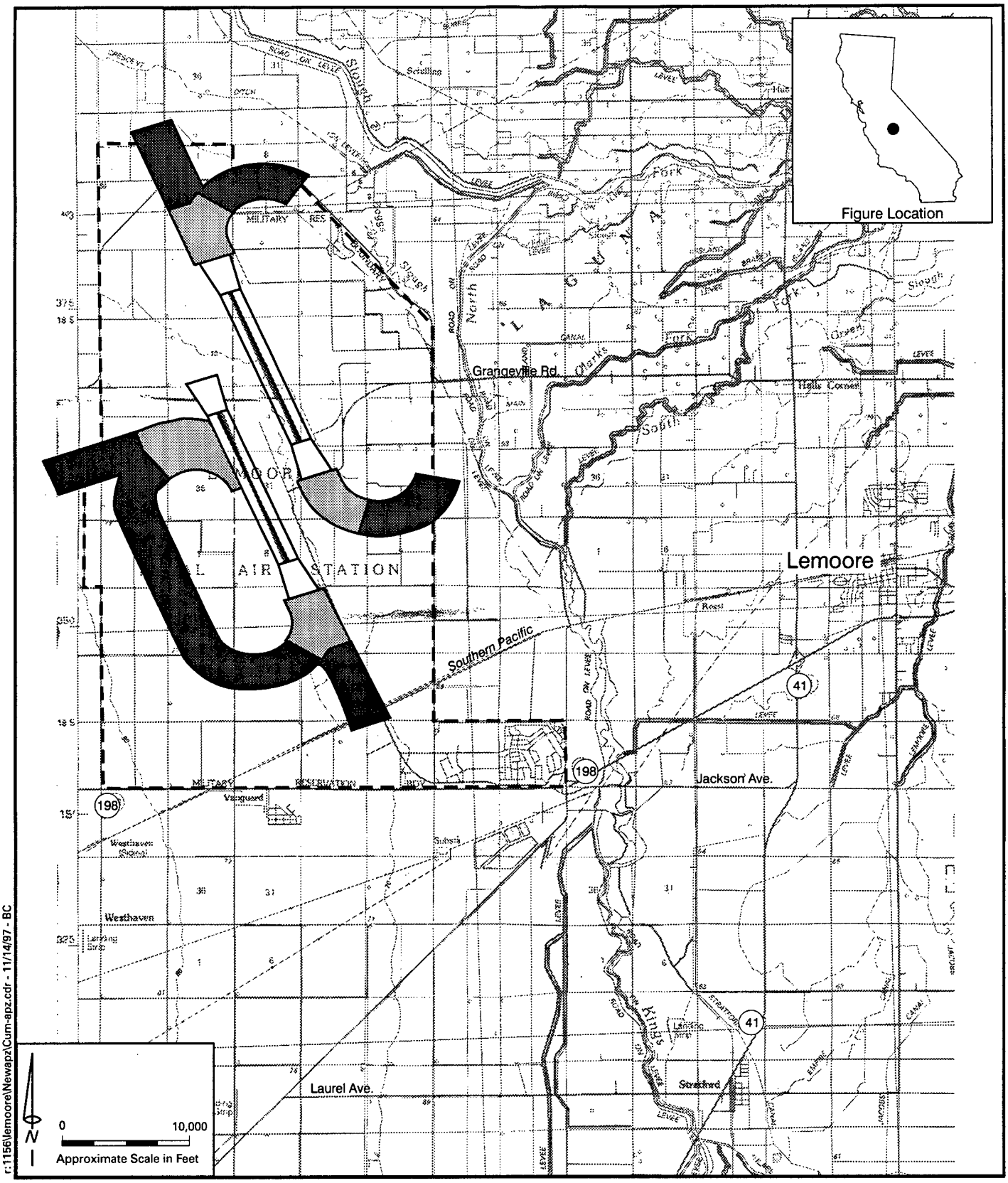
housing off-base. An EIS is being prepared by the Navy to evaluate the direct, indirect, and cumulative impacts from the possible realignment of E-2 squadrons to NAS Lemoore. Further analysis of cumulative effects will be provided in that EIS.

Land Use and Airspace

Cumulative actions at NAS Lemoore, including the addition of the E-2 aircraft, would result in modifications of accident potential zones (APZs) (Figure 5-1). An additional area designated APZII would extend off-base to the west under cumulative conditions. This would not affect the compatibility of off-base land uses. All existing and proposed on-base land uses would be compatible with the cumulative APZ designations. The E-2 aircraft operations at NAS Lemoore would not require any changes to runways to accommodate the flight carrier landing practices (FCLPs) conducted by the F/A-18E/F aircraft. No cumulatively significant impacts related to APZs would occur.

Socioeconomics

To determine cumulative impacts, socioeconomic changes were analyzed at NAS Lemoore assuming joint siting of the E-2 aircraft and F/A-18E/F aircraft at the



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The APZs for NAS Lemoore extend beyond the northern boundaries of the base.

LEGEND:

- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II
- NAS Lemoore

NAS Lemoore Accident Potential Zones Under Cumulative Conditions

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 5-1

Source: Wyle 1997

base. With the cumulative impacts scenario, local procurement, changes in civilian and military employment, and total construction expenditures were combined; civilian and military income and relocation and on-base residence percentage for each appropriate alternative were averaged on a weighted basis. With these inputs, the Economic Impact Forecast System (EIFS) model was run to determine the cumulative impacts for the appropriate affected area. For a discussion of the EIFS model and its national threshold values (RTVs), see Appendix B.

The affected area is defined as the area in which the principal direct and secondary socioeconomic effects of the proposed action would be likely to occur. The affected area for the cumulative effects at NAS Lemoore is Kings and Fresno Counties.

Steady state impacts for the F/A-18E/F would not occur until 2004; therefore, the steady state levels for the relocation of the E-2 were extended into the year 2004 to fully capture all impacts. For all socioeconomic indicators, the year of greatest impact was 2004, except for business volume, which was in 2001. These are the years discussed in this section.

The addition of the E-2 squadron and associated personnel at NAS Lemoore would result in less than significant impacts to population, employment, income and business volume that would be around 1 percent over the baseline (Table 5-2). These changes would be within the historic RTV range and would not be considered significant. No mitigation measures would be required.

In 2004 it is projected that an additional 1,131 rental units and 647 owner-occupied units would be required. In Kings and Fresno Counties, 13,780 units were vacant in 1994, and the area vacancy rate was 5.1 percent. Approximately 523 single family residences and 136 single and multifamily units (Table 5-1) are expected to be constructed in the City of Lemoore and nearby unincorporated areas of Kings County. At NAS Lemoore, base family housing units would be constructed in 2000 and 2001 for an additional 399 units, and bachelor units would be expanded. The additional requirements for rental units and owner-occupied units would not be considered substantial, and no mitigation measures would be required.

Implementation of the proposed projects at NAS Lemoore would result in a beneficial impact to net government revenues. Government revenues would increase by $7,411,000 in 2004. This change would not be considered substantial, and no mitigation measures would be required.

To ascertain the number of students generated with the F/A-18 and E-2 projects cumulative impacts scenario, changes in civilian and military employment were combined; and civilian and military relocation and on-base residence percentages for the two sites were averaged on a weighted basis. With these inputs, the EIFS

Table 5-2
Cumulative Socioeconomic Effects at NAS Lemoore

	Population	Employment	Income ($1,000)	Housing		Business Volume ($1,000)	Net Government Revenues ($1,000)	Number of School Children
				Rental	Owner-Occupied			
1998								
Operations	619	314	$7,910	106	63	$8,700	$418	104
Construction	102	381	$9,274	45	0	$30,459	$37	18
Total	**721**	**695**	**$17,184**	**151**	**63**	**$39,159**	**$455**	**122**
1999								
Operations	2,892	1,684	$53,514	489	287	$52,708	$2,948	486
Construction	233	874	$21,283	103	0	$69,900	$86	41
Total	**3,125**	**2,558**	**$74,797**	**592**	**287**	**$122,608**	**$3,034**	**527**
2000								
Operations	3,955	2,228	$71,429	650	377	$67,772	$4,078	667
Construction	189	710	$17,293	84	0	$56,796	$70	34
Total	**4,144**	**2,938**	**$88,722**	**734**	**377**	**$124,568**	**$4,148**	**701**
2001								
Operations	4,418	2,453	$79,064	671	389	$72,897	$4,619	745
Construction	229	858	$20,905	101	0	$68,658	$84	41
Total	**4,647**	**3,311**	**$99,969**	**772**	**389**	**$141,555**	**$4,703**	**786**
2002								
Operations	5,110	2,808	$90,729	776	448	$82,716	$5,354	863
Construction	126	474	$11,539	56	0	$37,896	$47	22
Total	**5,236**	**3,282**	**$102,268**	**832**	**448**	**$120,612**	**$5,401**	**885**
2003								
Operations	5,803	3,172	$102,545	925	531	$93,819	$6,046	980
Construction	111	417	$10,166	49	0	$33,389	$41	20
Total	**5,914**	**3,589**	**$112,711**	**974**	**531**	**$127,208**	**$6,087**	**1,000**
2004								
Operations	7,097	3,836	$124,399	1,131	647	$112,478	$7,411	1,200
Construction*	0	0	$0	0	0	$0	$0	0
Total	**7,097**	**3,836**	**$124,399**	**1,131**	**647**	**$112,478**	**$7,411**	**1,200**

Source: EIFS Model.

*The designated activity is not anticipated to occur in this year.

model was run to determine the total number of students that would be generated. For a discussion of the EIFS model see Appendix B. The year of greatest impact at NAS Lemoore would be 2004, which is when 1,200 additional students would require public education. Eligible school districts would need to apply for direct payment of impact aid funds by the US Department of Education, which would compensate for the addition of federal students. No significant cumulative impacts are anticipated to occur, and no mitigation measures would be required.

Approximately 523 single-family residences and 136 single/multifamily units are expected to be constructed in the City of Lemoore and nearby unincorporated areas of Kings County. New construction would contribute to the public education system as a result of developer fees that are earmarked for school construction. No significant cumulative impacts are anticipated to occur, and no mitigation measures would be required.

Traffic and Circulation

The proposed action in conjunction with other projects and planned actions would result in poor traffic conditions at signalized intersections near NAS Lemoore. The cumulative base condition at NAS Lemoore includes several on-

base and off-base projects. For the purposes of the traffic analysis, only those on-base projects that would include additional personnel were considered. The analysis of the cumulative projects was based on the traffic impact analysis prepared for the possible E-2 realignment (Linscott, Law & Greenspan 1997). The traffic generated by the off-base projects was extracted directly from that analysis.

The Wing/CVW Administration Building (P-156T) would require an additional 66 personnel (Shubert 1997.) The potential realignment of the E-2 squadron would require an additional 988 military personnel at NAS Lemoore. The trip generation estimates have been extracted from the separate EIS that is currently being prepared for the E-2 project. The off-base projects include three residential developments located about five miles (8 km) from base off of SR 41 and the new 100-acre (41-ha) campus for West Hills Community College.

The trip generation data for the cumulative projects are shown in Table 5-3. The cumulative projects would generate a total of 11,019 daily trips, 1,105 AM peak hour trips, and 1,365 PM peak hour trips. The F/A-18E/F squadrons would contribute an additional 2,923 daily trips, 891 AM peak hour trips, and 931 PM peak hour trips.

Table 5-3
Cumulative Trip Generation for NAS Lemoore

Cumulative Projects	Daily	AM In	AM Out	PM In	PM Out
On-base					
Wing/CVW - 66 personnel	159	54	6	6	54
E-2 Realignment	1,010	245	30	35	250
Off-base					
Avalon Subdivision - 156 SFDU	1,490	30	85	105	60
TR 567 - 136 SFDU	1,300	25	75	90	50
TR 739 - 367 SFDU	3,505	70	200	240	130
West Hills Community College - 1,500 students	3,555	235	50	100	245
Total - Cumulative Background	**11,019**	**659**	**446**	**576**	**789**
F/A-18E/F Project Traffic	**2,923**	**724**	**167**	**187**	**744**

Source: Linscott, Law, & Greenspan 1997, and Dowling Associates 1997.

The LOS results for cumulative conditions at intersections and roadway segments are shown in Tables 5-4 through 5-6. As shown in Table 5-4, the cumulative plus project traffic would result in a change in LOS to E and F at the intersections of SR-198/Main Gate during the AM peak hour and Grangeville Road/SR-41 during the PM peak hour. This would be a cumulatively significant impact.

Table 5-4
Signalized Intersection Operations at NAS Lemoore

Intersection	Peak Hour	Cumulative Delay (seconds)	Cumulative LOS	Cumulative + Project Delay (seconds)	Cumulative + Project LOS
Grangeville Road/SR-41	AM	14.4	B	22.3	C
	PM	15.5	C	103.0	F
SR-198/Main Gate	AM	6.7	B	47.8	E
	PM	12.9	B	40.0	D

Delay (seconds)	LOS
0.0 < 5.0	A
5.1 to 15.0	B
15.1 to 25.0	C
25.1 to 40.0	D
40.1 to 60.0	E
> 60.0	F

Source: Dowling Associates 1997.

Table 5-5
Unsignalized Intersection Operations at NAS Lemoore

Intersection	Peak Hour	Movement	Cumulative Delay (seconds)	Cumulative LOS	Cumulative + Project Delay (seconds)	Cumulative + Project LOS
Avenal Cutoff/EB SR-198 ramps	AM	EB - L/T	5.6	B	5.9	B
		EB – R	3.7	A	3.7	A
		WB - L/T	5.8	B	6.1	B
		WB – R	2.7	A	2.8	A
		NB – L	3.0	A	3.0	A
		SB – L	2.1	A	2.2	A
	PM	EB - L/T	6.0	B	6.1	B
		EB – R	2.9	A	3.0	A
		WB - L/T	6.0	B	6.3	B
		WB – R	2.6	A	2.6	A
		NB – L	2.7	A	2.7	A
		SB – L	2.1	A	2.1	A
Avenal Cutoff/WB SR-198 ramps	AM	WB – L	5.5	B	6.1	B
		WB – R	3.6	A	4.0	A
		NB – L	2.6	A	2.7	A
	PM	WB – L	6.9	B	8.0	B
		WB – R	3.0	A	3.1	A
		NB – L	3.3	A	3.6	A

Source: Dowling Associates 1997.

Table 5-6
Daily Street Segment Operations at NAS Lemoore

		Cumulative			Cumulative + Project		
Street Segment	Capacity*	Volume	V/C	LOS	Volume	V/C	LOS
SR-198							
West of Main Gate	14,000	4,772	0.34	B	4,798	0.34	B
East of Main Gate	31,000	9,905	0.32	B	11,225	0.36	B
Grangeville Boulevard							
West of SR-41	14,000	6,883	0.49	B	8,137	0.58	C
SR-41							
North of Grangeville Boulevard	43,000	12,416	0.29	A	12,704	0.30	A

Source: Dowling Associates 1997.

* Capacities and Volume/Capacity ratio thresholds based on Caltrans Standards

		Delay (seconds)	LOS	V/C Ratio	LOS
LOS = Level of Service	EB = Eastbound	0.0 < 5.0	A	0.00 - 0.30	A
L = Left-turn	WB = Westbound	5.1 to 10.0	B	0.31 - 0.50	B
R = Right-turn	NB = Northbound	10.1 to 20.0	C	0.51 - 0.75	C
T = Through	SB = Southbound	20.1 to 30.0	D	0.76 - 0.90	D
movement		30.1 to 45.0	E	0.91 - 1.00	E
		> 45.0	F	> 1.00	F

By increasing the signal cycle length to 120 seconds, the impacts to the intersection of SR-198 and Main Gate would be reduced to less than significant levels. The intersection would operate at LOS C and B under cumulative with project conditions during the AM and PM peak hours, respectively. At the intersection of Grangeville Road and SR-41, widening the eastbound approach to provide a left turn lane would improve operations to LOS C and B during AM and PM peak hours, respectively, reducing cumulative impacts to less than significant levels.

The addition of cumulative traffic at the unsignalized intersections would not result in any significant impacts (see Table 5-5). All unsignalized intersections would continue to operate at acceptable levels.

The roadway segments would operate at acceptable levels with the addition of cumulative traffic (see Table 5-6). The cumulative traffic would not result in any changes to the LOS, with the exception of Grangeville Road west of SR-41, which would change from LOS B to C. However, acceptable LOS C or better would be maintained on all roadways. No mitigation would be required.

Air Quality

Cumulative projects identified for the NAS Lemoore area include some on-base construction activities, various housing developments planned for the City of Lemoore, widening of Highway 41, development of a community college, and the potential realignment of four E-2 aircraft squadrons (16 aircraft) to the station. The on-base construction projects would be temporary sources of construction emissions, with some activity being concurrent with construction projects

supporting the F/A-18E/F aircraft. Traffic associated with housing development projects and the community college would contribute cumulatively to regional emissions of ozone precursors, but would have only minor cumulative contributions to carbon monoxide levels along roadways near NAS Lemoore.

The possible realignment of E-2 aircraft squadrons to NAS Lemoore is the most significant potential cumulative project from an air quality perspective. A separate EIS is being prepared for the realignment of the E-2 squadrons, with NAS Lemoore identified as one of three alternatives. For NAS Lemoore, the E-2 action would require some new facility construction: a new hangar, training and administrative facilities; new and expanded aircraft maintenance facilities; a new engine test cell; additional personnel support facilities; and new on-base housing facilities. Most construction activity would occur before completion of construction projects that support the F/A-18E/F aircraft. Air quality permits would probably be required for the engine test cell and any new central boilers for new or expanded facilities. Permits might also be required for various types of equipment, such as generators, compressors, degreasing tanks, painting facilities, etc.

If based at NAS Lemoore, the E-2 squadrons would add about 34,000 additional flight operations per year. Aircraft operations and engine run-ups would increase NAS Lemoore emissions by about 22.9 tons (20.8 t) per year for reactive organic compounds, 40.2 tons (36.4 t) per year for nitrogen oxides, and 11.6 tons (10.6 t) per year for PM_{10}.

Traffic associated with E-2 personnel and their dependents would contribute cumulatively to regional emissions of ozone and PM_{10} precursors. This traffic would also add incrementally to carbon monoxide levels along roadways near NAS Lemoore, but would not result in any violations of state or federal carbon monoxide standards.

Combined emissions from E-2 flight activity, associated base-related vehicle traffic, and permit-exempt equipment operations would be about 31.4 tons (28.5 t) per year of reactive organic compounds, 52.3 tons (47.4 t) per year of nitrogen oxides, 31.6 tons (28.7 t) per year of PM_{10}, and 2.5 tons (2.3 t) per year of sulfur oxides.

Emissions associated with E-2 aircraft activity would be more than the Clean Air Act (CAA) conformity rule de minimis thresholds for ozone precursors in the San Joaquin Valley, and thus would require a formal conformity determination.

Noise

Cumulative projects identified for the NAS Lemoore area include some on-base construction activities, various housing developments planned for the City of Lemoore, widening of Highway 41, development of a community college, and the potential realignment of four E-2 aircraft squadrons (16 aircraft) to the station. The on-base construction projects would be temporary sources of construction

noise, with some activity being concurrent with construction projects supporting the F/A-18E/F aircraft. Traffic associated with housing development projects and the community college would make only minimal cumulative contributions to cumulative noise conditions along roadways near NAS Lemoore.

The possible realignment of E-2 aircraft squadrons to NAS Lemoore would have no significant noise impacts from a cumulative perspective. E-2 aircraft use two turboprop engines, which are much quieter than the engines used on military jet aircraft. Flight operations by E-2 aircraft would not make any detectable change in community noise equivalent level (CNEL) contours at NAS Lemoore. Figure 5-2 illustrates preliminary noise contours around NAS Lemoore if both the E-2 and F/A-18E/F aircraft were to be based there. These contours are nearly identical to the expected noise contours at NAS Lemoore after arrival of the F/A-18E/F aircraft.

Traffic associated with F/A-18E/F personnel and their dependents would contribute cumulatively to noise levels along area roadways, but the net change in noise levels would not be significant (less than 1 A-weighted decibel [dBA]).

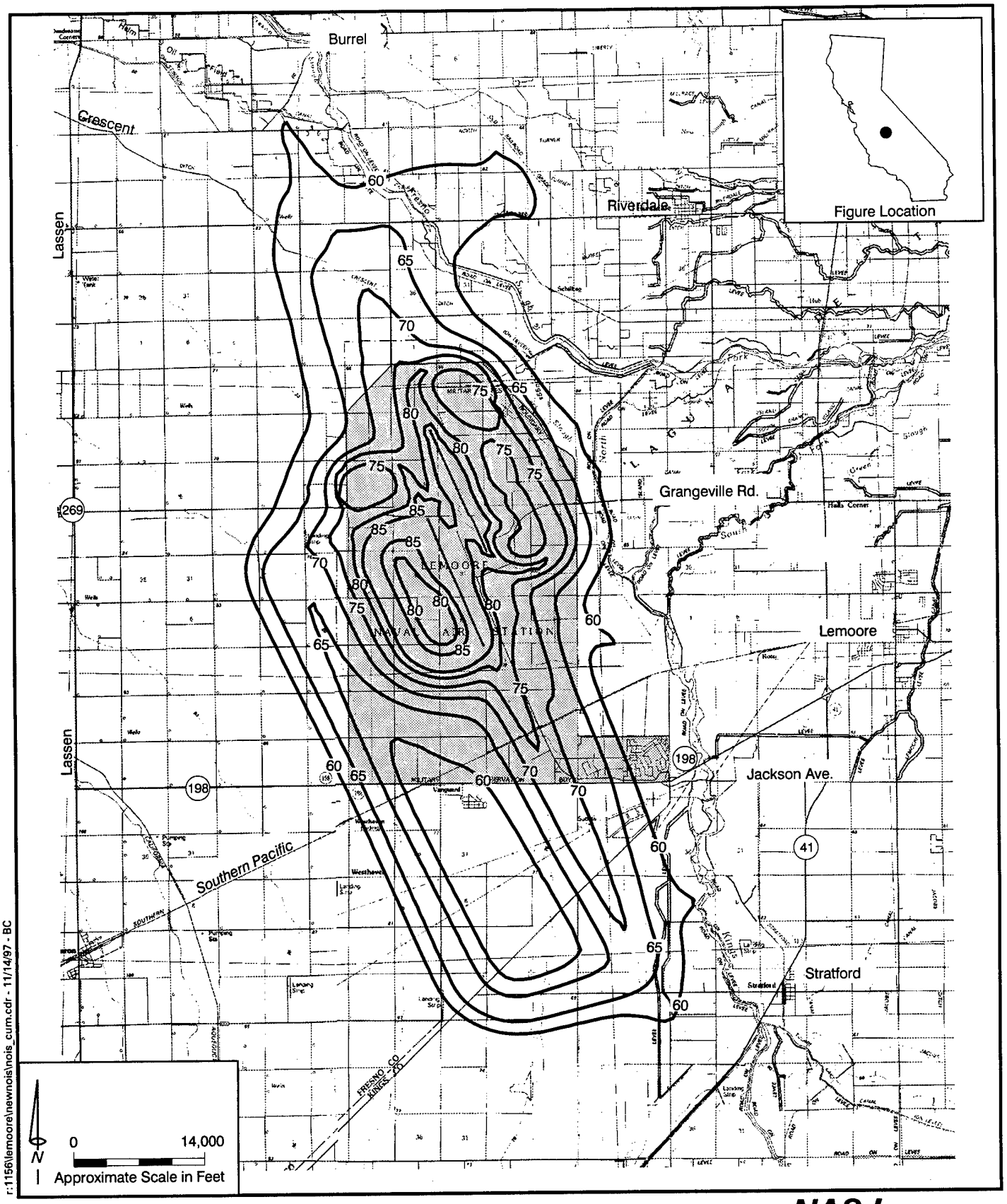
Public Health and Safety

The planned military projects could result in an increase of 164 F/A-18 E/F aircraft and 16 E-2 aircraft for a cumulative increase of 180 aircraft. Any changes in the training procedures associated with the E-2 squadrons that could affect overlapping airspace or nonmilitary airport agreements will be addressed in the E-2 Squadron EIS being prepared by the Navy. Therefore, the aircraft operations of the F/A-18E/F and other planned military projects would not result in cumulatively significant impacts to public health and safety.

The planned military projects would not result in an increase to hazards from explosives safety and electromagnetic radiation, as additional military projects would be sited according to Navy regulations for explosive safety quantity distance (ESQD) and hazards of electromagnetic radiation to ordnance/personnel/fuel (HERO/HERP/HERF) arcs. No cumulatively significant public health and safety impacts would occur.

Hazardous Materials and Wastes

The planned military projects would result in an increase of hazardous materials and waste used, stored, and transported at NAS Lemoore. The additional increase in hazardous wastes would be handled according to US Environmental Protection Agency (EPA) and Navy guidelines for hazardous waste storage and disposal. The planned military projects would be constructed and operated in accordance with approved spill response plans and federal, state, and local laws to prevent on-base releases of hazardous materials/wastes. No cumulatively significant impacts associated with hazardous materials and waste would occur.



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The 65-dB CNEL contour extends off-base along major approach and departure flight paths.

LEGEND:

—75— Community Noise Equivalent Level (CNEL)

NAS Lemoore

NAS Lemoore Noise Contours Under Cumulative Conditions

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 5-2

Source: Wyle 1997.

5.2 NAF El Centro Alternative

Table 5-7 represents the projects proposed in the near-term for Naval Air Facility (NAF) El Centro. No off-base projects are planned in the vicinity of NAF El Centro as determined through conversations with local cities and Imperial County staff. An EIS is being prepared by the Navy to evaluate the direct, indirect, and cumulative impacts of introducing the E-2 squadrons at alternative base locations, including NAF El Centro. Further analysis of the cumulative effects will be provided in that EIS.

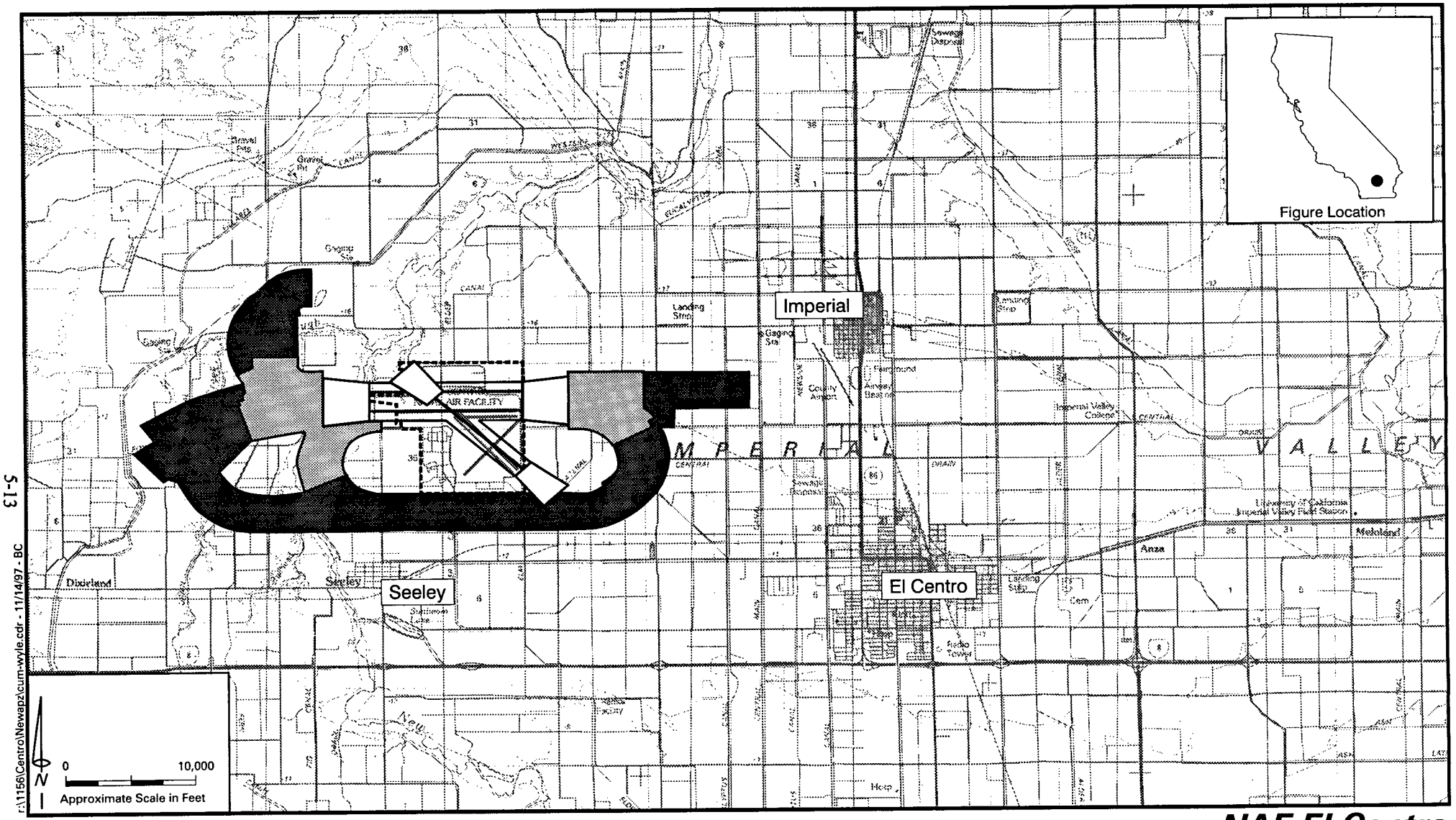
Table 5-7
List of Cumulative Projects: NAF El Centro

Location	Description
On-base 1997–1998	Child development center (4 additional personnel)
On-base 1997–1998	BEQ and galley (8 additional personnel)
On-base 1997–1998	Gymnasium addition
On-base 1999-2000	Potential for realignment of E-2 squadrons, operations, and personnel support facilities (988 personnel, 1500 family members, and 16 aircraft)
On-base 2010+	Potential for locating additional F/A-18E/F aircraft or Joint Strike Fighters. The exact number of aircraft and personnel numbers is not presently known.

Land Use and Airspace

The cumulative actions at NAF El Centro, including the addition of the E-2 aircraft, would result in modification of APZs (Figure 5-3). Areas to the east and west of NAF El Centro that are currently designated APZI or APZII would slightly expand. The affected areas are predominantly used for agriculture and recreation and would not be incompatible with the modified APZs. Existing and proposed on-base land uses would be compatible with the cumulative APZ designations. No cumulatively significant impacts related to APZs would occur.

The cumulative noise impacts at NAF El Centro from the F/A-18E/F and E-2 aircraft would result in on-going incompatibilities between noise sensitive land uses and AICUZ noise restrictions. Current housing, personnel support, and administration facilities at NAF El Centro would be located within an 80 dB CNEL or greater noise contour and identified by the AICUZ as clearly incompatible with this noise environment. According to AICUZ guidelines, noise attenuation measures should be implemented to reduce interior noise to an acceptable level. While it may be possible to attenuate noise to an acceptable level in some existing administrative or training facilities, it would not be possible in existing or proposed housing facilities. Housing, and probably other types of facilities as well, would have to be relocated off base to achieve compatibility with AICUZ noise restrictions. Should this installation be selected to receive the F/A-



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5-13

El Centro and Imperial are outside NAF El Centro's APZ and imaginary surfaces.

LEGEND:

- Clear Zone and Setback
- Accident Potential Zone I
- Accident Potential Zone II
- NAF El Centro Boundary

NAF El Centro Accident Potential Zones Under Cumulative Conditions

Facility Development for West Coast Basing of the F/A-18E/F Aircraft

Figure 5-3

Source: Wyle 1997

18E/F aircraft, on-base areas would be identified for development of noise-sensitive facilities to assure compatibility with AICUZ noise restrictions. Continuing to use these facilities under existing or future noise conditions would constitute and unavoidable significant cumulative impact.

The E-2 aircraft operations would not require any changes to designated APZs or Clear Zones. In addition, the E-2 aircraft operations at NAF El Centro would not require any changes to runways to accommodate the FCLPs conducted by the E-2 aircraft. Each military action/project review process would evaluate potential impacts to APZs. Therefore, no cumulatively significant impacts related to APZs would occur.

Socioeconomics

To determine cumulative impacts, socioeconomic changes were analyzed at NAF El Centro assuming joint siting of the E-2 and F/A-18 E/F aircraft. With the cumulative impacts scenario, local procurement, changes in civilian and military employment, and total construction expenditures were combined; civilian and military income were averaged on a weighted basis. With these inputs, the EIFS model was run to determine the cumulative impacts for the appropriate affected area. For a discussion of the EIFS model and its RTVs, see Appendix B.

The affected area is the area in which the principal direct and secondary socioeconomic effects of the proposed action would be likely to occur. The affected area for the cumulative effects is Imperial County; the county RTVs are listed in Appendix B. Steady state impacts for the F/A-18E/F would not occur until 2007; therefore, the steady state levels for the relocation of the E-2 was extended into the year 2007 to fully capture all impacts. In all cases the year of greatest impact was 2007, which is the year discussed in the following section.

The location of F/A-18E/F proposed projects in combination with the E-2 squadrons and associated personal at NAF El Centro would result in beneficial impacts (Table 5-8) for employment and business volume. Employment would increase almost 13 percent, and business volume a little over 7 percent. These increases would be within the historic RTV range.

The cumulative increase to population from 2004 to 2007 would be significant. The direct and indirect population increase would be between 8.5 and 10.7 percent over the baseline conditions. These population changes would not be within the historic RTV range (6.828 to -1.543) and would, therefore, be considered significant. However, these population changes would be accompanied by beneficial impacts to the community, e.g., increases in employment, income, business volume, and net government revenues.

There would be cumulatively beneficial impacts to income at NAF El Centro from 2004 to 2007. At $176,426,000 in 2007, income would increase over 11

percent above the baseline conditions. No mitigation would be required, however, because of the beneficial nature of the impact.

It is projected that in 2007 an additional 1,731 rental units and 987 owner-occupied units would be required However, with almost 4,000 units available in 1994; it can be projected that housing units would be available in Imperial County in 2007.

Table 5-8
Cumulative Socioeconomic Effects at NAF El Centro

	Population	Employment	Income ($1,000)	Housing		Business Volume ($1,000)	Net Government Revenues ($1,000)	Number of School Children
				Rental	Owner-Occupied			
1998								
Operations	620	300	$7,768	106	63	$5,001	$1,217	104
Construction	83	238	$5,968	37	0	$15,847	$619	15
Total	**703**	**538**	**$13,736**	**143**	**63**	**$20,848**	**$1,836**	**119**
1999								
Operations	2,861	1,648	$44,501	482	285	$32,373	$6,771	491
Construction	177	505	$12,664	78	0	$33,625	$1,314	32
Total	**3,038**	**2,153**	**$57,165**	**560**	**285**	**$65,998**	**$8,085**	**523**
2000								
Operations	4,477	2,408	$70,519	723	420	$47,314	$11,254	771
Construction	131	1,799	$9,362	58	0	$24,858	$971	24
Total	**4,608**	**4,207**	**$79,881**	**781**	**420**	**$72,172**	**$12,225**	**795**
2001								
Operations	4,895	2,605	$77,263	790	458	$51,261	$12,407	843
Construction	155	445	$11,137	69	0	$29,572	$1,155	28
Total	**5,050**	**3,050**	**$88,400**	**859**	**458**	**$80,833**	**$13,562**	**871**
2002								
Operations	5,578	2,926	$88,235	887	512	$57,463	$14,307	961
Construction	86	245	$6,147	38	0	$16,323	$638	15
Total	**5,664**	**3,171**	**$94,382**	**925**	**512**	**$73,786**	**$14,945**	**976**
2003								
Operations	6,260	3,248	$99,232	995	573	463,870	416,190	1,079
Construction	76	216	$5,416	33	0	$14,381	$562	13
Total	**6,336**	**3,464**	**$104,648**	**1,028**	**573**	**$78,251**	**$16,752**	**1,092**
2004								
Operations	8,767	4,427	$139,597	1,373	786	487,017	$23,139	1,514
Construction*	0	0	$0	0	0	$0	0	0
Total	**8,767**	**4,427**	**$139,597**	**1,373**	**786**	**$87,017**	**$23,139**	**1,514**
2005								
Operations	9,910	4,966	$158,009	1,552	887	$97,691	$26,297	1,711
Construction*	0	0	$0	0	0	$0	0	0
Total	**9,910**	**4,966**	**$158,009**	**1,552**	**887**	**$97,691**	**$26,297**	**1,711**
2006								
Operations	9,910	4,966	$158,009	1,552	887	$97,691	$26,297	1,711
Construction	0	0	$0	0	0	$0	0	0
Total	**9,910**	**4,966**	**$158,009**	**1,552**	**887**	**$97,691**	**$26,297**	**1,711**
2007								
Operations	11,053	5,505	$176,426	1,731	987	$108,366	$29,455	1,909
Construction*	0	0	$0	0	0	$0	$0	0
Total	**11,053**	**5,505**	**$176,426**	**1,731**	**987**	**$108,366**	**$29,455**	**1,909**

Source: EIFS Model.

*The designated activity is not anticipated to occur in this year.

Implementation of the proposed projects at NAF El Centro would result in a beneficial impact to net government revenues. Government revenues would increase by $29,455,000 in 2007 and no mitigation measures would be required.

To ascertain the number of students generated with the F/A-18 and E-2 projects cumulative impacts scenario, changes in civilian and military employment were combined; and civilian and military relocation and on-base residence percentages for the two sites were averaged on a weighted basis. With these inputs, the EIFS model was run to determine the total number of students that would be generated. The year of greatest impact at NAF El Centro was 2007, which is when 1,909 additional students would require public education. Eligible school districts would apply for direct payment of impact aid funds by the US Department of Education, which would compensate for the addition of federal students. No significant cumulative impacts are anticipated to occur, and no mitigation measures would be required.

Traffic and Circulation

The proposed action in conjunction with other projects and planned actions would contribute to poor traffic conditions in some areas near NAF El Centro. The cumulative base condition at NAF El Centro includes several on-base projects. For the purposes of the traffic analysis, only the on-base projects that would include additional personnel were considered. The analysis of the cumulative projects was based on the traffic impact analysis prepared for the E-2 realignment (Linscott, Law & Greenspan 1997). The traffic generated by the off-base projects was extracted directly from that analysis.

The potential realignment of the E-2 squadron would require an additional 988 military personnel and 65 support personnel at NAF El Centro. The trip generation estimates, which account for on-base and off-base personnel, have been extracted from the separate EIS that is currently being prepared for the E-2 project. Other on-base projects that require additional personnel include the Child Development Center and the BEQ and galley. No off-base projects were included in the analysis.

The trip generation data for the cumulative projects shown in Table 5-9. The cumulative projects would generate a total of 1,155 daily trips, 319 AM peak hour trips, and 329 PM peak hour trips. The F/A-18 E/F squadrons would contribute an additional 5,353 daily trips, 1,616 AM peak hour trips, and 1,690 PM peak hour trips.

Table 5-9
Cumulative Trip Generation for NAF El Centro

Cumulative Projects	Daily	AM In	AM Out	PM In	PM Out
On-base					
Child Development Center - 4 personnel	10	4	0	0	4
BEQ and galley - 8 personnel	19	8	0	0	8
E-2 Realignment	1,126	275	32	37	280
Total - Cumulative Background	**1,155**	**287**	**32**	**37**	**292**
F/A-18 E/F Squadrons	**5,353**	**1,305**	**309**	**347**	**1,343**

Source: Linscott, Law, & Greenspan 1997, and Dowling Associates 1997.

The LOS results for cumulative conditions at intersections and roadway segments are shown in Tables 5-10 and 5-11. As shown in Table 5-10, the cumulative plus project traffic would result in an unacceptable LOS at the intersections of Bennett Road/Even Hewes Highway and Forrester Road/Even Hewes Highway during the AM and PM peak hours.

Table 5-10
Unsignalized Intersection Operations at NAF El Centro

Intersection	Peak Hour	Cumulative		Cumulative + Project	
		Delay (seconds)	LOS	Delay (seconds)	LOS
Drew Road/Evan Hewes	AM	3.4	A	8.3	B
	PM	3.0	A	4.1	A
Bennett Road/Evan Hewes	AM	7.1	B	Overflow	F
	PM	6.8	B	Overflow	F
Forrester Road/Evan Hewes	AM	9.0	B	Overflow	F
	PM	9.4	B	Overflow	F

Source: Dowling Associates 1997.

Table 5-11
Daily Street Segment Operations at NAF El Centro

Street Segment	Capacity*	Cumulative			Cumulative + Project		
		Volume	V/C	LOS	Volume	V/C	LOS
Evan Hewes (S-80)							
West of Drew Road	14,000	3,762	0.27	A	4,244	0.30	A
East of Forrester Road	14,000	6,137	0.44	B	8,545	0.61	C
Drew Road							
North of Evan Hewes	14,000	1,275	0.09	A	1,435	0.10	A
South of Evan Hewes	14,000	2,575	0.18	A	2,735	0.20	A
Bennett Road							
South of Evan Hewes	14,000	2,241	0.16	A	3,311	0.24	A
Forrester Road							
North of Evan Hewes	14,000	3,709	0.26	A	4,405	0.31	B
South of Evan Hewes	14,000	6,122	0.44	B	6,496	0.46	B

Source: Dowling Associates 1997.

* Capacities and Volume/Capacity ratio thresholds based on Caltrans Standards

		Delay (seconds)	LOS	V/C Ratio	LOS
LOS = Level of Service	EB = Eastbound	0.0 < 5.0	A	0.00 - 0.30	A
L = Left-turn	WB = Westbound	5.1 to 10.0	B	0.31 - 0.50	B
R = Right-turn	NB = Northbound	10.1 to 20.0	C	0.51 - 0.75	C
T = Through movement	SB = Southbound	20.1 to 30.0	D	0.76 - 0.90	D
		30.1 to 45.0	E	0.91 - 1.00	E
		> 45.0	F	> 1.00	F

By installing a signal at the intersection of Bennett Road and Evan Hewes Highway, providing a separate southbound left turn lane, and allowing free-right turns for westbound traffic, the cumulative impacts would be reduced and the operation would improve to LOS C during the AM and PM peak hour. This mitigation would require widening the southbound approach to provide for a separate left turn lane and the free-right turn. The traffic volumes at this intersection would meet Caltrans peak hour signal warrants. Implementation of this mitigation would reduce the impact to a less than significant level.

By installing a signal at the intersection of Forrester Road and Evan Hewes Highway, the impacts of the cumulative traffic would be reduced and operations would improve to LOS C and B during the AM and PM peak hours, respectively. The intersection would meet Caltrans peak hour signal warrants. Implementation of this mitigation would reduce the impact to a less than significant level.

The intersection of Drew Road and Even Hewes would continue to operate at acceptable levels with or without the addition of cumulative traffic.

The addition of cumulative traffic to the roadway segments would not result in any significant impacts (see Table 5-11). The project traffic results in a change in LOS from B to C on Evan Hewes Highway east of Forrester Road, but it is not considered a significant impact. All roadway segments would operate at LOS C or better with or without the proposed project.

Air Quality

Cumulative projects identified for the NAF El Centro area include some on-base construction activities and the potential realignment of four E-2 aircraft squadrons (16 aircraft) to the NAF El Centro. The on-base construction projects would be temporary sources of construction emissions, with some activity being concurrent with construction projects supporting the F/A-18E/F aircraft.

The possible realignment of E-2 aircraft squadrons to NAF El Centro is the most significant cumulative project from an air quality perspective. A separate EIS is being prepared for the realignment of the E-2 squadrons, with NAF El Centro identified as one of three alternative sites. For NAF El Centro, the E-2 action would require significant new facility construction: a new parallel runway and associated facilities; new hangar space; new administrative and training facilities; a new engine test cell; new aircraft maintenance facilities; additional personnel support facilities; and new on-base housing facilities. Most construction activity would occur before completion of construction projects that support the F/A-18E/F aircraft. Air quality permits would probably be required for the engine test cell and any new central boilers for new or expanded facilities. Permits might also be required for various types of equipment, such as generators, compressors, degreasing tanks, painting facilities, etc.

If based at NAF El Centro, the E-2 squadrons would add about 34,000 additional flight operations and associated aircraft emissions per year. Aircraft operations and engine run-ups would increase NAF El Centro emissions by about 22.9 tons (20.8 t) per year for reactive organic compounds, 40.2 tons (36.4 t) per year for nitrogen oxides, and 11.6 tons (10.6 t) per year for PM_{10}.

Traffic associated with F/A-18E/F personnel and their dependents would contribute cumulatively to regional emissions of ozone and PM_{10} precursors. This traffic would also add incrementally to carbon monoxide levels along roadways near NAF El Centro, but would not result in any violations of state or federal carbon monoxide standards.

Combined emissions from E-2 flight activity and associated base-related vehicle traffic would be about 31.1 tons (28.2 t) per year of reactive organic compounds, 51.8 tons (47.0 t) per year of nitrogen oxides, 29.1 tons (26.4 t) per year of PM_{10}, and 2.6 tons (2.4 t) per year of sulfur oxides.

Emissions associated with E-2 aircraft activity would be less than the CAA conformity rule de minimis thresholds for Imperial County, and thus would not require a formal conformity determination.

Noise

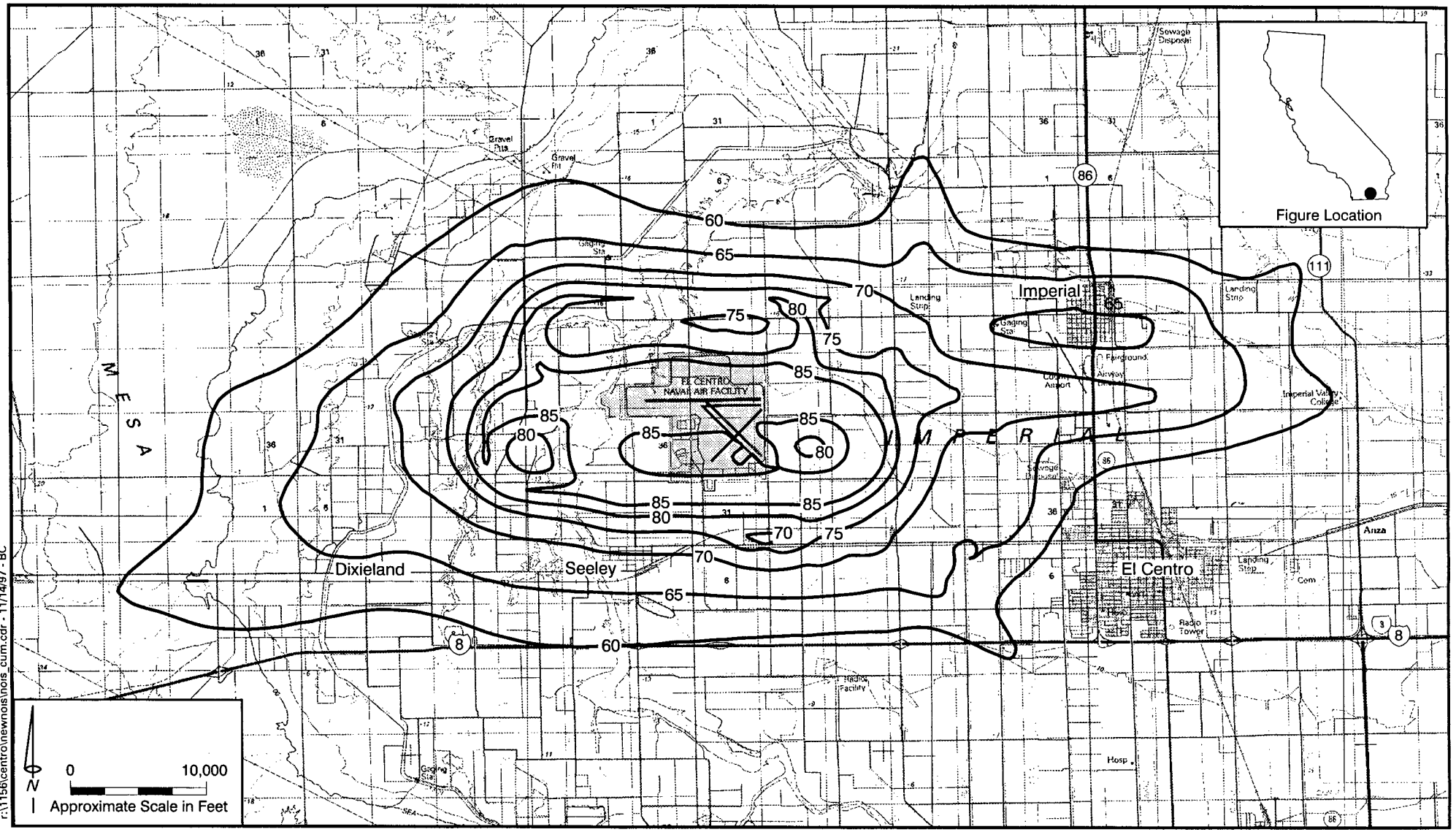
Cumulative projects identified for the NAF El Centro area include some on-base construction activities and the potential realignment of four E-2 aircraft squadrons (16 aircraft) to the station. The on-base construction projects would be temporary sources of construction noise, with some activity being concurrent with construction projects supporting the F/A-18E/F aircraft.

The possible realignment of E-2 aircraft squadrons to NAF El Centro would have no significant noise impacts from a cumulative perspective. E-2 aircraft use two turboprop engines, which are much quieter than the engines used on military jet aircraft. Flight operations by E-2 aircraft would not make any detectable change in CNEL contours at NAF El Centro. Figure 5-4 illustrates preliminary noise contours around NAF El Centro if both the E-2 and F/A-18E/F aircraft were to be based there. These contours are nearly identical to the expected noise contours at NAF El Centro after arrival of the F/A-18E/F aircraft.

Traffic associated with E-2 personnel and their dependents would contribute cumulatively to noise levels along area roadways, but the net change in noise levels would not be significant (less than 1 dBA).

Public Health and Safety

The planned military projects could result in an increase of 164 F/A-18E/F aircraft and 16 E-2 aircraft for a cumulative increase of 180 aircraft. The resulting increase in the use of NAF El Centro airspace may result in increased hazards to



Cumulative noise levels would not noticeably change over future with project noise levels.

LEGEND:

— 75 — Community Noise Equivalent Level (CNEL)

NAF El Centro

NAF El Centro
Noise Contours Under Cumulative Conditions

Facility Development for West Coast of the F/A-18E/F Aircraft

Source: Wyle 1997.

Figure 5-4

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airspace safety. Modifications to air traffic circulation patterns may be required to accommodate the additional aircraft operations and training. Air traffic control specialists for NAF El Centro will need to evaluate additional aircraft operations and training to evaluate the increased management of the airspace and reduce hazards to airspace safety. The implementation of any necessary modifications to overlapping airspace or agreements with nonmilitary airports would reduce hazards to airspace safety.

The planned military projects would not result in an increase to hazards from explosives safety and electromagnetic radiation as additional military projects would be sited according to Navy regulations for ESQD and HERO/HERP/HERF arcs. No cumulatively significant public health and safety impacts would occur.

Hazardous Materials and Wastes

The planned military projects would result in an increase in hazardous materials and wastes used, stored, and transported at NAF El Centro. The additional increase in hazardous wastes would be handled according to EPA and Navy guidelines for hazardous waste storage and disposal. The planned military projects would be constructed and operated in accordance with approved spill response plans and federal, state, and local laws to prevent on-base releases of hazardous materials/wastes. No cumulatively significant impacts associated with hazardous materials and waste would occur.

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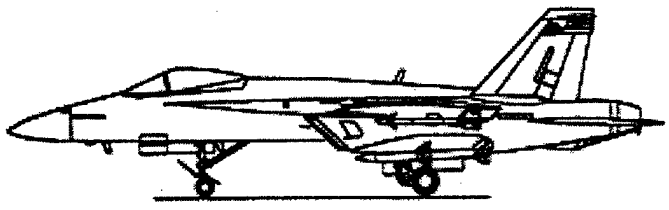

6.0 OTHER CONSIDERATIONS

6.1	IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES	6-1
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CHAPTER 6
OTHER CONSIDERATIONS

This chapter addresses specific topics that the National Environmental Policy Act (NEPA) requires and includes a discussion of environmental justice and the protection of children from environmental health risks. Unavoidable adverse impacts, any irreversible or irretrievable commitment of resources, and the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity are identified and analyzed. In addition, issues related to environmental justice are presented in accordance with Executive Order 12898 and issues related to protection of children from environmental health risks are presented in accordance with Executive Order 13045.

6.1 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires an analysis of significant irreversible effects. Resources that are irreversibly or irretrievable committed to a project are those that are utilized on a long-term or permanent basis. This includes the use of non-renewable resources such as metal, wood, fuel, paper, and other natural or cultural resources. Human labor would also be a non-retrievable resource. These resources are non-retrievable in that they would be utilized for this project when they could have been utilized for other purposes. Another impact that falls under the category of the irreversible and irretrievable commitment of resources is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

To support the West Coast basing of the F/A-18E/F aircraft, related support personnel, and their family members, equipment and functions, would require the construction, modification, or expansion of facilities to provide space for operational, training, maintenance, and personnel support. Construction of the proposed facilities would result in an irretrievable commitment of non-renewable resources such as building materials, fuel for aircraft, construction vehicles, and equipment, and other resources. In addition, the project would commit human

labor for construction, engineering, environmental review, and compliance, and after project completion, operation and maintenance time.

The proposed action would ultimately result in a net increase in the number of aircraft and air operations at the receiving installation, and, subsequently, the commitment of fuel and other non-renewable resources would also be increased. Therefore, the proposed action would constitute an irreversible or irretrievable commitment of non-renewable or depletable resources.

6.2 UNAVOIDABLE ADVERSE EFFECTS

NEPA requires a discussion of any adverse environmental effects that cannot be avoided (40 CFR 1502.16). Significant and unmitigable environmental impacts to noise have been identified at NAF El Centro. Increased aircraft operation associated with implementation of the proposed action would result in noise levels in excess of identified significance thresholds. The DEIS identified no mitigation that would reduce these noise impacts below the significance threshold.

All other potentially significant impacts of the proposed action would be mitigable to a less than significant level by the implementation of mitigation measures recommended in this document.

6.3 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA requires a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity (40 CFR 1502.16). The environmental productivity of the two alternative bases considered for basing the F/A-18E/F aircraft has historically been related to their operation as naval air stations/facilities. The proposed action would result in both short- and long-term environmental effects. Short-term effects are primarily related to construction activities. Temporary impacts would include construction-related traffic and emissions at all three bases. Long-term environmental effects would be related to any unavoidable impacts; namely, unmitigable environmental impacts to noise identified at NAF El Centro.

6.4 ENVIRONMENTAL JUSTICE (EO 12898)

On February 11, 1994, President Clinton issued the Executive Order on Federal Actions to Address Environmental Justice in Minority and Low-income Populations. This order requires that "each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations (Executive Order 12898, 59 Federal Register 7629 [Section 1-101])." On April 21, 1995, the Secretary of Defense submitted a formal environmental justice strategy and implementation plan to the US Environmental Protection Agency (USEPA). To comply with the executive order, the following actions have occurred concurrently with this environmental impact statement (EIS):

- Gathered economic, racial, and demographic information generated from the 1990 census to identify areas of low-income and high minority populations in the areas potentially exposed to project impacts;

- Assessed the alternatives for disproportionate impacts resulting from on-site activities associated with the proposed action; and

- Encouraged community participation and input through public meetings and extensive public notification, as described in Section 1.4, Public Involvement Process of this document.

Analysis Methodology

The affected area for NAS Lemoore includes Kings and Fresno counties and the affected area for NAF El Centro is Imperial County. To determine whether low-income and minority populations could be disproportionately affected by implementing the proposed action at NAS Lemoore or NAF El Centro, census data was used to identify income and population characteristics of neighborhoods near the installations. The percentages of low-income and minority populations in each census tract were compared to the county average to determine whether they were disproportionately larger than the countywide average. Households were classified as being below the poverty level if their total family income or unrelated individual income was less than the nation's poverty threshold specified for the applicable family size.

Traffic, air quality and noise would be the only impacts that could affect this larger region. While traffic and air quality would affect off-base areas with low-income and minority populations, these impacts were determined not to disproportionately affect any one group. Other environmental effects of the proposed action were determined to be either beneficial impacts or impacts that would not disproportionately affect any one group. With regard to the basing of the F/A-18E/F aircraft, the primary environmental justice issue would be the increase in noise levels from the additional aircraft operations. The potential for the increase in noise levels off-base from the additional aircraft operations to disproportionately affect low-income and minority populations has been evaluated for each alternative base.

The long-term overall economic effects of the proposed action would be positive to the communities, including minority and low-income population. The proposed action would not result in changes to off-base land uses and therefore would not disproportionately affect existing neighborhoods. Biological resource impacts would only occur on-base and would therefore not affect low-income or minority populations. Water resource issues are not relevant because impacts related to this resource (e.g., flooding) would not disproportionately affect any one group. Air Quality impacts occur over a large area and would not disproportionately affect any one group. Likewise, hazardous materials issues would not disproportionately affect any one group. No significant impacts to

visual or cultural resources were identified and there would therefore be no disproportionately high or adverse impact to any one group.

Traffic impacts from the proposed action would occur on local and regional highways in the affected areas. Regional impacts would result from the slight increases in traffic volumes on the highways accessing the installations. Local impacts would occur at intersections closest to the installations from the increased number of vehicles entering and leaving the installation. Because of the regional character of these transportation facilities, the range of populations that use these facilities, and the small contribution of traffic from the proposed action, traffic impacts from the proposed action would not result in disproportionately high or adverse affects upon minority and low-income populations.

6.4.1 NAS Lemoore Alternative

Existing Demographics

Fresno County census tracts 77, 78, and 82 are closest to NAS Lemoore. Table 6-1 identifies racial composition and the percentage of the population below the poverty level for these census tracts and compares them to Fresno County. As shown in Table 6-1, census tracts 77, 78, and 82 have a higher percentage of population living below the poverty level compared to the county (19, 18, and 29 percent, respectively versus 17 percent). Census tracts 77, 78, and 82 also have a higher Hispanic population than the county total (38, 94, and 74 percent, respectively versus 35 percent). The median family income in Fresno County is $29,970 (US Census 1991, 1992).

Table 6-1
Poverty Level and Race by Census Tract
Compared with Fresno and Kings Counties

	Census Tract							
Percentage	77	78	82	Fresno County	2	3	16	Kings County
Total Population	4,149	7,050	5,889	667,490	2,126	7,581	8,873	101,469
Below Poverty Level	19	18	29	17	13	11	23	15
Hispanic Origin	38	94	74	35	20	7	65	34
Black	5	<1	<1	9	3	11	2	8
Native American	<1	<1	<1	<1	<1	<1	10	<1
Asian	2	<1	6	8	<1	<1	<1	3

Sources: Wessex 1994.
1990 Census of Population and Housing Census Tracts and BNAs, Ventura County, CA MSA.
Summary of Social, Economic and Housing Characteristics - California, issued 1992.

Kings County census tracts 2, 3, and 16 are adjacent to NAS Lemoore. As shown in Table 6-1, census tract 16 has a larger percentage of its population living below the poverty level than the county total (23 percent versus 15 percent). Census tract 16 also includes higher Hispanic and Native American populations than the

county total (65 and 10 percent, respectively, versus 34 and less than 1 percent), while census tract 3 includes higher black populations than the county total (11 percent versus 8 percent). The median family income in Kings County is $27,614 (US Census 1991, 1992).

Potential Impacts

Impacts to minority and low-income populations from the proposed action at NAS Lemoore would primarily result from noise generated by additional aircraft operations. Census tracts 77, 78, and 82 in Fresno County and census tracts 3 and 16 in Kern County contain larger minority or low-income populations than the countywide average. Environmental justice impacts to these populations would be considered significant if 50 percent or more of the census tract with higher than average minority or low-income populations would be affected.

Using a geographic information system, an overlay analysis was performed to determine the area of these census tracts within the 65 dB CNEL or greater noise contours. (Future noise contours from implementing the proposed action are shown on Figure 4-9.) As shown in Table 6-2, approximately 10 percent or less of census tracts 16, 77, 78, and 82 would be affected by the proposed action. Census tract 3, with 94 percent of its area within the 65 dB contour, is located within the boundaries of NAS Lemoore. However, no significant adverse noise impacts have been identified at NAS Lemoore; therefore, there would be no disproportionate high or adverse noise impacts to minority populations in census tract 3. No other significant adverse impact have been identified at NAS Lemoore that cannot be mitigated to a less than significant level and disproportionate high and adverse impacts have not been identified.

Table 6-2
Area of Noise Contours at NAS Lemoore

Census Tract	Hectares	Square Miles	Area within 65 dB Contours
3	70,123	270.63	94%
16	1,704,282	6,577.46	5%
77	186,596	720.14	6%
78	816,181	3,149.95	10%
82	817,419	3,154.73	0%

Source: Wessex 1994.

6.4.2 NAF El Centro Alternative

Existing Demographics

Imperial County census tracts 110, 111, 112.01, and 123.01 are adjacent to NAF El Centro. As shown in Table 6-3, these census tracts have a smaller percentage of population living below the poverty level than the county total. Census tracts

110, 111, and 112.01 include a slightly higher black population than the county total (3, 3, and 4 percent, respectively versus 2 percent), while census tracts 111 and 112.01 include a higher Asian population than the county total (3 and 2 percent, respectively versus 1 percent). The Native American population in census tract 112.02 is also higher than the county percentage. The median family income in Imperial County is $25,147 (US Census 1991,1992).

Table 6-3
Poverty Level and Race by Census Tract Compared with Imperial County

	Census Tract				
Percentage	110	111	112.01	123.01	Imperial County
Total Population	5,571	3,021	1,473	719	109,303
Below Poverty Level	10	12	12	16	21
Hispanic Origin	50	45	62	13	66
Black	3	3	4	<1	2
Native American	1	1	3	1	1
Asian	1	3	2	1	1

Sources: Wessex 1994.
1990 Census of Population and Housing Census Tracts and BNAs, Outside Metropolitan Areas, California.
Summary of Social, Economic and Housing Characteristics – California, issued 1992.

Potential Impacts

Impacts to minority populations from the proposed action at NAF El Centro would primarily result from off-base noise generated by the additional aircraft operations. Using a geographic information system, an overlay analysis was performed to determine what portion of each census tract would be covered by 65 dB CNEL or greater noise contours. As shown in Table 6-4, none of these census tracts exceed the 50 percent threshold and, therefore, no disproportionately high and adverse noise impacts would result from the proposed action. No other significant adverse impact have been identified at NAF El Centro that cannot be mitigated to a less than significant level and disproportionate high and adverse impacts have not been identified.

Table 6-4
Area of Noise Contours at NAF El Centro

Census Tract	Hectares	Square Miles	Area within 65 dB Contours
110	180,470	696.50	17.7%
111	201,258	776.73	41.7%
112.01	14,394	55.55	2.3%

Source: Wessex 1994.

6.5 PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS (EO 13045)

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, states that each Federal agency shall (1) make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children, and (2) ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Environmental health risks and safety risks mean risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (Federal Register 1997).

The US Navy anticipates that EO 13045 would apply to the noise environment around schools and the potential overcrowding of schools. Noise impacts would be considered significant if the proposed project would alter existing noise environments so that public schools would be located in an area exceeding 65dB CNEL. Temporary construction activities to remodel existing facilities or build new facilities would not be located near schools. Increased aircraft operations could affect existing noise environments at public schools. School overcrowding would be considered significant if the additional students generated by the proposed project exceeded the capacity of the affected schools.

Projected noise levels at schools near NAS Lemoore would remain within compatible levels (65-dB CNEL or less) for school facilities and therefore would not adversely affect public schools in the area. Because schools in the NAS Lemoore area are either near or over capacity, the additional 788 students generated at NAS Lemoore would significantly affect these schools. School districts may be eligible for compensation for the federally connected students by impact aid, a federal program intended to compensate local school districts for burdens placed on their resources by federal activity. Schools must apply for impact aid through a competitive process and funds are paid directly by the Department of Education.

Noise levels exceeding 65-dB CNEL would encompass significant off-base areas near NAF El Centro. The City of Imperial would be encompassed by the 65-dB CNEL contour, and the community of Seeley would be within the 65 to 75-dB CNEL contours. Children attending Seeley Elementary School (kindergarten through 8th grade) and three schools in the City of Imperial would be affected by CNEL values above 65-dB. The affected schools near NAF El Centro are below capacity and would therefore not be adversely affected by the additional students generated by the F/A-18E/F squadrons at the facility.

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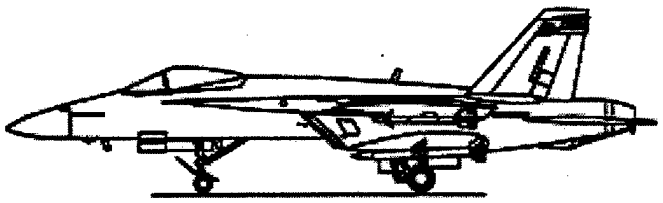

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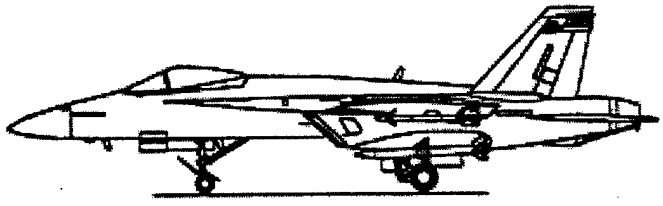

8.0 AGENCY CONSULTATION AND COORDINATION

8.1	MILITARY REPRESENTATIVES CONTACTED	8-1
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CHAPTER 8
CONSULTATION AND COORDINATION

8.1 MILITARY REPRESENTATIVES CONTACTED

NAS Lemoore

Ken Billick, Assistant Security Officer, Security Department
Tim Castro, Air Program Manager
Lt. Bob Craig, Air Traffic Control Facility Officer
John Crane
Florence Crosby, LCDR, Director of Administration, Hospital
Bill Ike, Environmental Protection Specialist
Teresa Mitchell
Sue Mora, Solid Waste Specialist
William O'Donnell, Program Manager
Katherine Ormsbee, Administration Officer, Hospital
Terry Rayback
L.N. Reith, Military Security Officer
Duane Rustad, Fire Chief, Fire Department
Bill Smith
David Sparlin, Public Works Department
Jerry Stewart, Utilities Engineer
Steve Thompson, Lieutenant
Victor Vaughn, III, Assistant Air Traffic Control Facility Officer
Jim Venturino, Environmental Protection Specialist
Rainer Winkelmann, Assistant Weapons Officer

NAF El Centro

Manny Bay, Director, Environmental Division
Jim Collins, Biologist
Ron Curiel, Solid Waste Specialist, Pollution Prevention Management Program
Shawn Fitzgerald, HMCS Senior Chief, Medical and Dental Clinic
Dwight Flowers, Stormwater and Wastewater Specialist, Public Works Department

Dwight Flowers, Stormwater and Wastewater Specialist, Public Works Department
Patrick Friel, Air Traffic Facility Officer
Joe Gallant, Base Pesticide Coordinator
David Godsey, Water and Wastewater Plant Operator
Jerald Kear, Energy Specialist, Public Works Department
Dale Leonard, Director of Branch Clinic Operations and Naval Medical Centers
Salvador Rodriguez, HMCS Senior Chief
John Stammreich, Security Officer, Security Department
Dave Tousseau, Public Works Environmental Division
Lt. Sewester, Public Works Officer
Paul Weller, Utilities Specialist, Public Works Department
Ken Zurn, Fire Chief, Fire Department

8.2 NAVAL AVIATION DEPOT NORTH ISLAND

Lyn P. Coffer, Aircraft Environmental Support Office

8.3 FEDERAL AGENCIES CONTACTED

Bureau of Indian Affairs
Tribal Listings

US Fish and Wildlife Service
John Bradley, Branch Chief, Carlsbad Field Office
Wayne White, Field Supervisor, Sacramento Field Office

8.4 LOCAL AGENCIES CONTACTED

Central Union High School District, El Centro
Marianne Terriquez

Central Union School District, Lemoore
Marilyn Lenhardt

City of Avenal, Public Works Department
Jerry Watson, Director

City of Brawley, Fire Department
Jesse Zendejas, Fire Captain

City of Brawley, Police Department
Henry Graham, Acting Chief

City of Brawley, Public Works Department
Alvin Smith, Chief Operator

City of El Centro, Police Department
Jim Townsel, LCMDR, Investigative Division

City of El Centro, Public Works Department
Randy Hines, Wastewater Plant Supervisor

City of Hanford, Fire Department
Tim Ieronimo, Fire Marshall

City of Hanford, Planning Department
John Stowe

City of Hanford, Public Works Department
Robert Sisneroz, Waste Disposal Manager

City of Hanford, Police Department
David Scott, Administrative Sergeant

City of Hanford, Public Works Department
Clee Haley, Utilities Superintendent

City of Holtville, Fire Department
Carl Gronstedt, Fire Chief

City of Holtville, Police Department
John Jordan, Chief

City of Holtville, Public Works Department
Frank Garcia

City of Imperial, Fire Department
Fred Nippins

City of Lemoore, Fire Department
Fire Chief Dee Machado

City of Lemoore, Planning Department
Gloria Hobbs

City of Lemoore, Police Department
Chief Robert Carden

City of Lemoore, Public Works Department
Richard Pereira, Utilities Superintendent

El Centro Elementary School District, El Centro
Carla Rayon

Hanford Elementary School District, Hanford
Liz Simas

Hanford High School District, Hanford
Marina Martinez

Imperial County Sanitation
John Lau, Controller

Imperial County Sheriff's Department
Michael Hackett, Assistant Sheriff

Imperial Irrigation District
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John Coltrane, Electrical Analyst

Island Union School District, Lemoore
Mary Jo Bernardo

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Len Chesmore

Kings County, Planning Department
Bill Zumwalt

Kings County, Sheriff's Department
William Landis, Assistant Chief

Kings County Waste Management Agency
Michael Adams, Executive Director

Lemoore Elementary School District, Lemoore
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Lemoore School District
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Lemoore Union School District, Lemoore
Carol Mayer

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Southern California Gas Company
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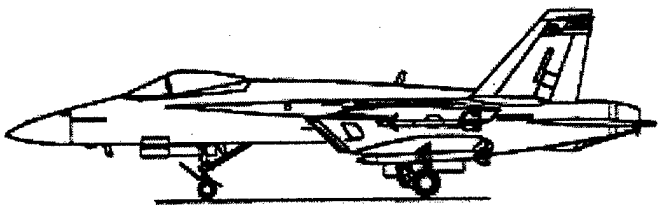

9.0 LIST OF PREPARERS

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CHAPTER 9
LIST OF PREPARERS

9.1 NAVY PERSONNEL

US Navy - EFA West
Sam Dennis
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US Navy - Commander Naval Air Force, Pacific Fleet
Capt Tad Chamberlain
Roger Newman
Andrew Harrison

US Navy - Commander Naval Base San Diego
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Rene Trevino

US Navy - F/A-18E/F Fleet Introduction Team
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Cdr Phillip Tomkins

US Navy - NAS Lemoore
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(Cultural Resources)

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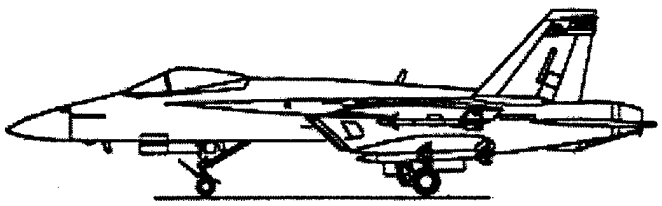

10.0 DISTRIBUTION LIST

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CHAPTER 10
DISTRIBUTION LIST

This distribution list includes elected officials, relevant federal, state, and local agencies, interested organizations and individuals, scoping meeting attendees, and libraries and media. All parties will receive notice of the Draft Environmental Impact Statement (DEIS) and the executive summary. Parties identified in the "copies" heading below will receive a complete copy of Volumes I and II of the DEIS.

Copies	Title	First	Last	Organization	Branch	City	State
Federal Elected Officials							
	Honorable	George	Radanovich	US Congress	19th District	Fresno	CA
1	Honorable	Calvin	Dooley	US Congress	20th District	Hanford	CA
	Honorable	Bill	Thomas	US Congress	21st District	Visalia	CA
	Honorable	Brad	Sherman	US Congress	24th District	Woodland Hills	CA
	Honorable	Henry	Waxman	US Congress	29th District	Los Angeles	CA
	Honorable	Sonny	Bono	US Congress	44th District	Palm Springs	CA
	Honorable	Bob	Filner	US Congress	50th District	Chula Vista	CA
	Honorable	Gary	Condit	US Congress	House of Representatives	Merced	CA
	Honorable	Richard	Lehman	US Congress	House of Representatives	Fresno	CA
	Senator	Barbara	Boxer	US Congress	US Senate	San Francisco	CA
	Senator	Dianne	Feinstein	US Congress	US Senate	San Francisco	CA
State Elected Officials							
	Honorable	Jim	Costa	California State Assembly	16th District	Fresno	CA
	Honorable	Cruz	Bustamante	California State Assembly	31st District	Fresno	CA
	Honorable	Jim	Battin	California State Assembly	80th District	Imperial	CA
	Honorable	Bill	Jones	California State Assembly		Fresno	CA
	Honorable	Margaret	Snyder	California State Assembly		Madera	CA
	Honorable	Ken	Maddy	California State Senate	14th District	Fresno	CA
	Honorable	David	Kelley	California State Senate	37th District	Palm Desert	CA
	Honorable	Phil	Wyman	California State Senate		Tehachapi	CA
	Governor	Pete	Wilson	State of California	Office of the Governor	Sacramento	CA
Local Elected Officials							
1	Mayor	Kelly	Granger	City of Avenal	Office of the Mayor	Avenal	CA
1				City of Brawley	Office of the Mayor	Brawley	CA

Copies	Title	First	Last	Organization	Branch	City	State
1				City of El Centro	Office of the Mayor	El Centro	CA
1	Mayor	Jim	Patterson	City of Fresno	Office of the Mayor	Fresno	CA
1				City of Holtville	Office of the Mayor	Holtville	CA
1				City of Imperial	Office of the Mayor	Imperial	CA
1	Mayor	Michael	Bixler	City of Imperial Beach	Office of the Mayor	Imperial Beach	CA
1	Mayor	Robert	Hill	City of Hanford	Office of the Mayor	Hanford	CA
1	Mayor	Dave	Simas	City of Lemoore	Office of the Mayor	Lemoore	CA
1				City of Westmoreland	Office of the Mayor	Westmoreland	CA

Federal Agencies

				Advisory Council on Historic Preservation	Western Office of Project Review	Golden	CO
	Director	Ronald	Anzalone	Advisory Council on Historic Preservation		Washington	DC
				Federal Aviation Administration		Sacramento	CA
				House Interior Committee	House Annex 1	Washington	DC
	Regional Administrator	Hilda	Diaz-Soltero	National Marine Fisheries Service	Southwest Region	Long Beach	CA
	Ms.	Irma	Lagomarsino	National Marine Fisheries Service	Southwest Region, Protected Species Management Division	Long Beach	CA
	Mr.	Kenneth	Hollingshead	National Marine Fisheries Service	Office of Protected Resources	Silver Spring	MD
	Associate Director	Denis	Galvin	National Park Service	Planning and Development	Washington	DC
1	Chief	Jim	Benedict	National Park Service	Santa Monica Mountains Recreational Area	Agoura Hills	CA
	Mr.	Art	Eck	National Park Service	Santa Monica Mountains Recreational Area	Agoura Hills	CA
	Ms.	Judith	Meister	National Park Service	Santa Monica Mountains Recreational Area	Santa Monica	CA
	Ms.	Debbie	Bird	National Park Service		Three Rivers	CA
	Wilderness Coordinator	Ralph	Moore	National Park Service		Three Rivers	CA
2				US Army Corps of Engineers	Sacramento District	Sacramento	CA
	Director			US Bureau of Indian Affairs	Field Office	Palm Springs	CA
	Superintendent			US Bureau of Indian Affairs	Southern California Area Office	Riverside	CA
	District Manager			US Bureau of Land Management	California Desert District	Riverside	CA
	Area Manager			US Bureau of Land Management	El Centro District	El Centro	CA
	Assistant Director	Maitland	Sharpe	US Bureau of Land Management	Resource Assessment and Planning	Washington	DC
				US Bureau of Land Management		Sacramento	CA
	External Affairs Officer	Bob	Walsh	US Bureau of Reclamation	Lower Colorado Regional Office	Boulder City	NV
	Area Manager	Rick	Martin	US Bureau of Reclamation	Southern California Area Office	Temecula	CA
	Environmental Specialist	Judy	Troast	US Bureau of Reclamation		Washington	DC
	Chief	T.J.	Granito	US Coast Guard	Environmental Protection Branch	Washington	DC
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				US Department of Commerce	National Oceanic & Atmospheric Admin. Sanctuary & Reserve Division SSMCIV	Silver Spring	MD
	Acting Director	Donna	Wieting	US Department of Commerce	National Oceanic & Atmospheric Admin., Office of Policy & Strategic Planning	Washington	DC

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2	Mr.	Paul	Ryeff	US Department of Defense	Office of Economic Adjustment	Sacramento	CA
2	Deputy	Peter	Boice	US Department of Defense	Natural Resources ODASD (E)	Arlington	VA
	Safety Manager	Richard	Green	US Department of and Health Human Services	Environmental Clearance	Los Angeles	CA
				US Department of Housing & Urban Development	Environmental Unit	Los Angeles	CA
18	Mr.	Terry	Martin	US Department of the Interior	Office of Environmental Policy & Compliance	Washington	DC
1	Environmental Officer	Patricia	Port	US Department of the Interior	Office of Environmental Policy & Compliance	San Francisco	CA
	Mr.	Daniel	Leubecker	US Department of Transportation	Office of Technology Assessment	Washington	DC
				US Department of Transportation	Quality Advisory Committee	Washington	DC
	Mr.	Harvey	Riebel	US Department of Transportation		Longdale	CA
5	Director	Dick	Anderson	US Environmental Protection Agency	Office of Federal Activities	Washington	DC
2	Chief	David	Farrel	US Environmental Protection Agency	Office of Federal Activities	San Francisco	CA
	Mr.	Bob	Pallarino	US Environmental Protection Agency	Region IX Air and Toxics Division	San Francisco	CA
	Director	Deanna	Weiman	US Environmental Protection Agency	Region IX Office of External Affairs	San Francisco	CA
	Mr.	Bob	Moyer	US Environmental Protection Agency	Region IX Office of Regional Counsel	San Francisco	CA
	Environmental Officer	Bill	Johnston	US Federal Aviation Administration	Western Pacific Region (AWP-532)	Longdale	CA
	Navy Rep.			US Federal Aviation Administration	Western Pacific Region (AWP-532)	Los Angeles	CA
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				US Fish and Wildlife Service	Ecological Services	Sacramento	CA
1				US Fish and Wildlife Service	Fish and Wildlife Enhancement	West Carlsbad	CA
	Regional Director	Rolf	Wallerstrom	US Fish and Wildlife Service		Portland	OR
1				US Fish and Wildlife Service	Sacramento Office Ecological Services	Sacramento	CA
	Refuge Manager			US Fish and Wildlife Service	Salton Sea National Wildlife Refuge	Calipatria	CA
	Ms.	Catherine	Clement	US Forest Service		San Francisco	CA
Military and Coast Guard							
	Mr.	Tad	McCall	US Air Force	Deputy Assistant Secretary	Washington	DC
	Mr.	Philip	Lammi	US Air Force	Environmental Office Western Region	San Francisco	CA
				US Army Corps of Engineers	Los Angeles District Regulatory Branch	Los Angeles	CA
	LTC		Daniels	US Coast Guard	Pollution Contingency Planner	Long Beach	CA
	COL	Louis	Van Mullem, Jr.	Vandenberg Air Force Base	Environmental Management	Vandenberg AFB	CA
	Manager	Allan	Naydol	Vandenberg Air Force Base	Natural Resources	Vandenberg AFB	CA
Tribal Agencies							
	Chair	Jearaldine	Alex	Big Sandy		Auberry	CA
	Chair	Frank	Lee	Cold Springs Rancheria		Tollhouse	CA

Copies	Title	First	Last	Organization	Branch	City	State
	Chair	Clarence	Brown	Mission Indians Viejas Group of Capitan	Grande Band Tribal Headquarters	Alpine	CA
	Executive Secretary	Larry	Myers	Native American Heritage Commission		Sacramento	CA
	Chair	Clarence	Atwell, Jr.	Santa Rosa Rancheria		Lemoore	CA
	Chair	Elaine	Schneider	Santa Ynez Chumash Reservation	Tribal Elders Council	Santa Ynez	CA
	Chair	Lewis	Barnes	Table Mountain Rancheria		Friant	CA
State Agencies							
	Chief	James	Morgester	CA Air Resources Board	Compliance Division	Sacramento	CA
				CA Air Resources Board	EIR Regional Impact Division	Sacramento	CA
1	Executive Director	Mark	Delaplaine	CA Coastal Commission		San Francisco	CA
	Analyst	Jim	Raives	CA Coastal Commission		San Francisco	CA
	Executive Officer	Michael	Fischer	CA Coastal Conservancy		Oakland	CA
	Mr.	David	Johnson	CA Department of Boating & Waterways		Sacramento	CA
	State Historic Preservation Officer	Cherilyn	Widell	CA Department of Parks and Recreation	Historic Preservation Office	Sacramento	CA
	Ms.	Karen	Collins	CA Department of Parks and Recreation	Historic Preservation Office	Sacramento	CA
	Chief	Richard	Rayburn	CA Department of Parks and Recreation	Resource Management Division	Sacramento	CA
				CA Department of Parks and Recreation	Salton Sea State Recreation Area	North Shore	CA
	Mr.	Randall	Brown	CA Department of Water Resources	Environmental Services Office	Sacramento	CA
	Director	Michael	Byrner	CA Department of Conservation		Sacramento	CA
	Mr.	John	Schmidt	CA Department of Conservation	Wildlife Conservation Board	Sacramento	CA
	Mr.	David	Hammond	CA Department of Ed., Sc, & Environ		Sacramento	CA
	Director			CA Department of Fish and Game		Sacramento	CA
1	President	Frank	Boren	CA Department of Fish and Game		Sacramento	CA
				CA Department of Fish and Game	Region 4	Fresno	CA
1	Regional Manager	Patricia	Wolf	CA Department of Fish and Game	Region 5	Long Beach	CA
	Chief	David	Spath	CA Department of Health Services	Environmental Health Division	Sacramento	CA
	Mr.	James	Stratton	CA Department of Health Services	Health Hazard Assessment	Sacramento	CA
				CA Department of Health Services	Toxic Substances Control Division Region 3	Glendale	CA
	Executive Director	Robert	Remen	CA Department of Transportation		Sacramento	CA
				CA Department of Transportation	District 6	Fresno	CA
				CA Department of Transportation	District 7	Los Angeles	CA
	Division Director			CA Department of Transportation	Division of Aeronautics	Sacramento	CA
	Mr.	James	Strock	CA Environmental Protection Agency		Sacramento	CA
	Mr.	Fredrick	Moss	CA Environmental Protection Agency	Department of Toxic Substances Control	Sacramento	CA

Copies	Title	First	Last	Organization	Branch	City	State
				CA Environmental Protection Agency	Public Participation and Education	Long Beach	CA
	Mr.	Terry	Rivasplata	CA Office of Planning and Research		Sacramento	CA
	Secretary	Douglas	Wheeler	CA Resources Agency		Sacramento	CA
	Director	Marsala	Tyler	California State University Northridge	Office of Public Affairs	Northridge	CA
				Regional Water Quality Control Board	Central Valley Region	Fresno	CA
	Mr.	Gerhardt	Hubner	Regional Water Quality Control Board	Los Angeles Region	Monterey Park	CA
	Mr.	Michael	Lyons	Regional Water Quality Control Board		Monterey Park	CA
1	Environmental Specialist	Lauma	Jurkevics	Regional Water Quality Control Board	Surveillance Unit	Monterey Park	CA
	Mr.	Juan	Salazar	State of California	California Conservation Corps,	Porterville	CA
				State Water Resources Control Board	Division of Water Quality	Sacramento	CA
	Mr.	Harry	Schueller	Water Resources Control Board	Division of Clean Water Program	Sacramento	CA
Regional Agencies							
	Ms.	Julie	Linxwiler	Fresno County	Department of Public Works and Development Services	Fresno	CA
1	Development Services Manager	Gail	Miller	Fresno County	Department of Public Works and Development Services	Fresno	CA
				Imperial County	Air Pollution Control District	El Centro	CA
	Chair			Imperial County	Board of Supervisors	El Centro	CA
	Director			Imperial County	Parks and Recreation Department	El Centro	CA
1	Planning Director	Jurg	Heuberger	Imperial County	Planning and Building Department	El Centro	CA
1	County Supervisor	Dean	Shores	Imperial County		El Centro	CA
1	Chairman	Lee	Lockhart	Kings County	Board of Supervisors	Hanford	CA
1	Mr.	John S.	Lehn	Kings County	Job Training Office	Hanford	CA
1	Ms.	Allison M.	Picard	Kings County	Office of County Administrator	Hanford	CA
1	Mr.	Ken	Marvin	Kings County	Office of the Sheriff	Hanford	CA
				Kings County	Waste Management Authority	Hanford	CA
	Mr.	Jim	Edwards	Kings County		Hanford	CA
1	County Aministrative Officer	Larry	Spikes	Kings County	County Administrative Office	Hanford	CA
	Mr.	Richard	Milhorn	San Joaquin Valley	Unified Air Pollution Control District	Fresno	CA
	Program Supervisor	Steve	Smith	South Coast Air Quality Management District		Diamond Bar	CA
	Mr.	Philip	Fernando	Southern CA Association of Governments		Los Angeles	CA
	Ms.	Maggie	Idle	Southern CA Association of Governments		Los Angeles	CA
Water Management Agencies							
	General Manager	Charles	Shreves	Imperial Irrigation District		Imperial	CA
				Lakeside Irrigation Water District		Hanford	CA
	Mr.	Frank	Royer	United Water Conservation District		Santa Paula	CA

Copies	Title	First	Last	Organization	Branch	City	State
1	General Manager	David	Orth	Westlands Water Districts		Fresno	CA
1	Chief of Operations	Steve	Ottomoeller	Westlands Water Districts		Fresno	CA
Local Agencies							
	City Manager	Melisa	Harriman	City of Avenal	Office of the City Manager	Avenal	CA
	Director	Jonathan	Demsky	City of Avenal	Utilities Department	Avenal	CA
	President			City of Brawley	Chamber of Commerce	Brawley	CA
				City of Brawley	Office of the City Manager	Brawley	CA
	President			City of Calexico	Chamber of Commerce	Calexico	CA
				City of Calexico	Office of the City Manager	Calexico	CA
	President			City of Calipatria	Chamber of Commerce	Calipatria	CA
	Mr.	James	Flournoy	City of Calipatria	City Hall	Calipatria	CA
				City of Corcoran		Cocoran	CA
1	Executive Vice President	Cathy	Kennerson	City of El Centro	Chamber of Commerce	El Centro	CA
1	Mr.	Rob	Zimmes	City of El Centro	Chamber of Commerce	El Centro	CA
		MC	Wyman	City of El Centro	Chamber of Commerce	El Centro	CA
1	Mr.	Robert	Zimmer	City of El Centro	Chamber of Commerce	El Centro	CA
	President			City of El Centro	Chamber of Commerce	El Centro	CA
				City of El Centro	Office of the City Manager	El Centro	CA
	President			City of Fresno	Chamber of Commerce	Fresno	CA
	President			City of Hanford	Chamber of Commerce	Hanford	CA
1	City Manager	Jan	Reynolds	City of Hanford	Office of the City Manager	Hanford	CA
1	Ms.	Barbara	McGurdy	City of Hanford		Hanford	CA
	President			City of Holtville	Chamber of Commerce	Holtville	CA
				City of Holtville	Office of the City Manager	Holtville	CA
	President			City of Imperial	Chamber of Commerce	Imperial	CA
				City of Imperial	Office of the City Manager	Imperial	CA
	Mr.	David	Ewing	City of Imperial Beach		Imperial Beach	CA
	President			City of Lemoore	Chamber of Commerce	Lemoore	CA
1	Ms.	Lynda	Lahodny	City of Lemoore	Chamber of Commerce, Downtown Revitalization Committee	Lemoore	CA
1	Mr.	Bobby	Lee	City of Lemoore	Chamber of Commerce, Governmental Affairs Committee	Lemoore	CA
1	Mr.	Jeffrey L.	Levinson	City of Lemoore	Chamber of Commerce, Governmental Affairs Committee	Lemoore	CA
1		Ed	Martin	City of Lemoore	City Council	Lemoore	CA
1		John W.	Luis	City of Lemoore	City Council	Lemoore	CA
	City Manager	Allen	Goodman	City of Lemoore	Office of the City Manager	Lemoore	CA
	Director	Verma	Nakul	City of Lemoore	Planning and Community Development	Lemoore	CA
1	Mr.	Bill	Bowen	City of Lemoore	Planning Commission	Lemoore	CA
				City of Malibu	Chamber of Commerce	Malibu	Ca
School Districts							
1	Mr.	John	Jones	Ackers School		Lemoore	CA
	Ms.	Marianne	Terriquez	Central Union High School District	Planning Department	El Centro	CA
1	Superintendent		Carlson	Central Union School District		Lemoore	CA
	Ms.	Marilyn	Lenhardt	Central Union School District		Lemoore	CA
1	Ms.	Carla	Rayon	City of El Centro	Elementary School District	El Centro	CA
1	Mr.	Bill	Miguel	City of Hanford	High School Board	Hanford	CA
1	Mr.	Richard	Rayburn	City of Lemoore	Union Elementary School District	Lemoore	CA

Copies	Title	First	Last	Organization	Branch	City	State
1	Ms.	Liz	Simas	Hanford Elementary School District		Hanford	CA
1	Ms.	Marina	Martinez	Hanford High School District		Hanford	CA
1	Superintendent	Thomas	Bates	Island Union School District		Lemoore	CA
1	Superintendent	Idanna	Aaron	Lemoore Elementary School District		Lemoore	CA
	Ms.	Barbara	Richwine	Lemoore Elementary School District		Lemoore	CA
1	Tri-Counties District Manager	Bill	Black	Lemoore High School		Lemoore	CA
1	Ms.	Carol	Mayer	Lemoore Union School District		Lemoore	CA
1	Mr.	Bob	Marineau	Nuetra School		Lemoore	CA
	Ms.	Sue	Anderson	Seeley Union School District		Seeley	CA
1	Superintendent	Dave	Watson	Seeley Union School District		Seeley	CA

Organizations

				American Cetacean Society		San Pedro	CA
1	Mr.	Nick	Wagner	American Federation of Government Employees		NAS Lemoore	CA
				Audubon Society	Coachella Valley	Palm Desert	CA
	Mr.	Charles	Imbrecht	California Energy Commission		Sacramento	CA
				California Environment Trust	Hearst Building	San Francisco	CA
				California Farm Bureau Federation		Sacramento	CA
	Executive Director	Richard	Martin	Castle Joint Power Authority		Atwater	CA
1	Ms.	Celine	Haugen	Crown Ed Corporation		Hanford	CA
	Ms.	Anna	Harlowe	Ecology Center of Southern California		Los Angeles	CA
	Mr.	Dan	Silver	Endangered Habitats League		Los Angeles	CA
	President	Steven	Rebuck	Fisheries Protection Institute		Summerland	CA
	Ms.	Andrea	Durbin	Friends of the Earth		Washington	DC
	Mr.	Ron	Bottorff	Friends of the Santa Clara River		Newbury Park	CA
	Mr.	Bradley	Angel	Greenpeace		San Francisco	CA
	Mr.	Jess	Kouch	Kaufman & Broad		Fresno	CA
1	Mr.	Ron	Dicken	KC Government Center	Veteran Service Office	Hanford	CA
1	Mr.	Dick	Jacques	Kings County Board of Realtors		Hanford	CA
	Ms.	Liz	Brown	Laguna Greenbelt, Inc.		Laguna Beach	CA
	Mr.	Michael	Gosliner	Marine Mammal Commission	General Counsel	Washington	DC
1	Mr.	Jay	Salyer	NAS Lemoore, Inc./Kings and Tulare Commuter Rail Committee		Lemoore	CA
				National Audubon Society	Western Regional Office	Sacramento	CA
	Senior Attorney	Joel	Reynolds	Natural Resources Defense Council		Los Angeles	CA
	President			Niland Chamber of Commerce		Niland	CA
	Associate Director	Harry	Helling	Orange County Marine Institute		Dana Point	CA
1	Mr.	Scott	Raiskup	PG&E		Lemoore	CA
	Mr.	Gary	Patton	Planning and Conservation League		Sacramento	CA
	Mr.	Joel	Schwartz	Rand Corp.		Santa Monica	CA
	Ms.	Misty	Gay	Santa Catalina Conservancy		Avalon	CA
		Terry	Tamminen	Santa Monica Bay Keeper		Marina del Rey	CA
		Gar	Goodson	Save Our Coastline 2000		Palos Verdes	CA
	Mr.	Scott	Thomas	Sea and Sage Audubon Society		Irvine	CA

Copies	Title	First	Last	Organization	Branch	City	State
				Sierra Club		Washington	DC
	Mr.	Ted	Gold	Southern California Edison		West Lancaster	CA
	Mr.	Terrance	Mack	Southern California Gas Company	M/L 722 L	Pico Rivera	CA
1	Ms.	Linda	Douglass	Southern California Gas Company		Visalia	CA
	Mr.	John	Rees	Southern California Gas Company		Downey	CA
	President			West Shores Chamber of Commerce		Salton City	CA
					California Environment Trust	San Francisco	CA
Individuals and Residents							
	Mr.	Mike	Boston			El Centro	CA
	Mr.	Stephen	Castillo			El Centro	CA
	Mr.	Marty	Coyne			El Centro	CA
	Ms.	Dorothy	George			El Centro	CA
	Mr.	Bruce	Giannimi			Seeley	CA
	Mr.	George	His			Agoura Hills	CA
	Mr.	Michael	Kitahara			Elk	CA
		Dane	Knight			El Centro	CA
1	Ms.	Bernadette	Kuller			NAS Lemoore	CA
		Pat	Lofgren			El Centro	CA
	Mr.	Steve	Monteleone			El Centro	CA
	Mr.	Joe	Neves			Stratford	CA
	Mr.	Tony	Oliveria			Lemoore	CA
	Ms.	Sherry	Parks			Lemoore	CA
	Ms.	Wilda	Parks			Hanford	CA
		Sandy	Salyer			Lemoore	CA
	Mr.	Mike	Schneewind			El Centro	CA
	Mr.	Ethan	Scott			El Centro	CA
		Hallen	Wagenvoord			Oakland	CA
	Mr.	Bill	Zumwalt			Hanford	CA
	Mr.	Dean	Shores			Imperial	CA
	Mr.	Eugene	Morgan			Lemoore	CA
	Mr.	Richard	Hopkins			Lemoore	CA
		Fred & Barbara	Griffith			Lemoore	CA
	Ms.	Connie	Wlaschin			Lemoore	CA
	Ms.	Mary Ann	Sarrah			Lemoore	CA
	Mr.	Tony	Barba			Hanford	CA
Libraries							
1				City of Avenal	Public Library	Avenal	CA
1	Ms.	Marjo	Mello	City of Brawley	Public Library	Brawley	CA
1	Ms.	Joann	Horne	City of El Centro	Public Library	El Centro	CA
1				City of Fresno	Public Library	Fresno	CA
1				City of Hanford	Public Library	Hanford	CA
1				City of Lemoore	Public Library	Lemoore	CA
1	Head Librarian	Fred	Schmidt	Colorado State University	Documents Department	Fort Collins	CO
Media							
				Fresno Bee	News Desk	Fresno	CA
	Mr.	Michael	Todd	Hanford Sentinel		Hanford	CA
	Editor			Holtville Tribune		Holtville	CA
	Editor			Imperial Valley Press		El Centro	CA
				KABC Channel 7	Public Announcements	Los Angeles	CA

Copies	Title	First	Last	Organization	Branch	City	State
				KFSN TV Channel 30	Public Announcements	Fresno	CA
				KFTV Channel 21	Public Announcements	Fresno	CA
				KJOP 1240 AM	Public Announcements	Lemoore	CA
		Noe	Diaz	KQVO Spanish Radio	Public Announcements	Calexico	CA
				KVPR KPRX FM 89	Public Announcements	Fresno	CA
				KXO AM & FM	Public Announcements	El Centro	CA
				KYMA TV Channel 11	Public Announcements	El Centro	CA
				La Opinion Newspaper		Van Nuys	CA
				Lemoore Advance	News Desk	Lemoore	CA

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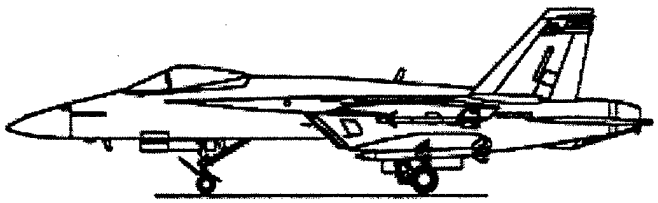

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CHAPTER 11
GLOSSARY AND INDEX

11.1 GLOSSARY

100-year flood zone	Land area having a one percent chance of being flooded during a given year.
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 resources, and to perform other duties as required by law (Public Law 89-655; 16 USC 470).
Aesthetics	Referring to the perception of beauty.
Air installation compatible use zones (AICUZ)	A concept for achieving compatible land use around a military airfield. The AICUZ program recommends land uses that will be compatible with noise levels, accident potential, and flight clearance requirements associated with military airfield operations. Community noise equivalent levels (CNELs), shown as noise contour lines on AICUZ maps, prescribe what kind of land uses may occur at certain noise levels. Similarly, accident potential zones (APZs) limit the types of land uses that may occur below the zone.
Air traffic control authorized airspace (ATCAA)	ATCAAs are similar to MOAs in that they are used to accommodate aircraft maneuvering in airspace adjacent to the restricted areas and are broader and higher than the restricted areas. ATCAAs are used to afford military aircraft the opportunity for flight above 18,000 MSL.
Airfield waivers	When imaginary surface violations become necessary for safe navigation, a waiver is obtained from the NAVAIR. This allows a facility to erect structures that serve as navigational aids that extend above the imaginary surface.
Airport control zone	Normally a five-mile radius circle center on the airport.

Ambient air quality standards	Standards established on a state or federal level that define the limits for airborne concentrations of designated criteria pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, lead), to protect public health with an adequate margin of safety (primary standards) and public welfare, including plant and animal life, visibility, and materials (secondary standards).
Aquifer	A layer of underground sand, gravel, or spongy rock in which water collects.
Archaeological site	Any location where humans have altered the terrain or discarded artifacts. The location of past cultural activity; a defined space with more or less continuous archaeological evidence.
Archaeology	A scientific approach to the study of human ecology, cultural history, and cultural process, emphasizing systematic interpretation of material remains.
Arterial	A roadway from which local routes branch.
Artifact	Any product or human cultural activity; more specifically, any tools, weapons, artworks, etc., found in archeological contexts.
Asbestos	A carcinogenic substance formerly used widely as an insulation material by the construction industry; often found in older buildings.
Assemblage	The complete inventory of artifacts from a single, defined archaeological unit (such as a stratum or component).
Attainment area	An area which meets the National Ambient Air Quality Standards for a criteria pollutant under the Clean Air Act or meets state air quality standards.
A-weighted decibel (dBA)	A number representing the sound level which is frequency weighted according to a prescribed frequency response established by the American National Standards Institute (ANSI-S1.4-1971) and accounts for the response of the human ear.
Before Present (BP)	Dating convention for cultural resources chronologies, defined as X years before present. Present is usually defined as 1950.
Best-management practices (BMPs)	Includes schedule of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff spillage or leaks, sludge or waste disposal, or drainage from raw material storage.
Burial	Human remains disposed of by interment. Burials may be *simple* (containing the remains of one person) or *complex* (containing the remains of two or more individuals), *primary* (including the remains as originally interred), or *secondary* (where a reinternment follows a temporary disposal elsewhere).

Capacity (transportation)	The maximum rate of flow at which vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions.
Capacity (utilities)	The maximum load a system is capable of carrying under existing service conditions.
Clean Air Act (CAA)	The CAA legislates that air quality standards set by federal, state, and county regulatory agencies establish maximum allowable emission rates and pollutant concentrations for sources of air pollution on federal and private property. Also regulated under this law is proper removal and safe disposal of asbestos from buildings other than schools.
Clean Water Act (CWA)	The CWA is the major federal legislation concerning improvement of the nations water resources. It provides for development of municipal and industrial wastewater treatment standards and a permitting system to control wastewater discharges to surface waters. The act contains specific provisions for regulation of ships' wastewater and disposal of dredge spoils within navigable waters. Section 404 of the act regulates disposal into waters of the United States, including wetlands.
Climate	The prevalent or characteristic meteorological conditions (and their extremes) of any given location or region.
Community Environmental Response Facilitation Act (CERFA)	A 1992 amendment to CERCLA, CERFA expedites the identification of uncontaminated real property within closing facilities which offer the greatest opportunity for reuse and redevelopment.
Community noise equivalent level	Noise compatibility level established by California Administrative Code, Title 21, Section 5000. The 24-hour average A-weighted sound level with a 5 dB weighting added to levels occurring between 10:00 PM and 7:00 AM
Comprehensive Environmental Response, Compensation, And Liability Act (CERCLA)	CERCLA, also known as Superfund, was enacted in 1980 to ensure that a source of funds is available to clean up abandoned hazardous waste dumps, compensate victims, address releases of hazardous materials, and establish liability standards for responsible parties. The act also requires creation of a National Priorities List which sets forth the sites considered to have the highest priority for cleanup under Superfund.
Contamination	The degradation of naturally occurring water, air, or soil quality either directly or indirectly as a result of human activities.
Council on Environmental Quality (CEQ)	Established by NEPA, the CEQ consists of three members appointed by the President. CEQ regulations (40 CFR 1500-1508, as of July 1, 1986) describe the process for implementing NEPA, including preparation of environmental assessments and environmental impact statements, and timing and extent of public participation.

Cultural	(1) The nonbiological and socially transmitted system of concepts, institutions, behavior, and materials by which a society adapts to its effective natural and human environment; (2) Similar or related assemblages of approximately the same age from a single locality or district, thought to represent the activities of one social group.
Cultural history	The archeological sequence of cultural activity through time, within a defined geographic space or relating to a particular group.
Cultural resources	Prehistoric and historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or a community for scientific, traditional, religious, or any other reason. Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. Resources may include prehistoric sites and artifacts, contemporary sacred areas, traditional use areas (e.g., native Plant habitat), and sources for materials used in the production of sacred objects and traditional implements.
Cumulative impacts	The combined impacts resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes them.
Day-night average sound level (Ldn)	The 24-hour average-energy sound level expressed in decibels, with a 10 decibel penalty added to sound levels between 10:00 PM and 7:00 AM to account for increased annoyance due to noise during the night.
Decibel (dB)	A unit of measurement on a logarithmic scale which describes the magnitude of a particular quantity of sound pressure or power with respect to a standard reference value.
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.
Dredging	Removal of mud from the bottom of water bodies using a scooping machine.
Easement	An interest in land owned by another that entitles its holder to a specific limited use
Effluent	Waste material discharged into the environment.
Endangered species	A species that is threatened with extinction throughout all or a significant portion of its range.
Endangered Species Act (ESA)	The ESA requires federal agencies to determine the effects of their actions on endangered species and their critical habitats.
Environmental impact statement (EIS)	A document required of federal agencies by NEPA for major projects or legislative proposals significantly affecting the environment. A tool for decision making, the EIS describes the positive and negative effects of the undertaking and lists alternative actions.

Equivalent noise levels (Leq)	Equivalent noise levels are used to develop single-value descriptions of average noise exposure over various periods of time.
Ethnohistory	The description of indigenous human groups and their behavior prior to and during contact with Euro-Americans. Ethnohistorical data was obtained by direct observation and/or by transcription of statements by living persons in the late 1800s and early 1900s, and in some cases, projected into the past.
Fault	Fracture in earth's crust accompanied by a displacement of one side of the fracture with respect to the other and in a direction parallel to the fracture.
Feasibility study (FS)	The feasibility study identifies and evaluates all applicable site cleanup alternatives. For most sites, a long list of alternatives are possible. A risk assessment is performed as part of the study to quantify the level of risk to the public and environment posed by the site. Often, the risk assessment determines which alternative is selected for final remediation. Each alternative is evaluated for effectiveness in protecting human health and the environment, ease of implementation, and overall cost. Typically, the remedial investigation and FS are performed concurrently.
Feature	A large, complex artifact or part of a site such as a hearth, cairn, housepit, rock alignment, or activity area.
Federal airways	Federal airways are corridors for civilian air traffic. These airways are shown with a "V" or a "J" and a number designation. "V" is for vector corridors that cover elevations up to 18,000 feet above MSL, while "J" is for jet corridors that cover elevations over 18,000 feet above MSL.
Ground water	Water within the earth that supplies wells and springs.
Hazard Ranking System (HRS)	This system provides a uniform method of scoring or ranking of the potential risk of a facility site where a hazardous substance has been present. The EPA developed the HRS to prioritize their cleanup efforts. The EPA evaluates the draft HRS packages and proposes any facilities scoring over 28.5 or higher for inclusion on the National Priorities List (NPL). Facilities which are listed on the NPL receive the highest priority.
Hazardous material	A substance or mixture of substances that poses a substantial present or potential risk to human health or the environment. Any substance designated by the EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if it is otherwise released into the environment.
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. Regulated under RCRA.

Historic district	National Register of Historic Places designation of a geographically defined area (urban or rural) possessing a significant concentration, linkage, or continuity of sites, structures, or objects united by past events or aesthetically by plan of physical development.
Historic/history	A period of time after the advent of written history dating to the time of 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 lifeforms. Generally considered to be the last 10,000 years.
Imaginary surfaces	The maximum safe height of buildings, towers, poles, and other possible obstructions to air navigation are defined by imaginary surfaces. Imaginary surfaces are another way to describe clearances for air navigation. These surfaces are invisible planes that radiate, at various increasing heights from the runway or helicopter pad. The FAA considers any terrain or man-made objects that extend above the imaginary surface an obstruction. Imaginary surfaces include the primary surface, the approach-departure surface, the inner horizontal surface, the conical surface, the outer horizontal surface, and transitional surfaces.
Impacts	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.
Infrastructure	The basic installations and facilities on which the continuance and growth of a locale depend (roads, schools, power plants, transportation, and communication systems).
Installation Restoration Program (IRP)	A program established by the Department of Defense to meet requirements of CERCLA of 1980 and SARA of 1986 which identifies, assesses, and cleans up or controls contamination from past hazardous waste disposal practices and hazardous material spills.
Level of Service (LOS)	In transportation analysis, a qualitative measure describing operational conditions within a traffic stream and how they are perceived by motorists and/or pedestrians. Usually given a letter grade from A to F, with A being free-flow; E, capacity; and F, forced-flow. Factors considered in LOS analyses include speed, travel time, traffic interruptions, freedom of maneuver, safety, driving comfort, and convenience. In public services, a measure describing the amount of public services available to community residents, generally expressed as the number of personnel providing service per 1,000 population.
Liquefaction	The transformation during an earthquake of unconsolidated, water-saturated sediment into a liquid form.

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.
Marsh	A type of wetland that does not accumulate appreciable peat deposits and is dominated by herbaceous vegetation. Marshes may be either fresh or salt water and tidal or nontidal.
Master plan	Land use on military bases is planned and documented in a Master Plan. A Master Plan is used in the short-term to site new construction projects, but also serves as a guide for achieving long-term development objectives. The purpose of a Master Plan is to provide realistic and orderly planning and to ensure logical and efficient use and development of base facilities and real estate.
Migratory Bird Treaty Act	This act prohibits the taking or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.
Military operating area (MOA)	MOAs exist to accommodate aircraft maneuvering in airspace adjacent to the restricted areas and are broader and higher than the restricted areas. MOAs can extend up to 18,000 feet above MSL, but not beyond. Non-hazardous military training activities such as air combat maneuvers, air intercepts, and aerobatics are conducted in the MOAs.
Military training routes (MTRs)	MTRs are shown by a visual route (VR) or instrument route (IR) designation. MTRs are often low altitude routes and are used for access to or from MOAs or for cross-country flight practice. Essentially, MTRs are airways for military aircraft.
Mitigation	A method or action to reduce or eliminate program impacts.
Multi-family housing	Townhouse or apartment units that accommodate more than one family though each dwelling unit is only occupied by one household.
National Environmental Policy Act (NEPA)	Public Law 91-190, passed by Congress in 1969, established a national policy designed to encourage consideration of the influence of human activities on the natural environment. NEPA also established the Council on Environmental Quality. NEPA procedures require that environmental information be made available to the public before decisions are made.
National Historic Preservation Act (NHPA)	The NHPA protects cultural resources. Section 106 of the act requires a federal agency to take into account the potential effect of a proposed action on properties listed on or eligible for listing on the National Register of Historic Places.

National Pollution Discharge Elimination System (NPDES)	The NPDES is a provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by the EPA or state.
National Priorities List (NPL)	A list of sites (federal and state) where releases of hazardous materials may have occurred and may cause an unreasonable risk to the health and safety of individuals, property, or the environment.
National Register of Historic Places (NRHP)	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 the 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 American Graves Protection and Repatriation Act (NAGPRA)	NAGPRA defines the ownership and control of Native American human remains and associated funerary objects discovered or recovered from federal or tribal land.
Native Americans	Used in the collective sense to refer to individuals, bands, or tribes who trace their ancestry to indigenous populations of North America prior to Euro-American contacts.
Native vegetation	Plant life that occurs naturally in an area without agricultural or cultivational efforts. It does not include species that have been introduced from other geographical areas and have become naturalized.
Natural gas	A natural fuel containing primarily methane and ethane that occurs in certain geologic formations.
Noncontributing resource	A resource (e.g., a building) that is located within the boundaries of a National Register District but that does not contribute to the eligibility of the district. A "non-contributing" building or structure is not eligible for the National Register of Historic Places.
Nonnative species	Species that have invaded or been introduced into an area.
Paleo-Indian	Prehistoric hunter-gatherer populations characterized by efficient adaptations to terminal Pleistocene environments in which small bands exploited megafauna such as mammoth.
PCB-contaminated equipment	Equipment which contains a concentration of PCBs from 50 to 449 ppm or greater. Disposal and removal are regulated by the EPA.
Peak hour	The hour of highest traffic volume on a given section of roadway between 7:00 AM and 9:00 AM or between 4:00 PM and 6:00 PM.
Permit	An authorization, license, or equivalent control document to implement the requirements of an environmental regulation.

Pleistocene	The last 1.6 million years of geological history, marked by repeated glaciation and the first indication of social life in human beings.
Polychlorinated biphenyls (PCBs)	Any of a family of industrial compounds produced by chlorination of biphenyl. These compounds are noted chiefly as an environmental pollutant that accumulates in organisms and concentrates in the food chain with resultant pathogenic and teratogenic effects. They also decompose very slowly.
Potable water	Water that is suitable for drinking.
Prehistoric/Prehistory	The period of time before the written record, and before Euro-Americans entered an area.
Prehistory	The archeological record of nonliterate cultures; the cultural past before the advent of written records.
Preliminary assessment (PA)	The PA identifies areas of potential contamination and evaluates each area to determine if a threat to human health or the environment exists. A PA report is developed from readily available information such as past inventory records, aerial photographs, employee interviews, existing analytical data, and a site visit. A PA may recommend no further action, additional work, or a removal action.
Radon	A colorless, naturally occurring, radioactive, inert gaseous element formed by radioactive decay of radium in soil or rocks.
Record of Decision (ROD)	The document prepared under the federal government that documents the reasoning behind the decision.
Recycling	The process of minimizing the generation of waste by recovering usable products that might otherwise become waste.
Region of influence	For each resource, the region affected by the proposed action or alternatives and used for analysis in the affected environment and impact discussion.
Remedial action	During the remedial action (RA) phase, the selected cleanup technology is implemented. RA can be as simple as soil excavation or as complicated as a complete ground water treatment system that operates for many years. Remedial action work plans for long term remediations will include Operation and Maintenance (O&M) plans. O&M efforts continue until the cleanup is complete.
Remedial investigation (RI)	This investigation is performed to more fully define the nature and extent of the contamination at a site and evaluate possible methods of cleaning up the site. During the investigation, ground water, surface water, soil, sediment, and biological samples are collected and analyzed to determine the type and concentration of each contaminant. Samples are collected at different areas and depths to help determine the spread of contamination.

Removal actions	In the event of an immediate threat or potential threat to human health or the environment, a short term mitigating or cleanup action may be implemented. The goal of the removal action is to isolate the contamination hot spot and its source from all biological receptors. Usually, removal actions do not completely clean up a site, and additional remediation steps are required.
Resource Conservation and Recovery Act (RCRA)	RCRA was enacted in 1976 as the first step in regulating the potential health and environmental problems associated with hazardous waste disposal. RCRA and the regulations developed by EPA to implement its provisions provide the general framework of the national hazardous waste management system, including the determination of whether hazardous wastes are being generated, techniques for tracking wastes to eventual disposal, and the design and permitting of hazardous waste management facilities.
Restricted use airspace	Restricted use airspace is an area of limited dimensions wherein military activities must be confined because of their nature or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.
Runoff	The noninfiltrating water entering a stream or other conveyance channel shortly after a rainfall event.
Safe Drinking Water Act (SDWA)	The SDWA establishes the amount of concentrated contaminants allowable in public drinking water. The SDWA also reviews federal agencies which maintain public water supply or contribute to groundwater contamination following all applicable requirements issued by the state.
Seismicity	Relative frequency and distribution of earthquakes.
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.
Single-family housing	A conventionally built house consisting oaf a single dwelling unit occupied by one household.
Site discovery	A site is an area that has or has had the potential for a hazardous substance release. A single facility may contain several sites to be studied. Potential sites are occasionally discovered by searching through records or during construction projects.
Site inspection (SI)	An inspection conducted after a preliminary assessment when additional information is needed to evaluate the site. The collection and analysis of soil, sediment, and surface or ground water samples may help determine the need for further study. The site inspection collects any information needed for hazard ranking. The SI may recommend a site for no action, further study, or an immediate removal action.

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 types	A category or detailed mapping unit used for soil surveys based on phases or changes within a series (e.g. slope, salinity).
Solid waste management	Supervised handling of waste materials from their source through recovery processes to disposal.
State Historic Preservation Officer (SHPO)	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.
Stratigraphy	The study of cultural and natural strata or layers in archeological and geological deposits, particularly with the aim of determining the relative age of strata.
Superfund Amendments and Reauthorization Act (SARA)	SARA was enacted in 1986 to increase the Superfund to $8.5 billion, modify contaminated site cleanup criteria scheduling, and revise settlement procedures. It also provides a fund for leaking underground storage tank cleanups and a broad, new emergency planning and community right to know program.
Surface water	All water naturally open to the atmosphere and all wells, springs, or other collectors which are directly influenced by surface water.
Threatened species	Plant and wildlife species likely to become endangered in the foreseeable future.
Toxic	Harmful to living organisms.
Toxic Substances Control Act (TSCA)	TSCA provides authority to test and regulate chemicals to protect human health. Substances regulated under TSCA include asbestos and PCBs.
Traffic, peak hour	The highest number of vehicles observed to traverse a section of roadway during 60 consecutive minutes.
Tribelet	The basic autonomous, self-governing, and independent sociopolitical group in aboriginal California; an aggregation of several villages under the authority of a single chief.
US Environmental Protection Agency	The independent federal agency established in 1970 to regulate federal environmental matters and oversees the implementation of federal environmental laws.
Visual Resources	Natural and man-made features that constitute aesthetic qualities and values.
Waters of the United States	Waters that are subject to Section 404 of the Clean Water Act. These include both deep water aquatic habitats and special aquatic sites, including wetlands.

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. This classification includes swamps, marshes, bogs, and similar areas. Jurisdictional wetlands are those wetlands that meet the vegetation, soils, and hydrology criteria under normal circumstances (or meet the special circumstances as described in the US Army Corps of Engineers, 1987 wetland delineation manual where one or more of these criteria may be absent) and are a subset of Waters of the United States.

Zoning

The division of a municipality into districts for the purpose of regulating land use, types of buildings, 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 requirement for each zoning category.

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