Eglin BRAC Program 2005

PROPOSED IMPLEMENTATION OF THE BASE REALIGNMENT AND CLOSURE (BRAC) 2005 DECISIONS AND RELATED ACTIONS AT EGLIN AFB, FL

FINAL ENVIRONMENTAL IMPACT STATEMENT

October 2008

COVER SHEET
FINAL ENVIRONMENTAL IMPACT STATEMENT
PROPOSED IMPLEMENTATION OF THE BASE REALIGNMENT AND CLOSURE (BRAC) 2005 DECISIONS AND RELATED ACTIONS AT EGLIN AFB, FL

a. *Responsible Agency*: U.S. Air Force
b. *Cooperating Agencies*: U.S. Army, U.S. Navy, and U.S. Marines
c. *Proposals and Actions*: This Final Environmental Impact Statement (EIS) describes the potential consequences to the human and natural environment from the implementation of various Alternatives for implementing the BRAC decisions and related actions at Eglin Air Force Base (AFB), Florida. The locations of the proposed actions are in Okaloosa, Walton, and Santa Rosa Counties, Florida.
d. *Comments and Inquiries*: Written comments on this document should be directed to Mr. Mike Spaits, Eglin AFB Environmental Public Affairs, 96 CEG/CEVPA, Eglin AFB, FL 32542-5000. Mr. Spaits may be reached by telephone at (850) 882-2878 or email at spaitsm@eglin.af.mil.
e. *Designation*: Final Environmental Impact Statement
f. *Abstract*: This Final EIS has been prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of the Proposed Implementation of the Base Realignment and Closure (BRAC) 2005 Decisions and Related Actions at Eglin AFB, Florida, and the No Action Alternative. The Proposed Action is to implement the 2005 BRAC Report decisions by relocating the 7th Special Forces Group (Airborne), or 7SFG(A), to Eglin AFB, Florida, and conducting joint initial graduate-level pilot training in the Joint Strike Fighter (JSF) for the Navy, Marines, and Air Force at Eglin AFB. The Proposed Action would result in a group of new missions at Eglin AFB, mandated by implementation of the BRAC Commission decisions, which would create significant growth in Eglin's personnel and military activities over the next several years. The 7SFG(A) would require a cantonment area for billeting and operational activities. Cantonment requirements for the 7SFG(A) realignment would include establishing a Special Operations Forces (SOF) Compound, facilities necessary to support the 7SFG(A) including barracks and living facilities, operations facilities, ranges, and storage, and munitions storage and supply. The 7SFG(A) requires utilization of the Eglin Range in three areas: Firing Ranges, Aircraft Operations, and Water Operations and Ground Maneuvers. Specific ranges and operational areas would need to be constructed to accommodate various training activities. Establishing the JSF Initial Joint Training Site (IJTS) would require construction of a cantonment area that would accommodate personnel associated with the JSF IJTS component of the Proposed Action. The Air Force would accommodate this need through the military construction (MILCON) process by renovating existing facilities and/or constructing new facilities, depending on the alternative selected. Flight Training activities associated with the JSF are also included in the EIS. These activities include flying operations and ordnance use. This EIS analyzes potential impacts associated with airspace, noise, land use, socioeconomics and environmental justice, transportation, utilities, air quality, safety, solid waste, hazardous materials and hazardous waste, physical resources, biological resources, and cultural resources. This EIS also identifies mitigations and best management practices that the proponent could implement to minimize or offset potential adverse impacts. After considering the potential environmental consequences analyzed for the Alternatives, the U.S. Air Force will decide whether to implement the Air Force Preferred Alternative or another of the Alternatives. The No Action Alternative cannot occur because the BRAC Commission decisions are legally mandated.

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Appendix I CZMA Determination
Appendix J Land Use
Appendix K Noise Evaluation

ACRONYMS

%HA	Percent Highly Annoyed
%N2	Percent RPM at Engine Location #2
%NC	Percent Core RPM
16 SOW	16th Special Operations Wing
33 FW	33rd Fighter Wing
46 RANS	46th Range Management Squadron
46 TW	46th Test Wing
53 EWG	53rd Electronic Warfare Group
53 WG	53rd Wing
6 RTB	6th Ranger Training Battalion
728 ACS	728th Air Control Squadron
7SFG(A)	7th Special Forces Group (Airborne)
919 SOW	919th Special Operations Wing
96 ABW/XPS	Eglin's Air Base Wing Plans and Programs Office
96 CEG	96th Civil Engineer Group
96 CEG/CEV	96th Civil Engineer Group/Environmental Management Division
96 CEG/CEVC	96th Civil Engineering Group/Environmental Compliance Branch
96 CEG/CEVCE	96th Civil Engineering Group/Environmental Engineering Section
96 CEG/CEVH	96th Civil Engineering Group/Cultural Resources Branch
96 CEG/CEVSN	96th Civil Engineer Group/Natural Resources Section
96 LG	96th Logistics Group (Supply)
A/C	Aircraft
AAC	Air Armament Center
AAC/EN	Air Armament Center/Directorate of Engineering
AAC/PA	Eglin Public Affairs Office
AAC/PK	Air Armament Center/Contracting
AAC/SEOG	Air Armament Center/Safety
AAC/SEU	AAC Range Safety Office
AADT	Annual Average Daily Traffic
AAFES	Army Air Force Exchange Service
AAS	Aquifer Air Sparge
AASHTO	American Association of State Highway and Transportation Officials
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACC TRSS Det 9	Air Combat Command Training Support Squadron Det 9
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos-Containing Materials
ACMI	Air Combat Maneuvering Instrumentation
ACP	Architectural Compatibility Plan
ADNL	A-weighted Decibel Day-Night Level
AETC	Air Education and Training Command
AF	Air Force
AF/DoN	Air Force/Department of the Navy
AFB	Air Force Base
AFCAA	Air Force Cost Analysis Agency
AFI	Air Force Instruction
AFIERA	Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFPD	Air Force Policy Directive
AFRL/MN	Air Force Research Laboratory for Munitions
AFSOC	Air Force Special Operations Command
AGE	Aerospace Ground Equipment
AGL	Above Ground Level

ACRONYMS, Cont'd

AICUZ	Air Installation Compatible Use Zone
ALARNG	Alabama Army National Guard
AME	Alternate Mission Equipment
AMU	Aircraft Maintenance Unit
AOCs	Areas of Concern
AP	Armor Piercing
APE	Area of Potential Effect
APZ	Accident Potential Zone
ARG/MEU	Amphibious Readiness Group/ Marine Expeditionary Unit
ASCC	Army Service Component Command
ATC	Air Traffic Control
ATV	All-Terrain Vehicle
Aux	Auxiliary
AWWA	American Water Works Association
BAG	Basic Air-to-Ground
BASH	Bird/Wildlife Aircraft Strike Hazard
BEE	Bio-environmental Engineering
BMP	Best Management Practice
BO	Biological Opinion
BRAC	Base Realignment and Closure
BX	Base Exchange
Bxxxx	Building #
C&D	Construction and Demolition
C2	Command and Control
CAL	Caliber
CAS	Close Air Support
CBOC	Community-Based Outpatient Clinic
CC	Commander
CCF	Central Control Facility
CDNL	C-weighted Decibel Day-Night Average Sound Level
CE	Civil Engineering
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHABA	National Academy of Sciences Committee on Hearing, Bioacoustics, and Biomechanics
CHELCO	Choctawhatchee Electric Cooperative
CHG	Charge
CMS	Congestion Management System
CO	Carbon Monoxide
COB	Cost of Business
COC	Community of Comparison
COPC	Contaminants of Potential Concern
CT	Continuation Training
CTG	Cartridge
CTIT	Centigrade Turbine Inlet Temperature
CTOL	Conventional Take-Off and Landing
CUP	Consumptive Use Permit
CV	Carrier Variant
CVF	Carrier Vehicle Future
CVN	Navy Aircraft Carrier Nuclear
CWA	Clean Water Act
CY	Calendar Year
CZ	Clear Zone
CZMA	Coastal Zone Management Act

ACRONYMS, Cont'd

DAR	Defense Access Road
dB	Decibels
dBA	A-Weighted Decibels
dBC	C-Weighted Decibels
DBCRC	Defense Base Closure and Realignment Commission
DCA	Department of Community Affairs
Demo	Demolish
Det	Detachment
DNL	Day-Night Average Sound Level
DNL_{mr}	Onset-Rate Adjusted Monthly Day-Night Average Sound Level
DoD	Department of Defense
DODIC	DoD Identification Code
DRI	Development of Regional Impact
DRMO	Defense Reutilization and Marketing Office
DTRA	Defense Threat Reduction Agency
DZ	Drop Zone
E&T JCSG	Education and Training Joint Cross-Service Group
EA	Environmental Assessment
EBD	Environmental Baseline Document
EDC	Economic Development Council
EFH	Essential Fish Habitat
EGTTR	Eglin Gulf Test and Training Range
EIS	Environmental Impact Statement
EMR	Environmental Management Restoration
EMS	Environmental Management Systems
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESP	Explosive Site Plan
ESQD	Explosive Safety Quantity Distance
ETR	Engine Thrust Request
EWC	East-West Corridor
FAA	Federal Aviation Administration
FAC	Florida Administrative Code
FCLP	Fleet Carrier Landing Practice
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FE	Federally Endangered
FICAN	Federal Interagency for Aviation Noise
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FL	Flight Level
FLARNG	Florida Army National Guard
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FRIES	Fast Rope Insertion/Extraction System
FSUTMS	Florida Standard Urban Transportation Model Structure
ft	Feet
FT	Federally Threatened
ft^2	Square Feet
FTD	Field Training Detachment
FWC	Florida Fish and Wildlife Conservation Commission
FY	Fiscal Year

ACRONYMS, Cont'd

gal	Gallons
GBU	Guided Bomb Units
GIS	Geographic Information System
GMV	Ground Mobility Vehicle
GPS	Global Positioning System
HAP	Hazardous Air Pollutants
HCP	Hot Cargo Pad
HE	High Explosive
HEDP	High Explosive Dual Purpose
HLZ	Helicopter Landing Zone
HMC	Hazardous Material Cell
HMMS	Hazardous Materials Management System
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HQ	Headquarters
HRMA	Housing Requirements and Market Analysis
Hwy	Florida Highway
Hz	Hertz
I-10	Interstate 10
IAP	Initial Accumulation Point
IFE	In-Flight Emergency
IFR	Instrument Flight Rules
IJTS	Initial Joint Training Site
ILLUM	Illuminating
ILS	Instrument Landing System
IMPLAN	Impact Analysis for Planning
in	Inches
INRMP	Integrated Natural Resources Management Plan
IP	Issue Point
IPT	Integrated Product Team
IR CM	Infrared Countermeasure
IRP	Installation Restoration Program
ITAM	Integrated Training Area Management
ITC	Integrated Training Center
JCA	Joint Combat Aircraft
JCSG	Joint Cross-Service Group
JDAM	Joint Direct Attack Munition
JRF	Joint Reprogramming Facility
JSF	Joint Strike Fighter
KIAS	Knots Indicated Airspeed
km^2	Square Kilometers
kV	Kilovolt
kWh	Kilowatt Hours
LBP	Lead-Based Paint
lbs	Pounds
lbs/ft^2	Pounds per Square Foot (a measurement of construction and demolition debris)
LFO	Lift-off
LHA	Landing Helicopter Amphibious
LHD	Landing Helicopter Dock
L_{max}	Maximum Sound Level
LMTV	Light Medium Tactical Vehicle
LOLA	Live Ordnance Load Area
LOS	Level of Service
LOX	Liquid Oxygen
Lpk	Maximum Peak Noise Level
LQG	Large Quantity Generator

ACRONYMS, Cont'd

LUC	Land Use Controls
LZ	Landing Zone
$\mu g/m^3$	Micrograms per Cubic Meter
MCF	Million Cubic Feet
MFH	Military Family Housing
mgd	Million Gallons per Day
MGTA	Military Ground Training Area
mi^2	Square Miles
MILCON	Military Construction
MJU	Munitions Countermeasures Unit
MK	Mark
mm	Millimeter
MMPA	Marine Mammal Protection Act of 1972
MOA	Military Operating Area
MOU	Memorandum of Understanding
MREs	Meals-Ready-to-Eat
MSA	Munitions Storage Area
MSL	Mean Sea Level
MTR	Military Training Route
Mx Fac	Maintenance Facility
MXS	Maintenance Squadron
MXS/TMDE	Maintenance Squadron Test, Measurement, and Diagnostic Equipment Flight
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NASMOD	Naval Aviation Simulation Model
NATO	North Atlantic Treaty Organization
NCOs	Non-Commissioned Officers
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NEW	Net Explosive Weight
NFA	No Further Action
NHPA	National Historic Preservation Act of 1966
NIOSH	National Institute of Occupational Safety and Health
NLR	Noise Level Reduction (as a unit of measurement)
NM	Nautical Miles
NMFS	National Marine Fisheries Service
NOLF	Navy Outlying Field
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Natural Resources Section
N-S	North-South
NSC	North-South Corridor
NSN	National Stock Number
NSR	New Source Review
NWFWMD	Northwest Florida Water Management District
NW-SE	Northwest-Southeast
O&M	Operation and Maintenance
OB/OD	Open Burn/Open Detonation
O-D	Origin-Destination
ODA	Operational Detachment Alpha
OFW	Outstanding Florida Water

ACRONYMS, Cont'd

Ops	Operations
ORA	Okaloosa Regional Airport
OSHA	Occupational Safety and Health Administration
OSS	Operational Support Squadron
OVA	Organic Vapor Analyzer
OWSs	Oil-Water Separators
PA	Programmatic Agreement
PAA	Primary Assigned Aircraft
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
PBT	Persistent Bioaccumulative Toxic
PK_{15}(met)	Peak Noise Exceeded by 15 Percent of Firing Events
Pk Dir	Peak-Direction
Pk Hr	Peak-Hour
PL	Public Law
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter With a Diameter of Less Than or Equal to 2.5 Microns
PM_{10}	Particulate Matter With a Diameter of Less Than or Equal to 10 Microns
POI	Point of Interest
POL	Petroleum, Oil, or Lubricant
POV	Privately Owned Vehicle
PPE	Personal Protection Equipment
ppm	Parts per Million
PRAC	Practice
PSD	Prevention of Significant Deterioration
psf	Pounds per Square Foot (overpressure of noise)
PT	Physical Training
Pvmt RPR	Pavement Repair
PWS	Potable Water System
Q/LOS	Quality/Level of Service
Q-D	Quantity-Distance
QTR	Qualification Training Range
RAP	Remedial Action Plan
RAPIDS	Rapid Infiltration/Exfiltration
RCNM	Roadway Construction Noise Model
RCO	Range Control Officer
RCRA	Resource Conservation and Recovery Act
RCS	Report Control Symbol
RCW	Red-cockaded Woodpecker
RDAT&E	Research, Development and Acquisition, and Test and Evaluation
RDT&E	Research, Development, Test, and Evaluation
REEF	Research and Engineering Education Facility
Ren	Renovate
RMB	Risk Management Board
ROCA	Range Operations Control Area
ROCC	Range Operations Command and Control
ROD	Record of Decision
ROI	Region of Influence
RPM	Revolutions per Minute
RR	Range Road
R-X	Restricted Areas
S&G	Sand and Gravel
SAC	Strategic Air Command
SAPF	Special Access Program Facility
SARC	Small Arms Range Complex

ACRONYMS, Cont'd

SCIF	Sensitive Compartmented Information Facility
SDD	System Development and Demonstration
SDZ	Surface Danger Zone
SE	State Endangered
SEL	Sound Exposure Level
SESOIL	Seasonal Soil Compartment
SFO	Simulated Flame Out
SHPO	State Historic Preservation Officer
SHPO/THPO	State Historic Preservation Office/Tribal Historic Preservation Office
SIS	Strategic Intermodal System
SO_2	Sulfur Dioxide
SOF	Special Operations Forces
SOW	Special Operations Wing
SO_x	Sulfur Oxides
SPCC	Spill Prevention, Control, and Countermeasures
SPT	Support
sq	Square
sq ft	Square Feet
Sqd	Squadron
SR	State Road or State Route
SRI	Santa Rosa Island
SSC	State Species of Special Concern
ST	State Threatened
STC	Sound Transmission Class
STOVL	Short Take-Off Vertical Landing
SUA	Special Use Airspace
SVE	Soil Vapor Extraction
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered
TA	Test Area
TCPs	Traditional Cultural Properties
TIP	Transportation Improvement Program
TNT	2, 4, 6-trinitrotoluene
TO	Technical Order
TP	Target Practice – or – Training Projectile
tpy	Tons per Year
TPO	Transportation Planning Organization
TRI	Toxic Release Inventory
TRI-DDS	Toxic Release Inventory-Data Delivery System
TSCA	Toxic Substances Control Act
TSM	Transportation System Management
TTPs	Techniques, Tactics, and Procedures
TW	Taxiway
U.S.	United States
UAC	Urban Assault Course
UAV	Unmanned Aerial Vehicle
UK	United Kingdom
US 90	U.S. Highway 90
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USASOC	U.S. Army Special Operations Command
USC	United States Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency

ACRONYMS, Cont'd

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
UWO	Underwater Ordnance
UXO	Unexploded Ordnance
v/c	Volume to Capacity
VA	Veterans Administration
VA CBOC	Veterans Administration Community-Based Outpatient Clinic
VFR	Visual Flight Rules
VOC	Volatile Organic Compound
W&A	Weapons and Armaments
W/	With
W/WHD	With Warhead
WFRPC	West Florida Regional Planning Council
WLT	Weapons Load Trainer
WMA	Wildlife Management Area
WP	White Phosphorous
WWTP	Wastewater Treatment Plant
W-X	Warning Areas

1. PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

On 8 September 2005, the 2005 Defense Base Closure and Realignment Commission (DBCRC) completed its review of initial base realignment and closure (BRAC) recommendations made by the Secretary of Defense and forwarded a Final Report with a list of recommended base closures and realignments to the President (DBCRC, 2005). The President approved the Commission's recommendations and forwarded them to Congress. Since Congress did not disapprove the recommendations within the time period provided under law, the recommendations are required by law to be implemented. Therefore, those 2005 BRAC recommendations associated with Eglin Air Force Base (AFB) must be implemented as stated in the Final Report without any deviation or consideration of alternate locations. As such, Eglin AFB is the only installation under consideration for the Proposed Action and alternatives described in this Environmental Impact Statement (EIS).

Now the Air Force, along with the other military Services, is required to execute the 2005 BRAC decisions and conduct the environmental analysis of the Proposed Action. While three recommendations identified in the 2005 Final Report will result in realignment of military organizations to Eglin AFB, only two are being evaluated in this EIS. This EIS identifies and evaluates those two (items 1 and 2 on the list below) along with the associated activities that are inherent to implementing the recommendations. All activities being evaluated are proposed to occur within the jurisdiction of Eglin AFB on the Eglin Reservation or within airspace associated with Eglin AFB.

The recommendations that the Commission identified for Eglin AFB are:

1. **Army 7th Special Forces Group (7SFG) Airborne (A) (DBCRC, 2005, p. 9):** Relocate the Army 7SFG(A) to Eglin AFB from Fort Bragg, North Carolina.
2. **Joint Strike Fighter (JSF) Initial Joint Training Site (IJTS) (DBCRC, 2005, p. 184):**
    a. Realign Luke AFB, Arizona, by relocating to Eglin AFB, Florida, a sufficient number of instructor pilots and operations support personnel to stand up the Air Force's portion of the JSF IJTS, to be established at Eglin AFB.
    b. Realign Marine Corps Air Station Miramar, California, by relocating to Eglin AFB, Florida, a sufficient number of instructor pilots and operations support personnel to stand up the Marine Corps' portion of the JSF IJTS, to be established at Eglin AFB.
    c. Realign Naval Air Station Oceana, Virginia, by relocating to Eglin AFB, Florida, a sufficient number of instructor pilots, operations, and maintenance

support personnel to stand up the Navy's portion of the JSF IJTS, to be established at Eglin AFB.

d. Realign Sheppard AFB, Texas, by relocating to Eglin AFB, Florida, a sufficient number of frontline and instructor-qualified maintenance technicians and logistics support personnel to stand up the Air Force's portion of the JSF IJTS, to be established at Eglin AFB.

e. Realign Naval Air Station Pensacola, Florida, by relocating to Eglin AFB, Florida, a sufficient number of frontline and instructor-qualified maintenance technicians and logistics support personnel to stand up the Department of the Navy's portion of the JSF IJTS, to be established at Eglin AFB.

3. Create an Air Integrated Weapons and Armaments Research, Development and Acquisition, Test and Evaluation Center (DBCRC, 2005, p. 293):

a. Relocate Weapons and Armaments In-Service Engineering Research, Development and Acquisition, and Test and Evaluation to Eglin AFB from Hill AFB, Utah.

b. Relocate Defense Threat Reduction Agency (DTRA) National Command Region Conventional Armament Research to Eglin AFB from Fort Belvoir, Virginia.

Items number 1 and 2 are described in greater detail in Chapter 2 and are the principal subjects of this EIS. Item 3a is not included in the EIS because the project was completed in 2005 and the workload realigned to Eglin AFB prior to the 2005 BRAC commission report became law.

The relocation of DTRA (item 3b) was addressed in an Environmental Assessment (EA) (U.S. Air Force, 2006a) and a Finding of No Significant Impact (FONSI) was signed by the Air Force on 12 December 2006 (U.S. Air Force, 2006b). "Eglin is one of three core integrated weapons and armaments (W&A) RDAT&E (Research, Development and Acquisition, and Test and Evaluation) centers. Relocation of DTRA capabilities will further strengthen Eglin as a full spectrum W&A RDAT&E Center" (DBCRC, 2005, p. 293).

The proposed action evaluated in the EA was to renovate existing office space in building 13(A) on Eglin Main Base to house 36 DTRA employees and their contractors who would be relocating from Fort Belvoir, Virginia. Building 13 was chosen because it met DTRA's direct day-to-day need to work closely with the Air Force Research Laboratory for Munitions (AFRL/MN) and Air Armament Center/Directorate of Engineering (AAC/EN), which are located in building 13(A). The proposed renovation would be a maximum of 5,590 square feet (ft^2) and would occur sometime in 2008. An alternative to the proposed action was to renovate the south end of building 1363 in the 33rd Fighter Wing (33 FW) area.

Issues addressed in the EA included socioeconomic factors, hazardous materials/waste, and air quality. Based on the small numbers of people that would be added to the area (45 total, including families), there were no significant socioeconomic impacts. Air quality impacts would be short-term and insignificant, lasting only during the renovation of the building. There would be insignificant quantities of waste generated during the construction, and these quantities would not impact the existing landfills. The cumulative effects of the DTRA relocation on the proposed BRAC actions are addressed in Chapter 9 of this EIS.

All other resource areas were eliminated from further detailed analysis (U.S. Air Force, 2006a). Building renovations would be performed entirely inside an existing building, and no ground disturbance would occur; therefore, geologic formations, soils, critical habitat or threatened and endangered species would not be disturbed. Because this work would be localized to the interior of a building, cultural resources would not be encountered, especially since there are no known cultural resources located in the vicinity of building 13. In addition, building 13, which was constructed in 1979, and the addition 13(A), are not considered historically significant or eligible for listing in the National Register of Historic Places (NRHP) (U.S. Air Force, 2006a).

7SFG(A) realignment. The 7SFG(A)'s principal mission includes planning and executing unconventional warfare, combating terrorism operations, direct action, special reconnaissance, and foreign internal defense in support of the Global War on Terrorism. The Area of Operations for the 7SFG(A) includes the landmass of Latin America south of Mexico; the waters adjacent to Central America and South America; the Caribbean Sea, its 13 island nations, plus European and U.S. territories; the Gulf of Mexico; and a portion of the Atlantic Ocean. The 7SFG(A) realignment to Eglin AFB provides multi-Service co-location, joint training synergy with Air Force Special Operations Command (AFSOC) as recommended by the BRAC Commission (DBCRC, 2005, p. 9) and places 7SFG(A) on training lands that match their wartime area of responsibility in Central and South America. The Army and Air Force Special Operations Forces joint training at Eglin AFB would be similar to the training they are performing now at other locations.

JSF IJTS. Establishing the JSF IJTS at Eglin AFB would consolidate the initial instruction of entry level pilots and maintenance technicians for the U.S. Air Force, Navy, and Marine Corps. The purpose of the JSF IJTS is to train personnel on safely operating and maintaining the new JSF (F-35) aircraft (DBCRC, 2005, p. 184). Initially, pilots being trained on the F-35 aircraft will transition from other high-performance fighters. As the program matures, the IJTS will train pilots that have recently graduated from high-performance aircraft in undergraduate pilot training. The JSF is a multi-role fighter optimized for the air-to-ground role, designed to meet the needs of the Air Force, Navy, and Marine Corps with improved survivability, precision engagement capability, and the mobility necessary for future joint operations. Establishing the JSF IJTS would include relocating approximately 200 instructors to Eglin AFB from throughout the

country. The F-35 basing, facility construction and renovation, on-site maintenance, and actual training are part of establishing the JSF IJTS and are included in this EIS.

The BRAC decision highlighted Eglin's training environment as one of the primary reasons for choosing Eglin AFB as the location for the JSF IJTS and the realignment of the 7SFG(A). Chapter 2 of this EIS describes where and how the JSF Program and 7SFG(A) would train at Eglin AFB.

Throughout the planning process to execute the requisite JSF activities at Eglin AFB, it has become apparent that there may be various uncertainties until the operations can be learned and tested over time. Also, the area around Eglin AFB is a dynamic system that is continually evolving: it is likely that there will be unanticipated changes in baseline conditions, that new information may become available, or that the effectiveness of mitigation measures may be different than expected. Consequently, the Air Force will accommodate growth in understanding JSF activities at Eglin by incorporating an adaptive management approach to the on-going basing of the F-35 aircraft and the training of people to fly and maintain it.

This EIS describes the potential environmental impacts that would result from the implementation of the BRAC decisions related to the JSF IJTS and the 7SFG(A) at Eglin AFB. The Air Force is the lead agency preparing this EIS, and the Army, Navy, and Marine Corps are cooperating agencies.

1.2 BACKGROUND

1.2.1 Eglin AFB

Eglin AFB, located in the northwest Florida panhandle (Figure 1-1), is one of 19 component installations that make up the Department of Defense (DoD) Major Range Test Facility Base. Eglin AFB is situated among three counties: Santa Rosa, Okaloosa, and Walton. Eglin's primary function is to support research, development, test, and evaluation (RDT&E) of conventional weapons and electronic systems. It also provides support for individual and joint training of operational units.

The Eglin Military Complex occupies much of northwestern Florida, east of Pensacola. It comprises 724 square miles (mi^2) of land area, often referred to as the Eglin Reservation (Figure 1-2), and nearly 130,000 mi^2 of airspace overlying the land and water ranges (U.S. Air Force, 1996a). Approximately 2.5 percent of the airspace is over land and the remaining 97.5 percent is over water (Figure 1-3). Eglin's charted airspace is above the land that is Eglin AFB and extends to the east, south, and to the north into Alabama (Figure 1-4). Contained within the 724 mi^2 of the Eglin Reservation are 17 miles of barrier island coastline on Santa Rosa Island (Okaloosa and Santa Rosa Counties), of which 13 miles are closed to the public.

Figure 1-1. Location of Eglin AFB

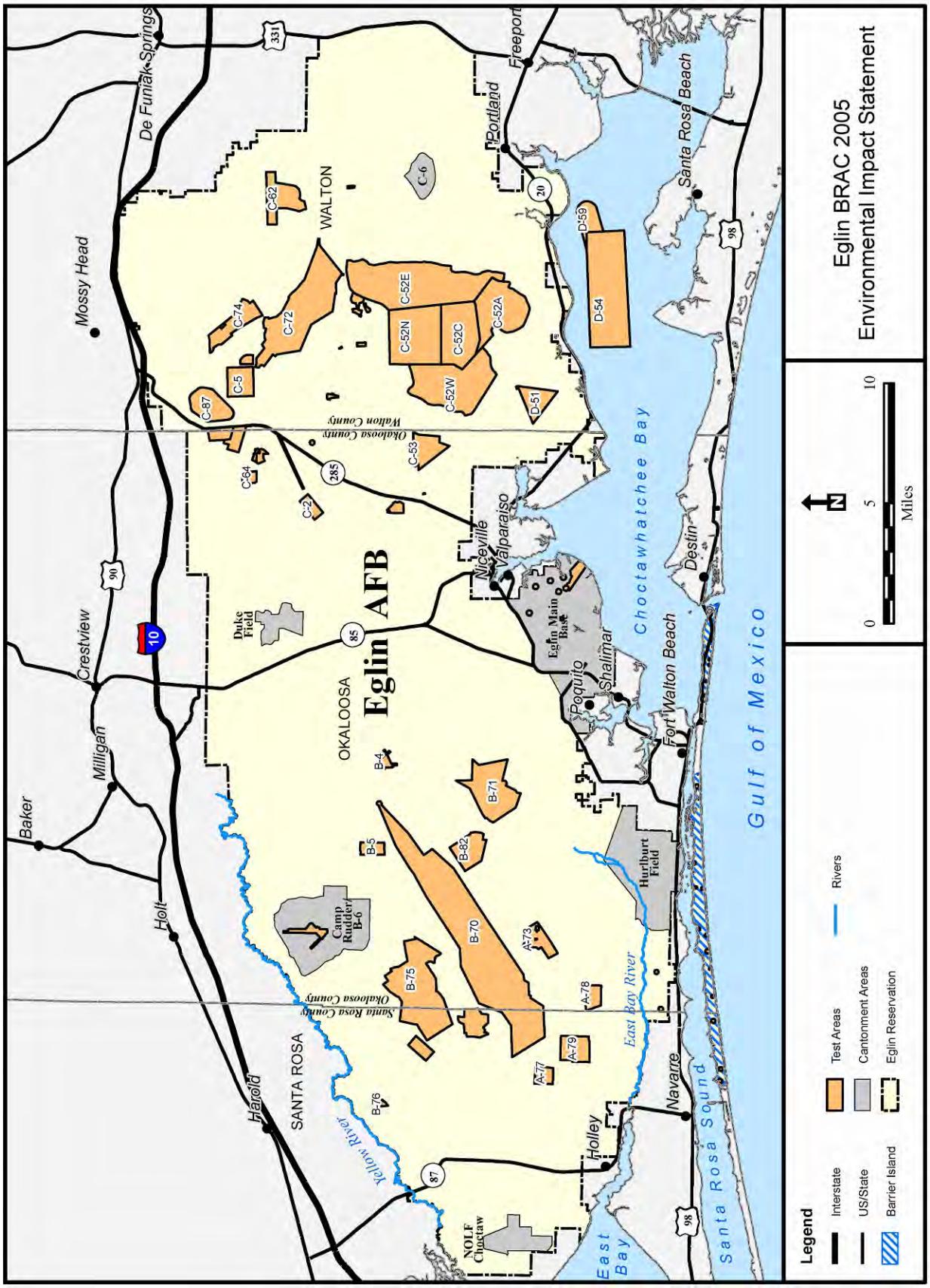

Figure 1-2. Location of the Eglin Reservation and Land Portion of the Eglin Range

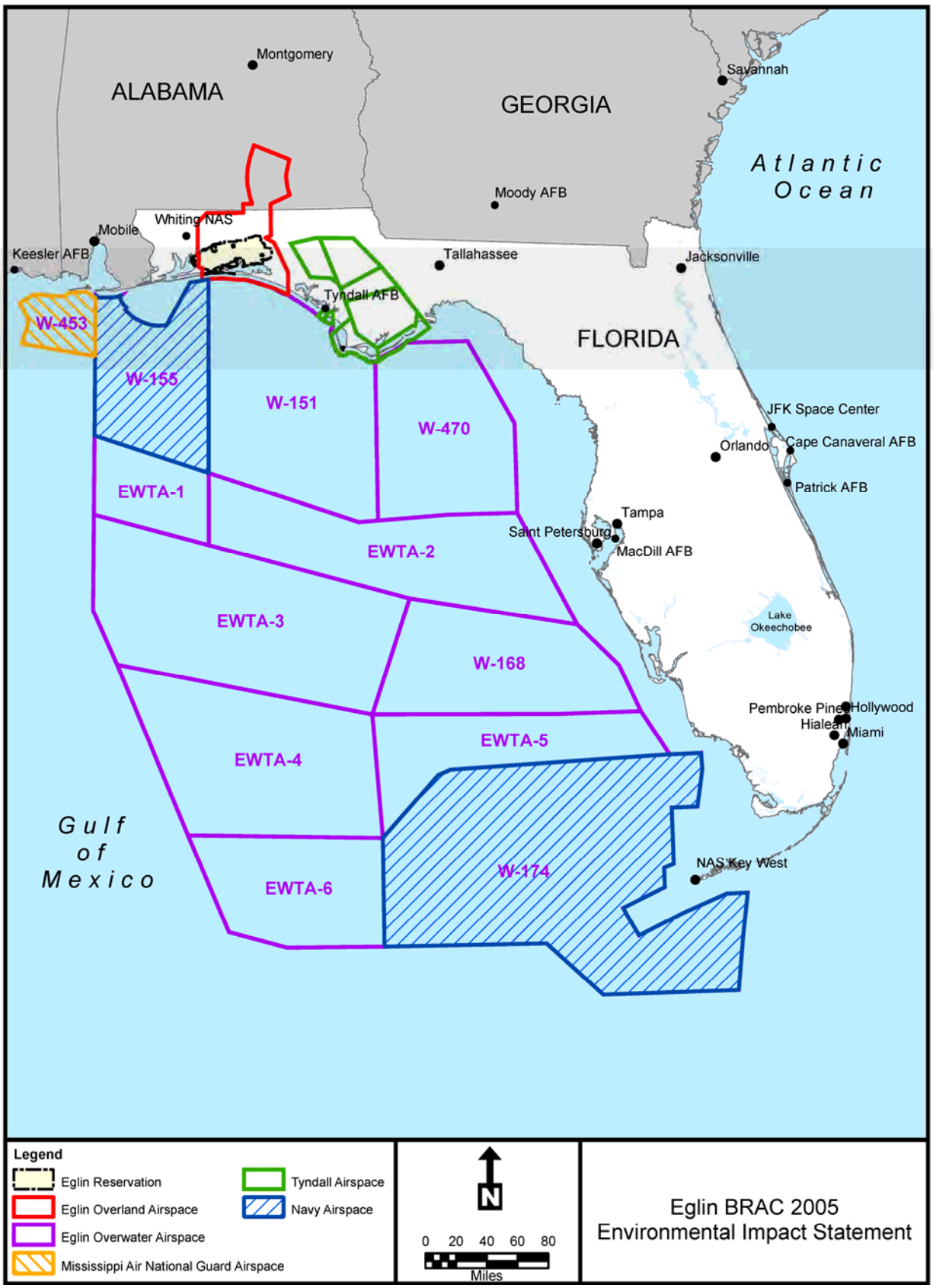

Figure 1-3. Department of Defense Airspace

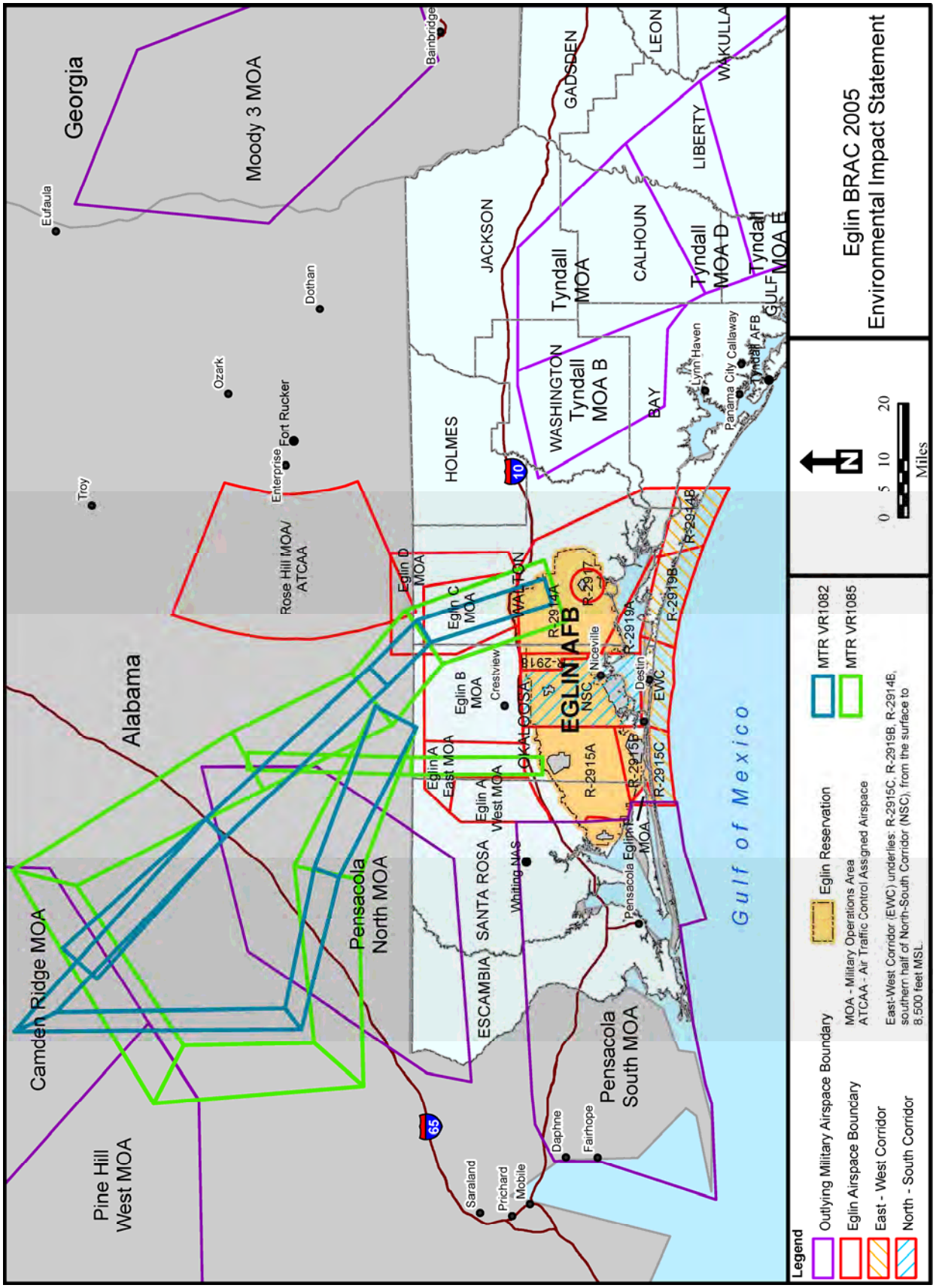

Figure 1-4. Location of Eglin AFB Over-Land Airspace

Also, 3 miles of coastline are located at Cape San Blas in Gulf County. The Eglin Military Complex includes a number of cantonment areas and test areas as shown in Figure 1-1.

As part of the Eglin Military Complex, the Eglin Range exists to support the efforts of the warfighter with testing and training. The Range is currently composed of four components (U.S. Air Force, 1996a) and does not refer to the cantonment or main base areas:

- Test areas/sites (Figure 1-2)
- Interstitial areas (areas beyond test areas) (Figure 1-2)
- Parts of the Gulf of Mexico (Figure 1-2)
- Airspace (over land and water) (Figure 1-3 and Figure 1-4)

Eglin airspace is composed of both restricted and warning airspace in addition to military operating area (MOA) airspace, and military training routes (MTRs). The airspace of the Eglin Gulf Test and Training Range (EGTTR) is under the authority of the Federal Aviation Administration (FAA) but is scheduled and managed by Eglin AFB. The EGTTR is composed of both DoD-controlled airspace and FAA-controlled airspace available on request with an established Letter of Agreement. It extends from Eglin AFB almost to Key West and includes 20 miles of shoreline for littoral (coastal) missions (Figure 1-3). The EGTTR is the DoD's largest water test range in the continental United States.

Eglin AFB is home to the Air Armament Center (AAC), a unit of the Air Force Materiel Command, and supports approximately 25 tenants, including:

- 33rd Fighter Wing, Air Combat Command (ACC).
- 53rd Wing, ACC.
- AFSOC (Hurlburt Field) and 16th Special Operations Wing (SOW).
- 919 SOW, U.S. Air Force Reserve (at Duke Field).
- 20th Space Control Squadron, U.S. Air Force Space Command.
- 6th Ranger Training Battalion (6 RTB), U.S. Army Infantry Center.
- Naval School Explosive Ordnance Disposal (Commander, Naval Education Training Center).
- Alabama Army National Guard, Alabama National Guard.

The AAC, headquartered at Eglin AFB, is one of four product centers in the Air Force Materiel Command. Serving as the focal point for all Air Force armaments, the Center

is responsible for the development, acquisition, testing, deployment, and sustainment of all air-delivered weapons. The AAC applies advanced technology, engineering, and programming efficiencies across the entire product life cycle to provide superior weapons and combat capability to the warfighter. It also plans, directs, and conducts RDT&E of U.S. and allied air armament, navigation/guidance systems, and Command and Control systems. In addition, the AAC manages an extensive training program that includes unconventional warfare and explosive ordnance disposal. The combined RDT&E and training activities heavily utilize the physical resources located on the Eglin Military Complex.

Eglin AFB is a national DoD asset because it provides a unique environment for RDT&E of conventional munitions and electronic systems. The Secretary of Defense's BRAC Education and Training Joint Cross-Service Group (E&T JCSG) scored the Eglin Military Complex highest in military value for both the testing and training categories. In addition to providing training opportunities for the DoD, Eglin Reservation has over 36 specific test areas embedded in a single contiguous land area adjacent to the eastern Gulf of Mexico with numerous water-to-land transitions. These test areas are located beneath Special Use airspace (SUA) that permits relatively unconstrained operations.

Eglin Main Base is located along the south central edge of the Eglin Reservation and occupies 10,500 acres, or 16.5 mi^2 (Figure 1-4). This urban-like setting includes all Command and Control elements, base operating support activities, and the installation housing area. There are currently about 2,000 individual housing units located on Eglin Main Base. Most of the existing homes are eligible for demolition. The existing munitions storage area (also referred to as an ammunition supply point) is also located on Eglin Main Base.

The major land uses on Eglin Main Base include airfield and aircraft operations and maintenance (approximately 2,362 acres), industrial land use in nine separate areas (2,057 acres), open space (4,141 acres), and residential areas (over 1,000 acres). The following is a summary of base facilities, features, and base operating support:

- 2 major runways
  - Northwest-Southeast (NW-SE) Runway 12/30 (12,000 feet by 300 feet)
  - North-South (N-S) Runway 01/19 (10,000 feet by 300 feet)
- Over 100 designated military aircraft parking spaces
- Approximately 134 miles of paved and unpaved roads
- 3 fire stations
- A hospital
- 140,000-ft^2 commissary

- 150,000-ft^2 Base Exchange
- 2 base chapels
- Approximately 2,400 buildings
- 1 school (Eglin School) with 2 campuses: (1) Cherokee Campus (first through fourth grade) and (2) Oak Hill Campus (PreK–Kindergarten)
- A large Child Development Center for preschool needs
- 46,000-ft^2 Youth Development and Recreation Center
- 21 playgrounds
- More than 30 athletic fields and courts
- 3 small-craft marinas
- 2 sewage treatment plants

1.2.2 7th Special Forces Group (Airborne)

The 7SFG(A) operates under the U.S. Army Special Forces Command. The U.S. Army Special Forces Command is a Major Subordinate Command of the U.S. Army Special Operations Command (USASOC), which is the Army Service Component Command (ASCC) of the United States Special Operations Command. The 7SFG(A) performs seven doctrinal missions: Unconventional Warfare, Direct Action, Special Reconnaissance, Foreign Internal Defense, Combating Terrorism, Counter-proliferation, and Information Operations. These missions make Special Forces unique in the U.S. military because they are employed throughout the three stages of the operational continuum: peacetime, conflict, and war. The Area of Operations for the 7SFG(A) encompasses 32 countries (19 in Central and South America and 13 in the Caribbean) and covers about 15.6 million mi^2. The region represents about one-sixth of the landmass of the world assigned to regional unified commands. As part of the BRAC process, the 7SFG(A) would be moved to Eglin AFB, which provides multi-Service co-location, joint training synergy with AFSOC and places the 7SFG(A) on training lands that match their wartime area of responsibility in Central and South America.

The 7SFG(A) would construct a Special Operations Forces (SOF) Compound, which would contain the cantonment area or main base for the 7SFG(A).

The Eglin Military Complex provides a unique opportunity for both water- and land-based training. Most weapons systems training for the 7SFG(A) would require the use of 13 ranges specifically designed for certain weapons training certifications. Either these ranges would need to be constructed or existing test areas would need to be reconfigured to provide the necessary facilities/assets. The training ranges are mandated by Army authorization, training, and doctrinal documents for Conventional

Army and SOF. The majority of the land required for training would be utilized for mounted (in vehicles) and dismounted (on foot) maneuvers.

1.2.3 Joint Strike Fighter

The 2005 BRAC decision to establish the JSF IJTS at Eglin AFB would relocate instructors and maintenance personnel from five locations to Eglin AFB. The JSF Program (F-35 Lightning II) is a Joint Major Defense Acquisition Program with no lead Service, staffed by Air Force, Navy, and Marine Corps personnel. The Program Executive Officer position alternates between the Departments of Navy and Air Force and reports to the Service Acquisition Executive of the other Service. It serves as a focal point for a cost-effective, next-generation aircraft strike weapons system capable of meeting an advanced threat while improving lethality, survivability, and supportability.

The F-35 would fulfill stated Service needs as follows:

- Air Force – Multi-role (primary air-to-ground) fighter to replace the F-16 and A-10 and to complement the F-22A.
- Navy – Multi-role strike fighter to complement the F/A-18E/F.
- Marine Corps – Multi-role, short take-off vertical landing (STOVL) strike fighter to replace the AV-8B and the F/A-18C/D.
- United Kingdom (UK) – Future Joint Combat Aircraft (JCA) that would be a stealthy, multi-role replacement for the Sea Harrier FA2 and the Harrier GR 7/9.

The JSF training program would be implemented at Eglin AFB by establishing all of the facilities associated with the JSF IJTS and providing opportunities for flight training. The JSF IJTS would provide the facilities to house academic classrooms, virtual trainers, flying training squadrons, and hardware trainers. Initial and replenishment training of pilot and maintenance personnel (maintainers) would be conducted at the JSF IJTS. In addition, the JSF IJTS would contain all of the administrative, operational, and instructor personnel necessary to implement the JSF training program. The JSF Program anticipates that the IJTS would require approximately 200 acres and approximately 23 buildings that would require either renovation of existing facilities or new construction. The JSF IJTS would require approximately 3,200 mi^2 of airspace for daily training activities and would also need air-to-ground capable land areas for weapons training.

Pilot training would address the operation of the aircraft systems for the purpose of developing flight-specific habit patterns and procedural memorization, and generating high levels of proficiency under an elevated workload while using the F-35. Maintainer training would be focused on three critical skill groups: Avionics, Mechanical, and

Weapons. Avionics includes all the electronic systems and subsystems (hardware and software) installed in an aircraft or attached to it while Weapons includes ordnance armament. Mechanical groups cover the following areas: fuels, propulsion, Line/Crew Chief systems (such as the electrical, cooling, etc.), low observables (materials that make an aircraft hard to detect by radar, infrared, or other sensors), and all activities associated with aircraft departure from the ramp to the runway.

1.3 PURPOSE OF AND NEED FOR ACTION

The purpose is to implement the BRAC 2005 program, as required by law, by relocating the 7SFG(A) from Fort Bragg, North Carolina, to Eglin AFB, Florida, and establishing the JSF IJTS at Eglin AFB. The purpose and need of each of the proposed requirements have been structured as a result of the BRAC statute and process and its underlying goals and objectives. To implement the Eglin BRAC 2005 decisions, the Air Force, Army, Navy, and Marine Corps identified the following four required activities at the Eglin Reservation:

- Requirement 1: Establish a 7SFG(A) cantonment area. In this document, the cantonment area for the 7SFG(A) includes operations and maintenance facilities; housing; dining facilities; and munitions storage and loading facilities. The underlying purposes of the BRAC process assisted in defining alternatives for where on Eglin to place the cantonment area.
- Requirement 2: Accommodate 7SFG(A) training requirements by providing range space, airspace, and scheduling for training missions. The underlying purposes of the BRAC process assisted in defining alternative range configurations to accommodate existing testing and training and new 7SFG(A) training missions.
- Requirement 3: Establish the JSF IJTS cantonment area. In this document, the cantonment area for the IJTS includes all training and maintenance facilities; hangars, dormitories; and munitions storage and loading facilities. The underlying purposes of the BRAC process assisted in defining alternatives for where on Eglin to place the JSF IJTS cantonment area.
- Requirement 4: Accommodate JSF IJTS flight training requirements by providing airfields and airspace, and scheduling for training missions. The decision to be made is what airfields and airspace to use to accommodate the JSF IJTS flight training requirements. The underlying purposes of the BRAC process assisted in defining alternative airfields and airspace to use to accommodate the JSF IJTS flight training requirements.

These four requirements (i.e., needs) comprise the scope of the action, form the basis for alternative development, and are discussed in detail in Chapter 2 of this document and in Appendix A, Volume III of III, Addendum 1, *Summary of the BRAC Process for JSF IJTS*.

After considering the potential environmental impacts described in this document, the Air Force will decide which alternative to implement for each of the four requirements described above. Because the BRAC decisions by law must be implemented, the No Action Alternative cannot be selected by the Air Force. It will be discussed in Chapter 2 and will be used for comparisons to the alternatives. The Air Force is the military department exercising real property accountability for Eglin AFB. Consequently, this EIS has been developed in compliance with the promulgated Air Force National Environmental Policy Act- (NEPA-) implementing regulations (32 Code of Federal Regulations [CFR] 989), as directed by 32 CFR 174.17, *Revitalizing Base Closure Communities and Addressing Impacts of Realignment*.

1.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

Congress enacted NEPA (Public Law [PL] 91-190, 42 United States Code [USC] 4321-4347, as amended) to establish a national policy for the protection of the environment. It requires federal agencies to assess the environmental consequences of the Proposed Action and alternatives systematically as part of the decision-making process. The intent of NEPA is to protect, restore, or enhance the environment through well-informed decisions by the federal decision maker. The President established the Council on Environmental Quality (CEQ) under NEPA to implement the provisions of the Act and review and appraise federal programs and activities in light of NEPA policy. The CEQ promulgated regulations for implementing the procedural provisions of NEPA (40 CFR 1500–1508). These regulations outline the responsibilities of federal agencies and provide specific procedures for preparing EISs to comply with NEPA.

In furtherance of NEPA's Section 101 goals to "protect, restore, and enhance the environment" (40 CFR 1500.1(c)), the Air Force will implement an adaptive management approach to basing the F-35 aircraft and standup of the JSF IJTS. Adaptive management allows for improving an understanding of complex, interrelated systems through a long-term process built around a continuous cycle of experimentation, evaluation, learning, and improvement over time. The ability to experiment and test hypotheses in a time frame that allows meaningful data to be gathered and evaluated is an important element of that process.

The JSF training variables analyzed in the BRAC 2005 EIS and their relationship to biological, physical, and social systems are complex. In the analysis of anticipated impacts in the EIS, the Air Force has done its best to accurately predict potential impacts and anticipate future conditions using the best available information and tools at the time of analysis. However, the area around Eglin AFB is a dynamic system that is continually evolving: it is likely that there will be unanticipated changes in baseline conditions, that new information may become available, or that the effectiveness of mitigation measures may be different than expected. Adaptive management techniques are well suited to such circumstances.

The adaptive management program will focus primarily on the JSF IJTS and incorporate the following kinds of adaptive management approaches:

- Noise models that have been developed or will be developed in the future will be used to reveal and understand the potential effects of policies, activities, or practices that are being considered for implementation in the F-35 aircraft ramp-up to final operation capability.
- Management and oversight activities reveal, through monitoring and evaluation of results, the accuracy or completeness of the earlier predictions. Adaptations can be developed to eliminate or reduce effects.

New knowledge and information produced through experimentation can be incorporated into management options and recommendations to appropriate decision makers. This EIS identifies and describes the affected environment and assesses the potential environmental impacts resulting from implementation of the Proposed Action or alternatives for the BRAC 2005 decisions at Eglin AFB, including the location of new facilities and personnel at Eglin AFB. The analysis identifies environmental permits and specific mitigation measures to prevent or minimize environmental impacts, if required. Air Force environmental impact analysis process regulations require the action proponent to prepare a mitigation plan and forward it to Headquarters (HQ), U.S. Air Force for review within 90 days of the signing of the Record of Decision (ROD). Among other things, the mitigation plan must specifically identify each mitigation measure, how the measures will be executed, and who will fund and implement the mitigations. Requiring the detailed mitigation plan after the signing of the ROD enables the mitigation plan to be tailored precisely to the decision that is made. In the analysis of anticipated impacts in the EIS, the Air Force has done its best to accurately predict potential impacts and anticipate future conditions using the best available information and tools at the time of analysis. However, given the nature of the alternatives analyzed; the dynamics surrounding Eglin AFB; and the likelihood that baseline conditions will have unanticipated changes, new information may become available, or the effectiveness of mitigation measures may be different than expected; adaptive management techniques are well suited to such circumstances.

Since the adaptive management approach is being adopted as part of the implementation for the beddown and operations of the JSF IJTS at Eglin AFB, any post-ROD mitigation plan for its beddown and operations will need to include provisions for monitoring noise post implementation and the success of the mitigations, as well as procedures for making necessary adaptations.

Some adaptations may require additional NEPA analysis, such as those that would result in a substantial change to the action. Thus, the Post-ROD mitigation plan will include an adaptive management program incorporating (for example) the following kinds of adaptive management approaches:

- **Noise modeling:** Supplement existing data with new noise data as it is being developed in the future. Use new data to reveal and understand the potential effects of activities or practices that are underway or being considered for implementation in the F-35 IJTS ramp up to final operational capability and thereafter. Make changes to improve mitigations and related actions.
- **Management and oversight:** Monitor and evaluate results of earlier predictions. Develop and implement adaptations to eliminate or reduce effects.
- **New knowledge and information:** Through experimentation, knowledge and information can be incorporated into management options and recommendations.

The following additional steps will also be part of the mitigation plan:

- Identifying the type of monitoring for the action and each mitigation.
- Delineating how the monitoring will be executed.
- Identifying who will fund and oversee its implementation.
- Establishing the process and responsibilities for identifying and making changes to the action or mitigations to influence beneficial results or avoid/reduce adverse ones.

NEPA and the Air Force's implementing regulations require the lead agency (in this case, the Air Force) to seek public participation throughout the conduct of the environmental impact analysis process. "Scoping" identifies potential issues and alternatives early in the EIS development process. The Air Force filed a Notice of Intent to prepare an EIS. The Notice of Intent was published in the Federal Register on 01 August 2006. After public notification announcements were made in newspapers, on radio, and on television, Eglin AFB held two public scoping meetings in Fort Walton Beach and Crestview, Florida, on 22 and 24 August 2006, respectively. The Air Force distributed a 12-page brochure providing information on the Eglin BRAC 2005 Program and the scope of the EIS. Several individuals expressed interest in the proposal during the public scoping period, which began 28 July 2006 and ended 31 August 2006. In addition to the public, the Air Force notified in writing local, state, and federal agencies of the intent to prepare an EIS. Appendix A, *Public Involvement*, provides a list of these contacts.

Subsequent to the initial scoping period, the Air Force identified new potential alternatives for the JSF flight training. The Air Force filed a supplemental Notice of Intent to prepare an EIS. The Notice of Intent was published in the Federal Register on 15 October 2007. The alternatives were presented at public scoping meetings in Navarre, Florida, and Niceville, Florida, on 06 and 07 November 2007. The public scoping period was extended until 07 December 2007. Public concerns and comments (Table 1-1) were used to develop the document and are noted in relevant sections.

Table 1-1. Summary of Scoping Comments by Resource Area

Resource Area	Comment Summary	Meeting
Noise	Several scoping commenters expressed concerns about increased noise from new aircraft, increased number of training flights, increased number of night flights, and the potential impact on the community.	2006
	Scoping commenters asked about noise from engine testing.	2007
	Scoping commenters expressed concern about noise on the north side of the runway and noise increase over Valparaiso schools and churches.	2007
Land Use and Planning	Commenters at scoping meetings expressed concern that noise could affect future building permits.	2006
	Public access to the Florida Trail was a concern expressed during scoping.	2006
	One concern that arose during scoping questioned whether Eglin residences would be accessible to the public.	2006
	Scoping commenters wanted to know what land uses were considered compatible under different noise levels.	2006
	Commenters at scoping requested that all BRAC activities at Eglin be aggregated to make it easier for local citizens to see and understand impacts.	2007
	Scoping commenters requested more detailed maps that are easier to read.	2007
Socioeconomics	Public commenters at scoping requested an assessment of the impacts of each alternative on property values.	2006
	Scoping comments asked whether the Crestview Police Department is equipped to serve and protect a larger community.	2006
	During scoping, commenters requested information about the number of students to manage the impact to schools of an increased local population.	2006
	One scoping commenter was concerned with equivalent analysis of local communities.	2007
	Scoping questions were concerned about the city of Valparaiso and schools near potential training areas.	2007
	During public scoping, concerns were expressed about secondary growth impacts to land use and commercial and housing demand.	2007
	Scoping questions asked whether construction or operations could result in deterioration to housing.	2007
Transportation	One scoping issue was how the beddown will affect traffic flow.	2006
	Scoping commenters requested the installation of traffic flow and reduction measures, such as additional stoplights and/or changes to highway access points.	2006
	Several scoping commenters requested information on highway infrastructure redesign and funding to handle traffic increases and congestion.	2006
	One public scoping comment dealt with potential highway congestion from military training vehicles.	2007

Continued on the next page…

Table 1-1. Summary of Scoping Comments by Resource Area, Cont'd

Resource Area	Comment Summary	Meeting
Utilities	Commenters at scoping questioned whether the current water and sewer system can handle the increased needs of a larger population.	2006
	Scoping commenters noted that an infrastructure plan would need to ensure that wastewater, electricity, and natural gas needs will be adequately met.	2006
Air Quality	One comment during public scoping was concerned with possible excess pollution over the city of Valparaiso.	2007
Safety	Safety comments at scoping expressed concerns about increased motor vehicle traffic, increased crime, off-base security, and possible increases in fire hazards.	2006
	Public scoping comments on safety asked about increased potential for accident and safety risks associated with F-35 training.	2007
	Scoping health concerns dealt with potential hearing loss as a result of increased noise and potential effects to Valparaiso schools under the potential training area.	2007
Solid Waste	A solid waste comment during scoping asked about efficient removal of solid waste/garbage from impacted communities.	2006
Hazardous Materials/Hazardous Waste	One comment referenced concern about radar hazards.	2006
	Public scoping comments on waste focused on the need to control and accommodate increases in garbage and wastewater.	2006
	During scoping, two commenters expressed concern with hazardous materials/waste generation at project sites near the city of Valparaiso.	2007
Water Resources	Scoping commenters expressed interest in potential impacts to surface water resources, wetlands, and floodplains.	2006
	Public comments included concerns on water quality and potential water pollution to the Destin, Florida, area.	2007
Biological Resources	Scoping comments included a request to protect and maintain the diversity of species found in and around proposed alternative areas.	2006
	Commenters during scoping requested that species and species' habitat within each proposed project area be maintained and continue as viable wildlife areas.	2006
	Comments at public scoping included concerns about avoiding wetlands and avoiding threatened and endangered species such as Choctaw bean, tapered pigtee, southern sandshell and flatwoods salamanders.	2007
	Public scoping commenters wanted to be sure the beddown would be in compliance with the ecosystem management plan in Eglin AFB's INRMP.	2007

Continued on the next page…

Table 1-1. Summary of Scoping Comments by Resource Area, Cont'd

Resource Area	Comment Summary	Meeting
Cultural Resources	Commenters at scoping asked how the Air Force would avoid disturbance of Native American remains per the Native American Graves Protection and Repatriation Act.	2006
	During scoping, commenters wanted an accurate and comprehensive analysis of cultural resources within each proposed project area.	2006
	Scoping commenters wanted to be sure that existing historic resources were adequately protected.	2006
	One public scoping commenter expressed concern about noise impact to the Valparaiso historic registry and historic downtown district.	2007
Cumulative Impacts	Comments on cumulative projects during scoping asked about other military activities.	2006
	Public scoping on cumulative impacts asked about potential lasting impacts on resources as a result of noise.	2007
EIS Process	One scoping commenter expressed concern with the adequacy of the involvement of affected communities and their government officials.	2007
Proposed Action	Scoping commenters wanted to be sure the military takes all measures to reduce risk.	2007

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2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter details reasonable alternatives that meet the purpose and need from Section 1.3. These alternatives form the basis for the analyses of potential environmental impacts (Chapters 4 through 7). This chapter also discusses the narrowing criteria used to identify candidate alternatives.

2.1 PROPOSED ACTION

The Proposed Action is to implement the 2005 Base Realignment and Closure (BRAC) Report decisions by relocating the 7th Special Forces Group (Airborne), or 7SFG(A), to Eglin Air Force Base (AFB), Florida, and conducting joint initial graduate-level pilot training in the Joint Strike Fighter (JSF) for the Navy, Marines, and Air Force at Eglin AFB (DBCRC, 2005, pp. 9 and 184).

The Proposed Action would locate new missions at Eglin AFB and increase Eglin's personnel and military activities over the next several years. Detailed descriptions of missions are provided in Sections 2.3, 2.4, 2.5, and 2.6.

2.2 ALTERNATIVE LOCATION NARROWING PROCESS

The Air Force, Army, Navy, and Marine Corps identified four activities to implement the Eglin BRAC recommendations: (1) a cantonment area for the 7SFG(A), (2) range training areas for the 7SFG(A), (3) a cantonment for the JSF Initial Joint Training Site (IJTS), and (4) flight training areas for the JSF. All activities would occur within the jurisdiction of Eglin AFB on the Eglin Reservation or within airspace associated with Eglin AFB or the Department of Defense (DoD).

The Eglin Reservation comprises 724 mi^2 of land area and nearly 130,000 mi^2 of airspace overlying the land and water ranges (U.S. Air Force, 1996a). A location-narrowing process was established for the four activities listed above. The specific requirements needed to accomplish the four activities were screened in three phases:

- Phase I: Identification of initial screening criteria
- Phase II: Application of screening criteria
- Phase III: Input from the Public Scoping Process

2.2.1 Identification of Initial Screening Criteria

A screening process was established to meet operational requirements for the 7SFG(A) and JSF IJTS *cantonment* areas. A separate, but related, screening process was established to meet operational training requirements. Specific criteria associated with the cantonment alternatives are described in Sections 2.3.1 and 2.5.1. Those for the ranges and airspace are discussed in Sections 2.4.1 and 2.6.2.

Both cantonment and training activities considered existing activities and existing users of the Range. Alternative training locations for the 7SFG(A) and JSF were identified (Borthwick, 2006).

2.2.2 Application of Screening Criteria

Phase I resulted in the identification of proposed alternative locations for cantonment and training areas. The Air Force has identified a preferred alternative for all of the activities. The alternative locations are listed below and shown in Figure 2-1.

7SFG(A) Cantonment

The five proposed alternative locations that met operational requirements for the 7SFG(A) cantonment area are listed below and discussed in detail in (Section 2.3.3):

- 7SFG(A) Cantonment Alternative 1: Eglin Main Base
- 7SFG(A) Cantonment Alternative 2: Near Duke Field
- 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)
- 7SFG(A) Cantonment Alternative 4: North of Eglin Main Base
- 7SFG(A) Cantonment Alternative 5: Near DeFuniak Springs

7SFG(A) Range Training

This activity divided the ranges into two types: Group 1, which differed among the five proposed alternative locations shown in Figure 2-1; and Group 2, which would be the same for any of the five alternatives. These ranges are discussed in Section 2.4.2:

- 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Base
- 7SFG(A) Range Alternative 2: East Side and North-South Corridor
- 7SFG(A) Range Alternative 3: East and West Side (Preferred Alternative)
- 7SFG(A) Range Alternative 4: East and Northeast Side
- 7SFG(A) Range Alternative 5: East Side

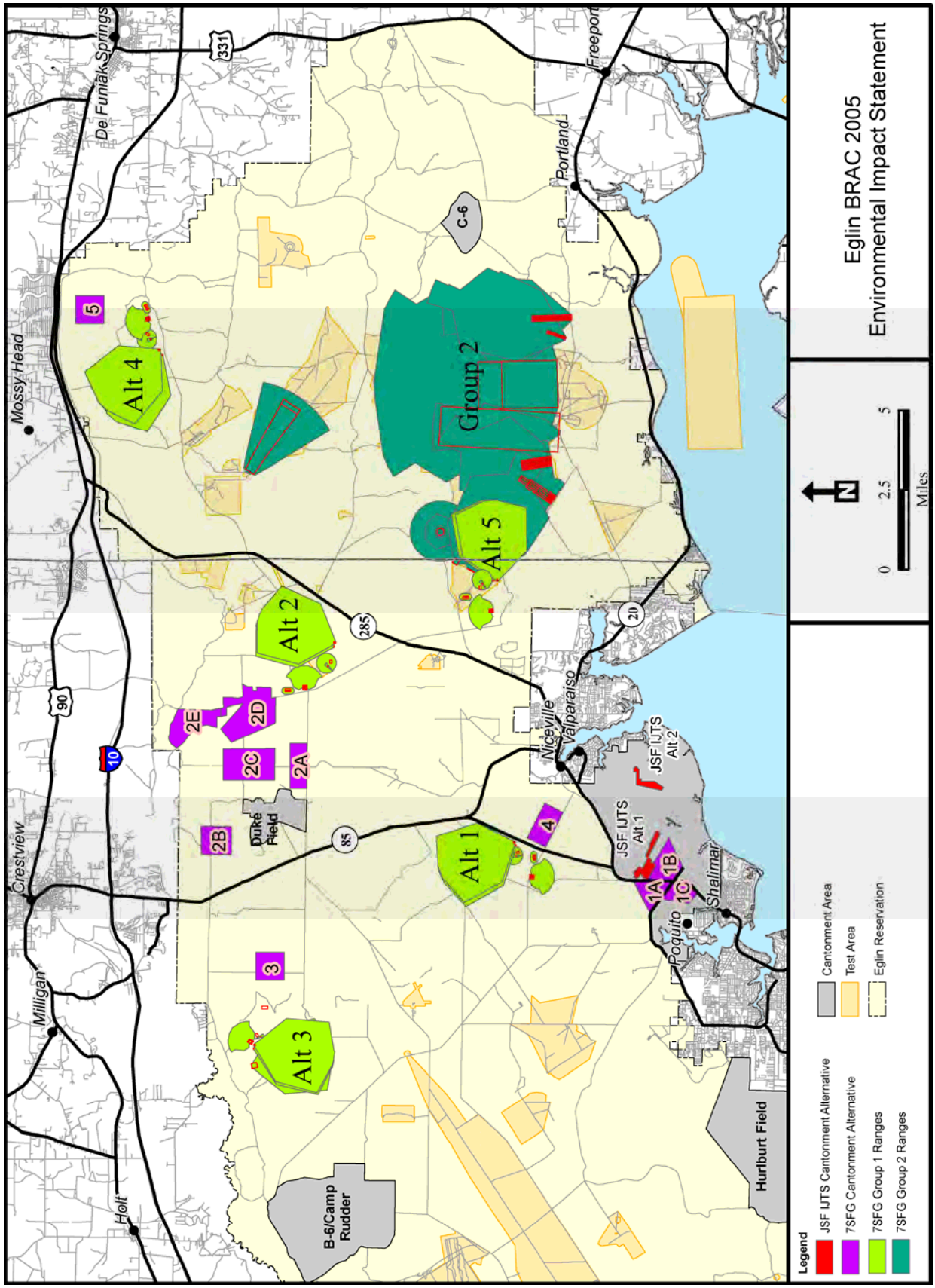

Figure 2-1. Eglin BRAC Implementation Alternatives

JSF IJTS Cantonment

Two proposed alternative locations met the JSF IJTS cantonment operational and BRAC requirements and are discussed in Section 2.5.2:

- JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)
- JSF IJTS Alternative 2: 46th Test Wing Area (East Side of Eglin Main Runway)

JSF Flight Training

Two proposed alternatives best meet the current operational training requirements for the JSF at Eglin AFB. These alternatives use Eglin Main Base and two auxiliary airfields with different combinations of operations at each airfield. The alternatives are discussed in detail in Section 2.6.5:

- JSF Flight Training Alternative 1 (Preferred Alternative)
- JSF Flight Training Alternative 2 (formerly identified in scoping meetings as "Eglin Heavy")

Airspace and ordnance training would use the same locations on the Eglin Reservation for either alternative.

2.2.3 Input from the Public Scoping Process

Public scoping described the preliminary alternatives being considered during February 2006 meetings in Crestview and Fort Walton Beach, Florida, and November 2007 meetings in Niceville and Navarre, Florida. The Air Force uses scoping meetings to identify the public and agency concerns and to define the issues and alternatives that will be examined in detail in the Environmental Impact Statement (EIS). Scoping identified the special public concerns listed in Table 1-1. Public and Agency input provided feedback for the cantonment and training alternatives. The feedback resulted in refinement of the alternatives to especially address noise, which could impact off-base locations.

2.3 OPERATIONAL REQUIREMENTS FOR THE 7SFG(A) CANTONMENT AREA

The 7SFG(A) requires a cantonment area for billeting and operations. A Special Operations Forces (SOF) Compound would include facilities for three Special Forces Battalions, a Motorized Special Forces Battalion, a Group Support Battalion, and the Group Headquarters (HQ). Table 2-1 lists the proposed construction.

Table 2-1. 7SFG(A) – Proposed Cantonment/Support Facility Requirements for 7SFG(A)

Facility	Total Square Footage Required
Special Forces Group Operations Building	68,800
Special Forces Battalion Operations Complex	119,900
Special Forces Battalion Operations Complex	119,900
Special Forces Battalion Operations Complex	119,900
Special Forces Battalion Operations Complex (Expanded)	120,000
Support Battalion Complex	71,000
Vehicle Maintenance Complex	100,000
Privately Owned Vehicle (POV) Parking	700,000
Organizational Vehicle Parking	800,000
Logistics Complex	47,400
Petroleum, Oil, and Lubricant (POL) Storage	2,300
Enlisted Unaccompanied Housing	35,100
Enlisted Unaccompanied Housing	35,100
Enlisted Unaccompanied Housing	35,100
Dining Facility	23,000
Access Control Facility	3,400
Tactical Communications Center (with 10-acre antenna farm)	3,800
Wash Platform	2,340
Ammunition Storage Magazine	10,300
Ammunition Surveillance/Inspection	5,000
Segregated Ammunition Storage	3,000
Indoor Baffle Range	23,000
Deployment Readiness Center	50,000
Combat Readiness Training Facility	44,400
Maritime Operations Facility	18,500
Hazardous Materials Storage	6,700
Deployment Equipment Storage	36,600
UAV Hangar	9,200
Sidewalks	285,800
Roads	1,771,200
Concrete Aprons	600,000
MWD Kennel	10,000
Fire Station	8,500
Medical Clinic	23,000
Chapel	10,000
AAFES Shoppette	10,000
Total	5,332,240

To the extent possible, all buildings would be designed in harmony with one another and Eglin AFB. The buildings would be designed per established building codes using U.S. Army Corps of Engineers (USACE) military construction (MILCON) transformation strategy and in accordance with aesthetic and visual criteria in the Eglin AFB Architectural Compatibility Plan (ACP). All necessary utilities, roads, and perimeter security would be constructed to include primary and commercial traffic entrances. Anti-Terrorism/Force Protection measures and communications requirements would be incorporated into the compound and its constituent facilities.

These facilities would be constructed through the MILCON process, which is proposed to begin in November 2008 and conclude in 2011.

The 7SFG(A) would have approximately 2,200 officers, non-commissioned officers (NCOs), and soldiers distributed throughout the command structure and among subordinate battalions, companies, and detachments. Table 2-2 provides a summary of the number of persons associated with the 7SFG(A) realignment to Eglin AFB (Vavrin, 2007). Analysis of indirect housing impacts is discussed in the socioeconomic analysis.

Table 2-2. 7SFG(A) – Estimated Maximum Daily Load of Personnel at Eglin AFB

Personnel	Number
Total Daily 7SFG(A) Personnel	**2,200**
Spouses	*1,452*
Children	*2,415*
Total New People to Area	**6,067**

Source: Vavrin, 2007

The 7SFG(A) utilizes unmanned aerial vehicles (UAVs) and wheeled, but not tracked (e.g., tank), vehicles for training exercises. The 7SFG(A) does not possess or operate any aircraft for personnel transport but utilizes various fixed-wing and rotary-wing aircraft from the Army and Air Force to conduct air operations.

2.3.1 Alternative Narrowing Process for the 7SFG(A) Cantonment Area

Two sets of considerations were applied to the Eglin Reservation to identify possible alternative cantonment locations. These considerations were designated as "requirements" or "desirable attributes" and are described below.

Requirements

- The 7SFG(A) cantonment area must be operationally secure for 24 hours per day, seven days per week.
- To meet the logistical requirements of the 7SFG(A), 300 contiguous acres with the capability to provide operational security are needed.
- The mission of the 7SFG(A) requires discreet movement (out of public view) from the cantonment to a deployment area with an existing C-17 capable airfield.
- The cantonment area must not be under restricted airspace.
- To ensure rapid deployment capabilities, the cantonment should be located within 2 miles of a major transportation artery.
- The support capacity of the barracks must be approximately 288 individuals.

- Because of the general lack of vehicles and the limited mobility of the 7SFG(A), the cantonment must be within 10 minutes' driving time or 30 minutes' walking time of the proposed training ranges.

Desirable Attributes

- The potential for future expansion beyond the 300 acres should be available.
- Access to the cantonment area should be relatively unencumbered with minimal restrictions from other missions.
- A location that has minimal environmental considerations (e.g., Environmental Restoration Program sites, cultural resources, endangered species, etc.) and avoids wetlands, floodplains, and unexploded ordnance (UXO) areas would be desirable.
- A location that allows for placement of barracks in areas with noise levels less than 65 A-weighted decibel (dBA) would be desirable.
- A location that would permit ammunition transport on currently approved or future approvable routes would be desirable.

2.3.2 Locations Considered but not Carried Forward as Viable Alternatives for the 7SFG(A) Cantonment Area

Areas under restricted airspace not carried forward as viable alternatives included Hurlburt Field, Camp Rudder, and locations around Test Area C-52. Approximately 72 percent of the Eglin Reservation is under Restricted Airspace and did not meet the siting requirements. Other criteria supported the elimination of other locations, including the lack of sufficient area for future expansion beyond the 300 acres at Hurlburt Field; excessive distance to training ranges at Choctaw Field; and significant portions (greater than 50 percent) of the areas near Test Area C-52 likely contain UXO, which would be cost prohibitive to remove.

2.3.3 Alternatives Carried Forward for the 7SFG(A) Cantonment Area

Five proposed alternatives identified in Figure 2-2 were carried forward for detailed analysis (Borthwick, 2007).

2.3.3.1 7SFG(A) Cantonment Alternative 1: Location on Eglin Main Base

Alternative 1 establishes the 7SFG(A) cantonment area at a location within close proximity to the Eglin Main Base airfield. Figure 2-3 shows the three sub-alternative locations considered under Alternative 1.

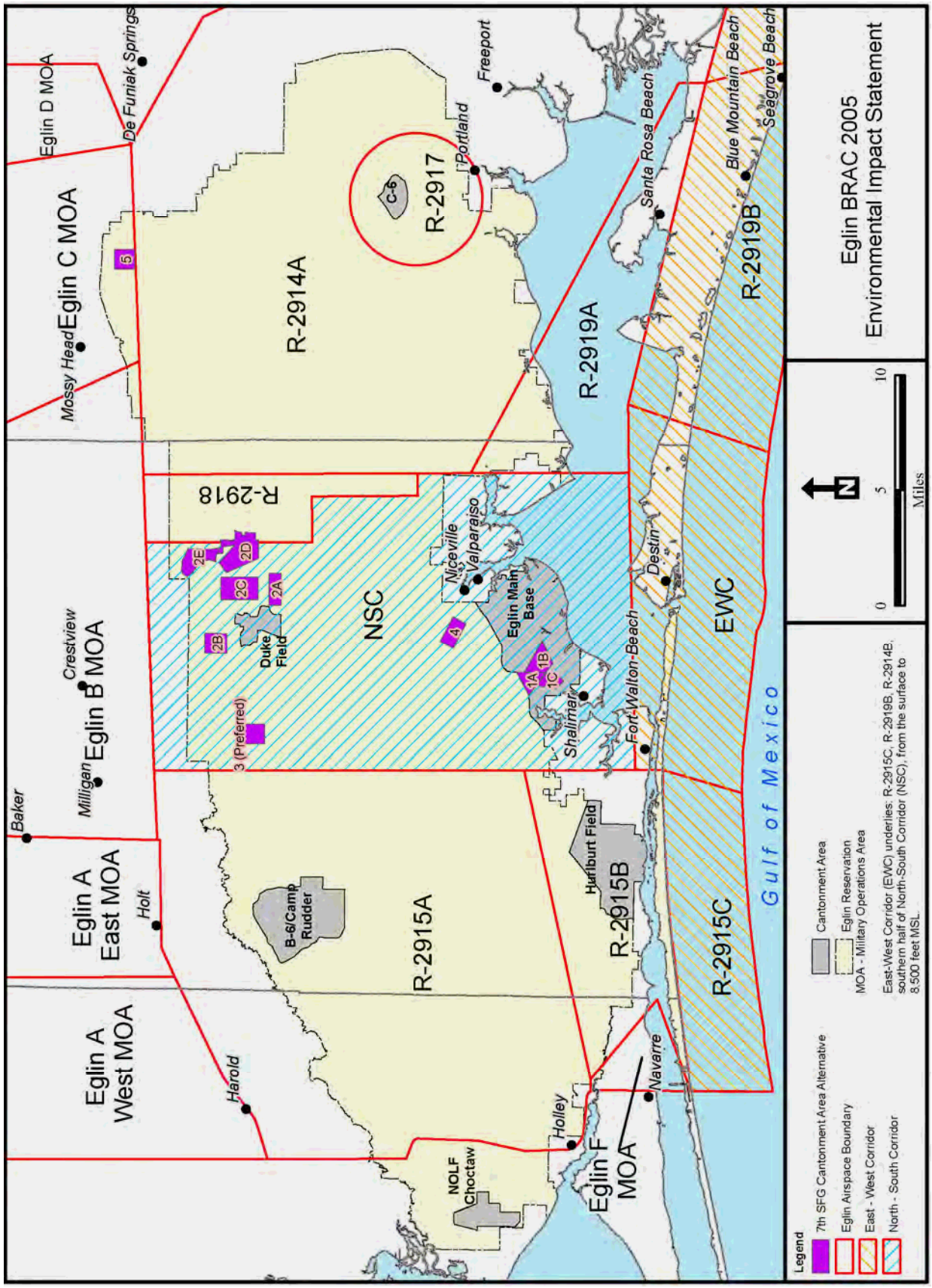

Figure 2-2. 7SFG(A) Cantonment Area Alternative Locations

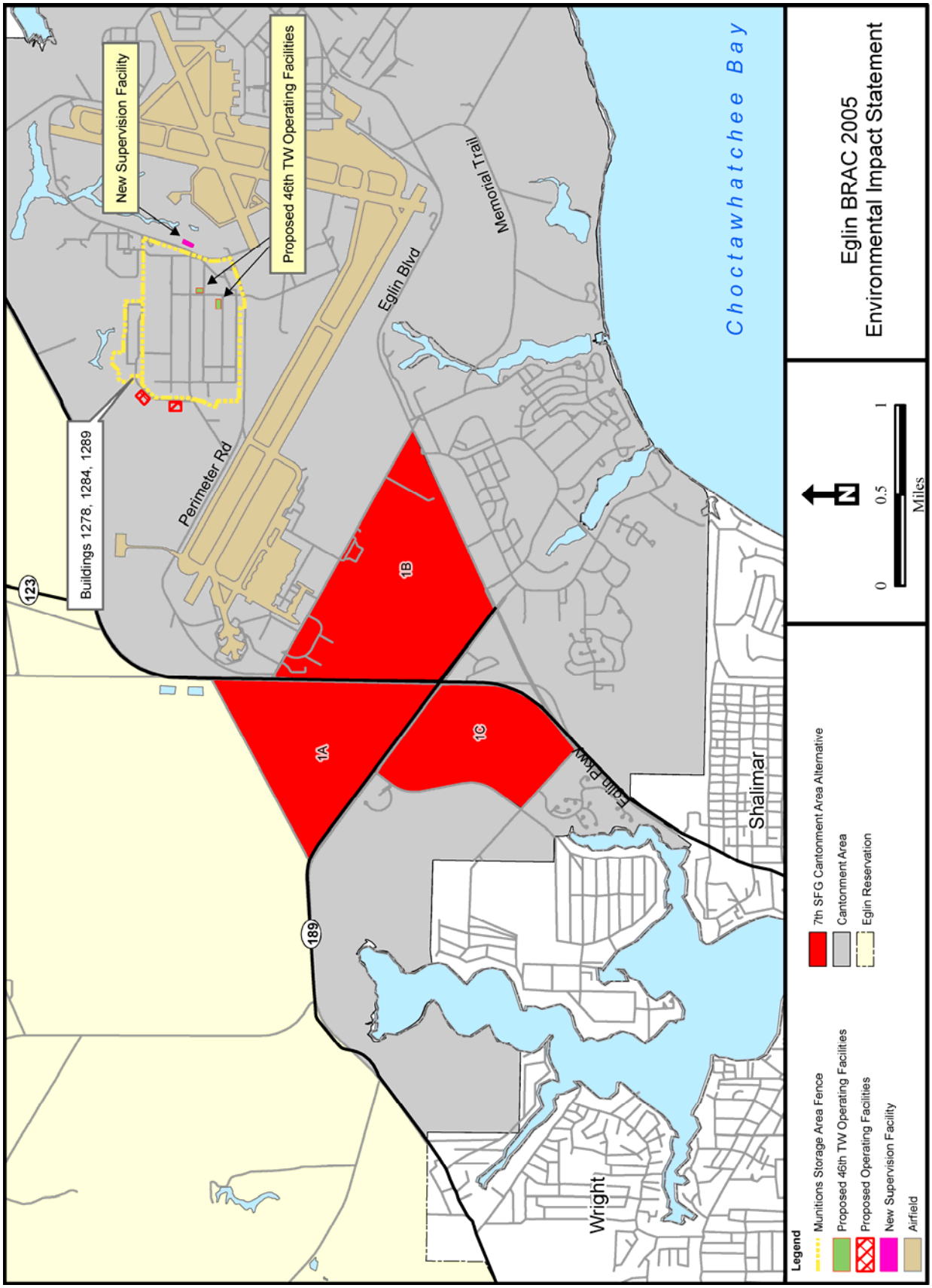

Figure 2-3. Alternative 1 Potential 7SFG(A) Cantonment Area Locations

Under Alternative 1, the 7SFG(A) would construct additional munitions storage facilities within the existing munitions storage area (MSA) for the 46 TW, which can be accessed from either Eglin Main Base runway (Figure 2-3). The existing MSA would need to support both the 7SFG(A) and the JSF munitions, because both of the JSF IJTS cantonment alternatives would be in the Eglin Main Base area (see Section 2.5.2).

Operating facilities for the JSF would be located outside the existing MSA fence and along the western side of the MSA as shown in Figure 2-3. The 46 TW anticipates needing two additional operating facilities which could be located inside the existing MSA fenced area (Figure 2-3).

Within the existing MSA, the Air Force would need to build new storage magazines to accommodate the combined munitions. These would all be located within the confines of the existing fence at safe distances from public traffic routes, inhabited buildings, and outdoor facilities. Safety distances would require the removal of administration/ supervisory buildings 1278, 1284, 1289, and Gazebo J. The modifications to the MSA would require facilities for relocated personnel.

A new supervision facility of approximately 7,000 ft^2 constructed on the 46 TW side of the MSA, just east of Perimeter Road (see Figure 2-3), would accommodate both existing administrative and new JSF personnel. The current parking area (facility 1278C) would change from privately owned to government-owned vehicle parking.

Alternative 1 would not be as desirable to the Army or to Eglin AFB as the other alternatives due to the reduced operational security (outside the Eglin fence), traffic on Florida Highway (Hwy) 85, and noise associated with the Eglin Main airfield.

7SFG(A) Cantonment Alternative 1A: The Triangle

Alternative 1A is to construct the 7SFG(A) cantonment requirements identified in Table 2-1 at "The Triangle" located adjacent to Eglin Main Base and to the west of Hwy 85. The Triangle would provide the 7SFG(A) with a secure compound location that can support both garrison and deployment activities. The naturally forested environment of the site achieves the requirement for a strong perimeter with a visible barrier between the general public and 7SFG(A) activities and operations. In addition, this location is within approximately 1.5 miles of the Eglin Main Base runway that can support C-17 aircraft. Figure 2-4 provides a notional layout of the 7SFG(A) cantonment area at The Triangle.

The Triangle is an approximately 404-acre triangular area located west of Eglin Main Base across from the airfield/cantonment perimeter fence. The site is currently largely undeveloped woodlands. Site topography ranges in elevation from a high between 75 and 80 feet to a low of less than 60 feet. A north-south section of Hwy 85 separates the site from the Base. Hwy 189, a four-lane divided highway, bounds the southern

edge of the site. General Bond Boulevard, a small two-lane road that is owned and maintained by Eglin, defines the northern boundary of the site. General Bond Boulevard is currently a one-way street heading southwest.

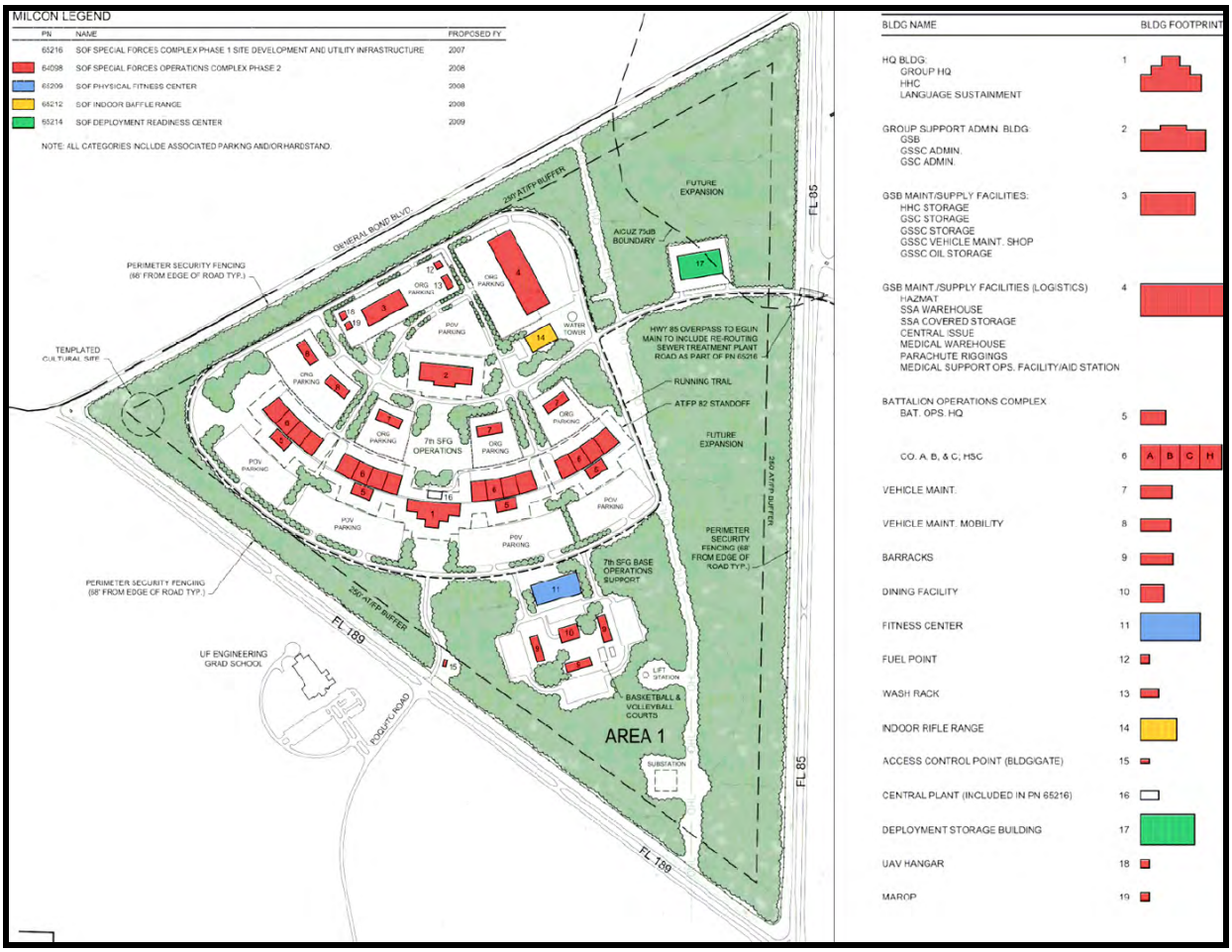

Figure 2-4. Alternative 1A Notional Layout of 7SFG(A) Cantonment Area (at The Triangle)

The Triangle would include a single secured POV access point along Hwy 189 for the daily arrival of operational staff. This access point is located near the center of the site directly across from the Poquito Road intersection. Circulation for service and supply vehicles, access to ammunitions storage facilities, and deployment and general traffic access to Eglin Main Base could be accomplished via an elevated bridge overpass connecting The Triangle to Eglin Main Base. The conceptual overpass would be located approximately 200 feet south of the existing ACC gate.

7SFG(A) Cantonment Alternative 1B: West Gate

Alternative 1B constructs the 7SFG(A) cantonment facilities listed in Table 2-1 at a 571-acre trapezoidal area located within Eglin Main Base cantonment area perimeter fence (Figure 2-5). The site is situated against the perimeter fence separating the Base

from the adjacent Hwy 189 and Hwy 85. For the purposes of this document, the northern limit has been defined by a line approximately 2,000 feet north and parallel to the southern property line.

The site is largely undeveloped, except along the side that borders the 33 FW area. The remainder of the site consists of a dense native forest of slash pine, scrub oak, and live oak. Understory plantings are dense and include a variety of native plant material including saw palmetto. A 20-inch sanitary forced main traverses the site in a diagonal direction from southeast to northwest. Site topography ranges in elevation from a high between 70 and 75 feet to a low of less than 55 feet.

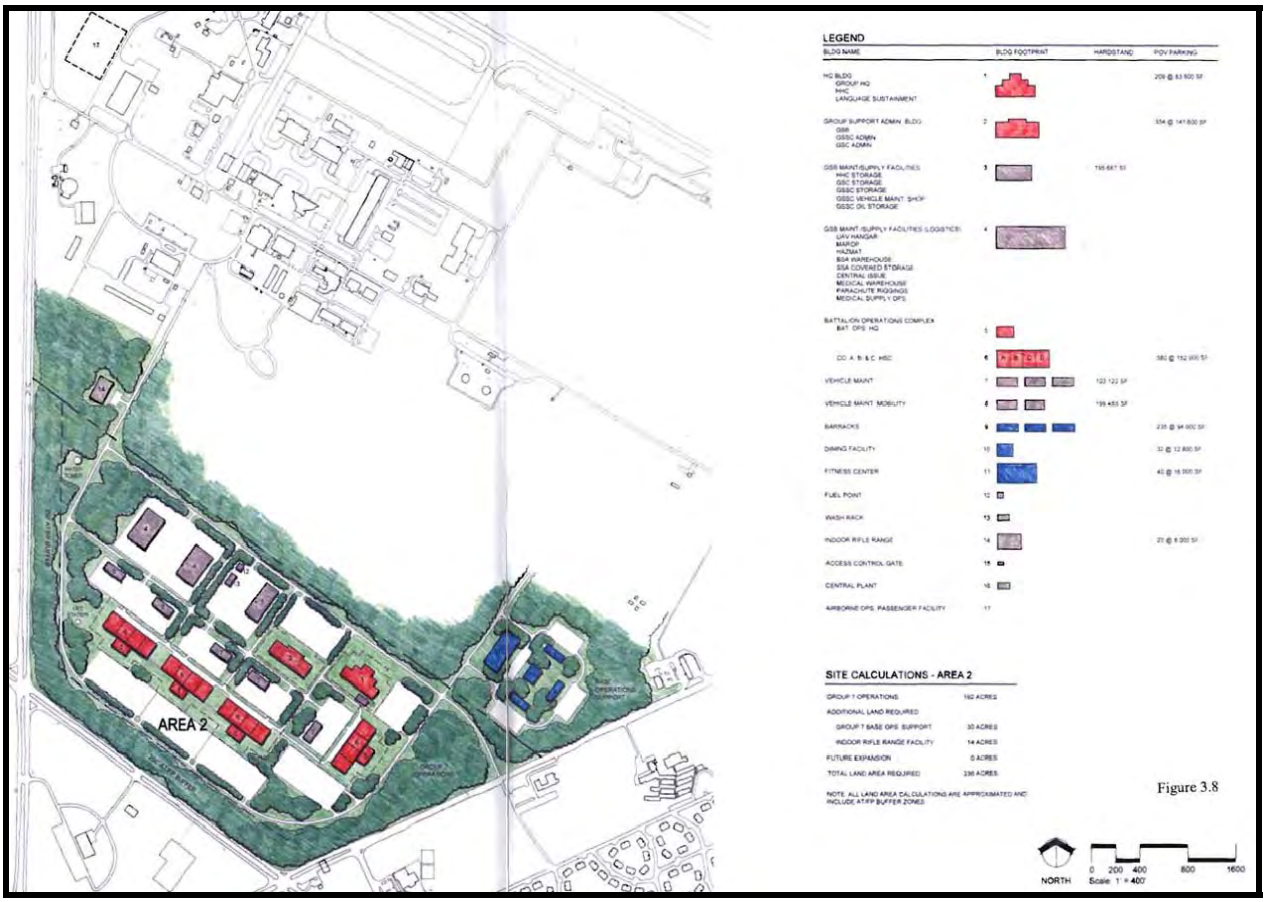

Figure 2-5. Alternative 1B Notional Layout of 7SFG(A) Cantonment Area (at the West Gate)

The development of this site does not require the construction of a new gate or entrance drive. Therefore, construction of the roadway network within the 7SFG(A) cantonment area is designed to be consistent with the existing Eglin AFB road alignment. This location is within approximately 1.5 miles of the Eglin Main Base runway that can support C-17 aircraft.

7SFG(A) Cantonment Alternative 1C: North Poquito

Alternative 1C, the North Poquito area, is a 314-acre tract of land located to the south and west of the main base cantonment perimeter fence (Figure 2-6). The property is bordered on the north by Hwy 189 and on its east by Hwy 85, which makes a gradual sweeping curve. Poquito Road and Sunset Lane border the property's western and southern sides, respectively. The site is accessible only along the middle section of Poquito Road. The primary Gulf Power 115 kilovolt (kV) overhead transmission line crosses the property's northeast corner. The property is predominantly covered by native vegetation. Portions of the property's southwestern corner have been cleared. Site elevations range from an approximate low of 20 feet and a high elevation of between 55 and 60 feet. The topography of this site includes two drainage swales that run through the site in a north-south direction and are up to 20 feet deep at the southern end of the site.

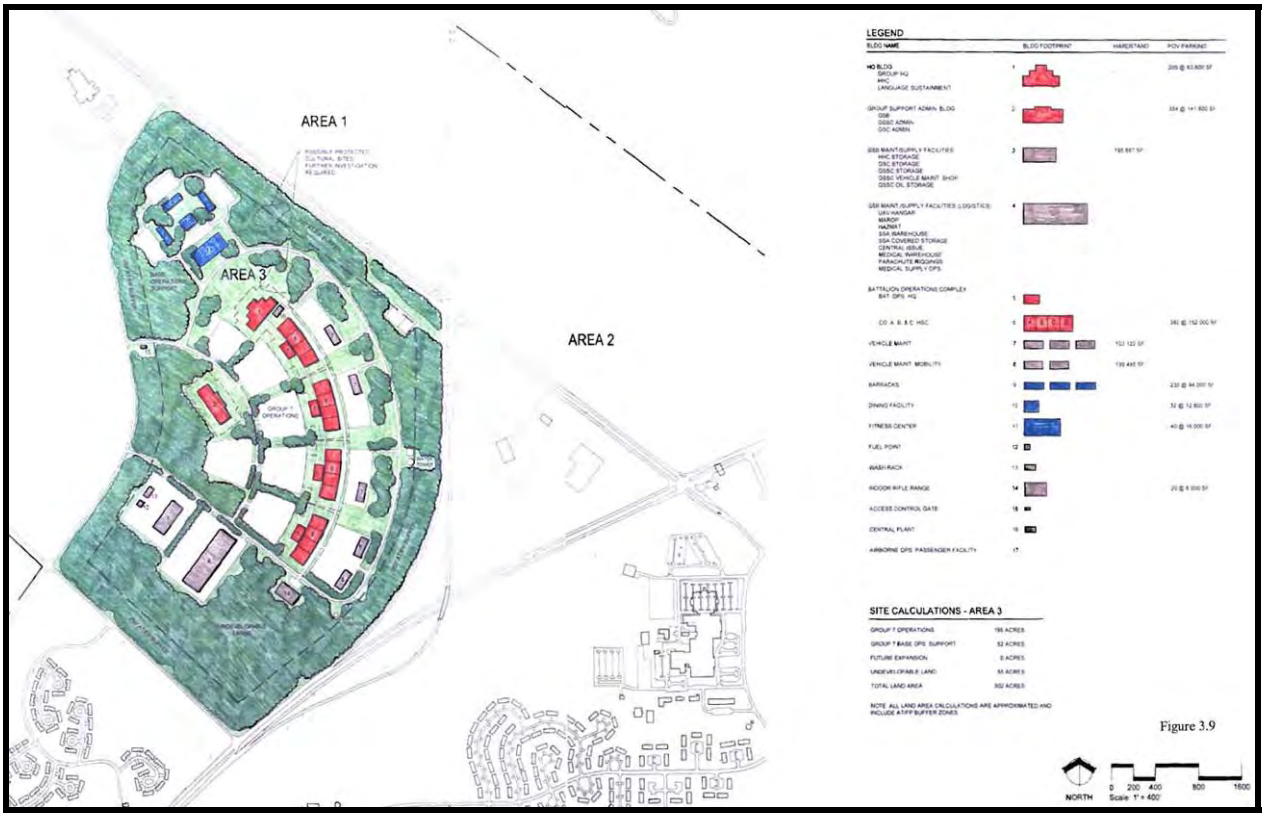

Figure 2-6. Alternative 1C Notional Layout of 7SFG(A) Cantonment Area (at North Poquito)

Figure 2-6 provides a notional layout of the 7SFG(A) cantonment area near the North Poquito area. This location is within approximately 1.5 miles of the Eglin Main Base runway that can support C-17 aircraft. The site concept locates all of the proposed 7SFG(A) improvements into the northern portion of the property. A new gated entrance drive and access control point would be constructed in the middle of the site

along Poquito Road. A second entrance would be planned south of the main entrance also on Poquito Road. The second entrance would be locked and secured in accordance with military guidelines and used on a limited basis for deployment or logistics supply.

2.3.3.2 7SFG(A) Cantonment Alternative 2: Location Near Duke Field

7SFG(A) Cantonment Alternative 2 is within close proximity to Duke Field as shown in Figure 2-7. The five sub-alternatives are primarily undeveloped areas, consisting of a mixture of sandpine, longleaf pine, and pine plantations (Gault, 2007a). Several infrastructure improvements would be part of Alternative 2 sub-alternatives. Road improvements to Range Roads (RR) 213, 220, and 231 and along Bill Davis Way would be required. These roads would be widened and paved, with gravel shoulders. The road corridor would be expanded to 200 feet.

In addition, electrical, water main, gas, telephone, and wastewater main utility lines would run in along roadway easements and the southwestern boundary of Duke Field from the southern terminus of Bill Davis Way. A 5-acre site to the east of Hwy 85 would be utilized for an electrical substation and three possible locations for an access control point: one at the intersection of RR 213 and RR 231 for 7SFG(A) Cantonment Alternatives 2A and 2C; one along Bill Davis Way just north of Duke Field for 7SFG(A) Cantonment Alternative 2B; and one at the intersection of RR 213 and RR 220 for Alternatives 2D and 2E. Figure 2-8 provides a notional layout of the cantonment area for 7SFG(A) Cantonment Alternative 2 that would be similar for Alternatives 3, 4, and 5.

The MSA would be the same for any of the five sub-alternatives located at Duke Field. All 7SFG(A) munitions would fit inside the existing fenced area of the MSA at Duke Field without any conflict over the types of munitions. The MSA is located in the northwest portion of the airfield (Figure 2-7), with sufficient separation from the majority of the base activities.

Additional storage modules, igloos, and an explosives operating location would need to be constructed within the fenced area and to the southeast of the existing storage area. This area of approximately 3 acres would need to be cleared. No existing facilities would need to be removed. Due to the type of use and the low use of RR 474, there would be no minimum distance requirement for this road. Primary traffic on the road is security patrols that provide security for the MSA.

7SFG(A) Cantonment Alternative 2A: Southeast of Duke Field

Alternative 2A would construct facilities identified in Table 2-2 at Site 2A, identified in Figure 2-7.

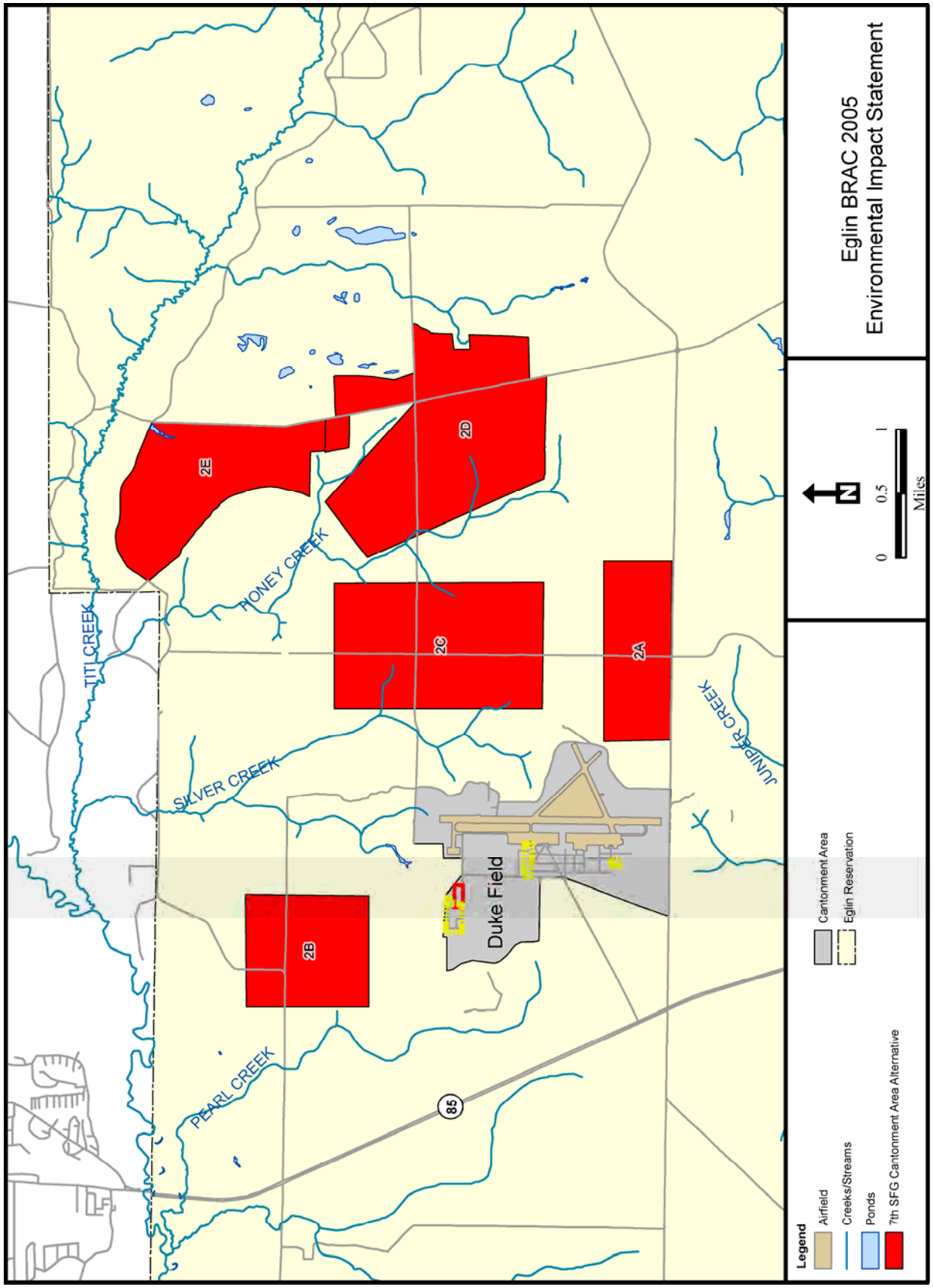

Figure 2-7. Alternative 2 Potential 7SFG(A) Cantonment Area Locations

The 7SFG(A) Cantonment Alternative 2A area encompasses approximately 473 acres and is bounded by the existing Duke Field fence to the west and Honey Creek to the east. The southeastern portion of the site contains UXO contamination dating back to the 1940s and trees that were formerly home to red-cockaded woodpeckers (RCWs). Access to the proposed 7SFG(A) cantonment area would be accomplished by exiting east off Hwy 85 onto a new paved road that proceeds east across Juniper Creek and northeast to the site. Construction of the new road would be required as part of this alternative. The land outside Duke Field is occasionally used for military training exercises and is seasonally used for public recreational archery hunting.

7SFG(A) Cantonment Alternative 2B: Northwest of Duke Field

Alternative 2B would construct cantonment facilities identified in Table 2-1 at Site 2B (Figure 2-7).

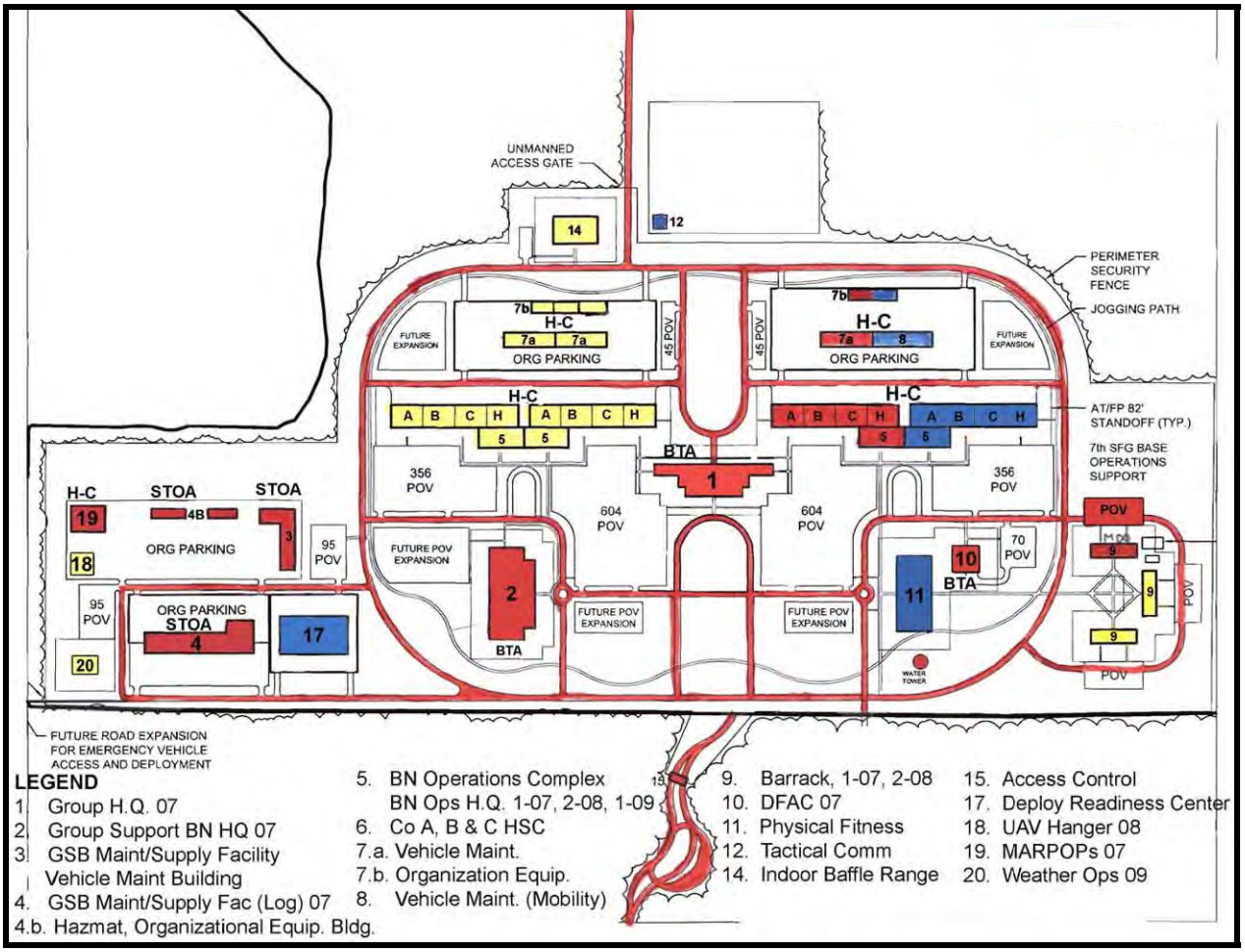

Figure 2-8. Notional Layout of 7SFG(A) Cantonment Area

The approximately 535-acre area is bounded by Pearl Creek to the west, a tributary of Silver Creek to the east, wetlands to the north, and the MSA for Duke Field to the south. The southeastern portion of the site reportedly contains UXO contamination dating back to the 1940s. The northwestern portion of the site contains wetlands. This proposed site is closer than 7SFG(A) Cantonment Alternative 2A to the Gulf Power transmission lines and is substantially farther from the existing wastewater treatment plant at Duke Field.

Access to the proposed 7SFG(A) Cantonment Alternative 2B area would be accomplished by exiting east off Hwy 85 onto an existing dirt surface road (RR 211). This remote and undeveloped area is occasionally used for military training exercises and is seasonally used for public recreational archery hunting.

7SFG(A) Cantonment Alternative 2C: Northeast of Duke Field

Alternative 2C would construct cantonment facilities listed in Table 2-1 at Site 2C (Figure 2-7). The approximately 1,023-acre site is bounded by Silver Creek to the west and Honey Creek to the east. Access to the proposed 7SFG(A) Cantonment Alternative 2C area would be accomplished by exiting east off Hwy 85 onto a new paved road that proceeds east across Juniper Creek and northeast to the site. Construction of the new road would be required as part of this alternative. This remote and undeveloped area is occasionally used for military training exercises and is seasonally used for public recreational archery and general gun hunting.

7SFG(A) Cantonment Alternative 2D: East of Duke Field

Alternative 2D would construct Table 2-1 cantonment facilities at Site 2D (Figure 2-7). This area is about 2 miles from the runway at Duke Field and within the North-South Corridor. Alternative 2D covers approximately 1,281 acres between two tributaries of Honey Creek. Access to the Alternative 2D area would be accomplished by exiting east off Hwy 85 onto a new paved road that proceeds east across Juniper Creek and northeast to the site. This remote and undeveloped area has been used for outdoor recreation and for timber harvesting.

7SFG(A) Cantonment Alternative 2E: Eglin North Border near Duke Field

Alternative 2E would construct Table 2-1 cantonment facilities at Site 2E (Figure 2-7). This area is about 3 miles from the Duke Field runway and is beneath the North-South Corridor. It covers approximately 716 acres and lies between Honey and Titi Creeks.

Access to the Alternative 2E area would be accomplished by exiting east off Hwy 85 onto a new paved road that proceeds east across Juniper Creek and northeast to the site.

Exiting east from RR 231, access would be from RR 211, along the northern Eglin Reservation boundary. This remote and undeveloped area has been used for outdoor recreation and timber harvesting.

2.3.3.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

Alternative 3 would establish the 7SFG(A) cantonment area at a location approximately 4 miles west of Duke Field (Figure 2-7) and requires construction of facilities identified in Table 2-1. Figure 2-8 provides a notional layout of the cantonment area. Several additional infrastructure improvements would also be part of Alternative 3. Improvements to RRs 211, 213, 215, and 237 would be required. These roads would be widened and paved, with gravel shoulders. The road corridor would be expanded to 80 feet for RR 211 and the section of RR 237 north of Alternative 3. The section of RR 237 south of Alternative 3 and the sections of RR 215 and RR 213 from RR 237 to Hwy 85 would be widened to 200 feet. A new 200-foot-wide connecting road segment would link RR 213 to the Duke Field entrance.

In addition, electrical, water main, gas, telephone, and utility lines would run in along these roadway easements on RR 215 and the southern portion of RR 237. A 5-acre site to the east of Hwy 85 would be utilized for an electrical substation, and an access control point would be located at the intersection of RR 237 and RR 215. Two options are being considered for wastewater treatment at the 7SFG(A) Cantonment Alternative 3 site. The first option would be to develop on on-site wastewater treatment facility. The second option would be to direct wastewater to the Crestview Wastewater Treatment Plant via an on-site wastewater main and sewer easement along the northern portion of RR 237 and RR 211. Both options are analyzed, as appropriate, in Chapter 4.

The MSA would be the same as for 7SFG(A) Cantonment Alternative 2, which would be the existing MSA at Duke Field.

Alternative 3 lies under the North-South Corridor, covers approximately 500 acres, and lies between Duck Pond to the west and Gopher Creek to the east (Figure 2-9). The site is undeveloped with elevations ranging from 100 feet to 175 feet and consists of a mixture of sandpine plantations and old growth longleaf pines (Gault, 2007a). The area is used primarily for outdoor recreation, including dog hunting. The proposed new access to Alternative 3 could be from a new signalized intersection at the existing Duke Field entrance at Hwy 85. The new access road would extend southwest from the intersection to RR 213. Access to the Alternative 3 site would then continue on RR 213, then RR 215, then north onto RR 237.

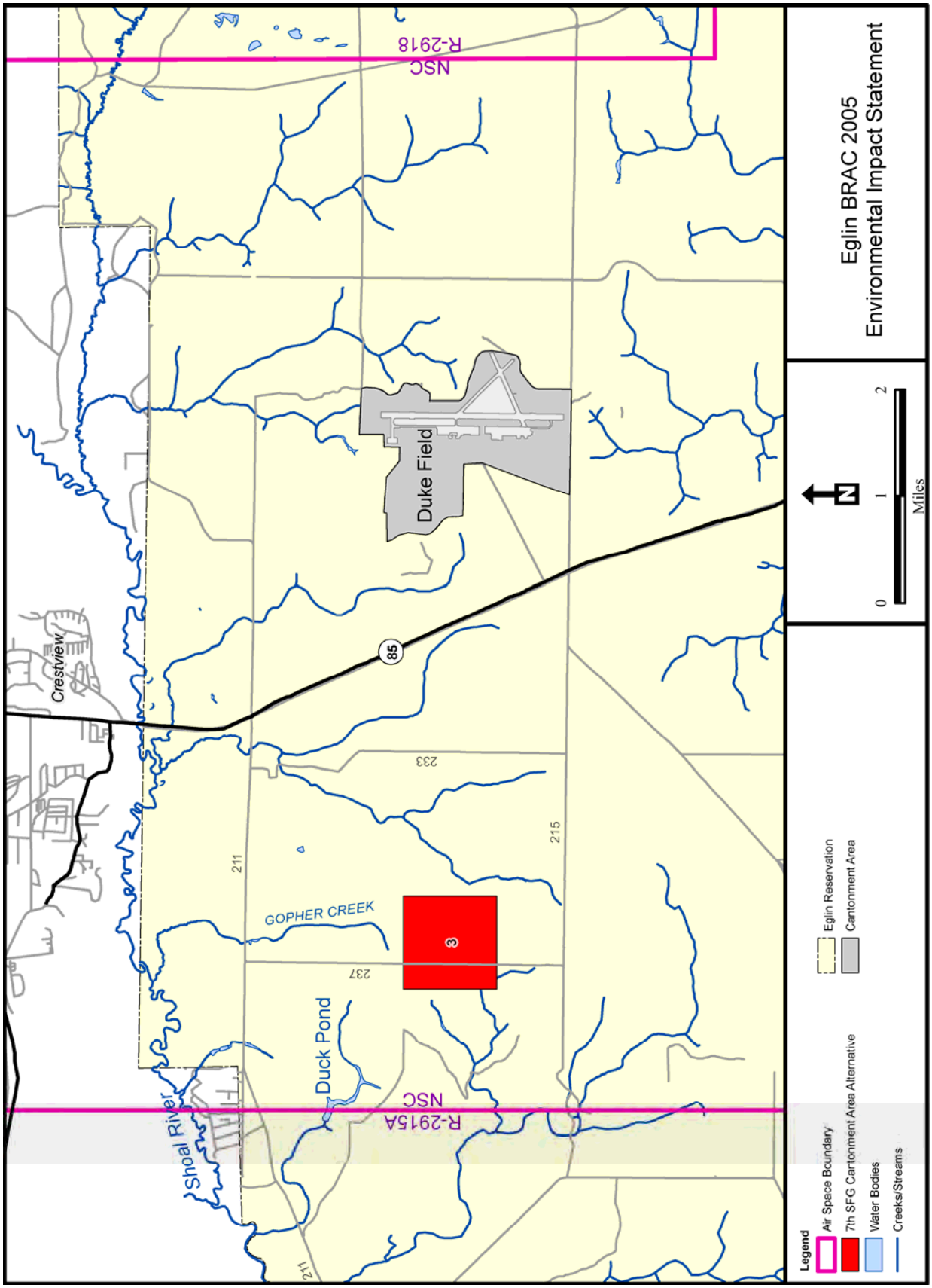

Figure 2-9. Alternative 3 Potential 7SFG(A) Cantonment Area Location

2.3.3.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main Base

Alternative 4 would construct Table 2-1 facilities cantonment area at a location approximately 2 miles north of Eglin Main Base off Hwy 85, along RR 230, west of the city of Valparaiso (Figure 2-7). Figure 2-8 provides a notional layout of the cantonment area. The site lies under the North-South Corridor between Toms Creek to the south and Turkey Creek to the north (Figure 2-10) and is relatively flat with elevations ranging from 75 feet to 100 feet. The 500-acre site is undeveloped and has thick turkey oak and sandpine vegetation with some scattered longleaf pines (Gault, 2007a). It has a thick understory and midstory as it has not been burned in over 15 years (Gault, 2007a). Although open to hunting, the area has not been used very much for outdoor recreation (Gault, 2007a).

The MSA would be the same as for 7SFG(A) Cantonment Alternative 1 and would use the existing MSA at Eglin Main Base. Access to the proposed cantonment would be accomplished by exiting Hwy 123 onto RR 626.

2.3.3.5 7SFG(A) Cantonment Alternative 5: Near DeFuniak Springs

Alternative 5 would construct Table 2-1 facilities near the northeastern border of the Eglin Reservation near the intersection of RR 212 and RR 382 (Figure 2-7). Figure 2-8 provides a notional layout of the cantonment area. The site lies between Buck Branch to the west and Bullhide Creek to the east (Figure 2-11). Elevations over the site range from 150 feet to 250 feet. The MSA would be the same as for Alternative 2 and would use the existing MSA at Duke Field. Infrastructure improvements under Alternative 5 would include road improvements to RR 210 and a connector road from RR 210 to the cantonment area. These roads would be widened to 200 feet and paved, with gravel shoulders. In addition, electrical, water main, gas, telephone, and wastewater main utility lines would run in along these roadway easements on RR 210, and off-base utility service lines would follow existing power line easements. A 5-acre site along RR 210 would be utilized for an electrical substation, and an access control point would be located at the intersection of RR 210 and the connector road to the cantonment area.

7SFG(A) Cantonment Alternative 5 lies under special use airspace, designated as Eglin Military Operating Area (MOA) C, covers approximately 500 acres, and is near the towns of Mossy Head and DeFuniak Springs (Figure 2-11). The area consists of a mixture of sandpine, longleaf pine, and pine plantations and is open to hunting, including dog hunting (Gault, 2007a). Access to the proposed cantonment would be accomplished by exiting Hwy 285 onto RR 213 and onto a new paved road. This remote and undeveloped area has been used for outdoor recreation (Gault, 2007a).

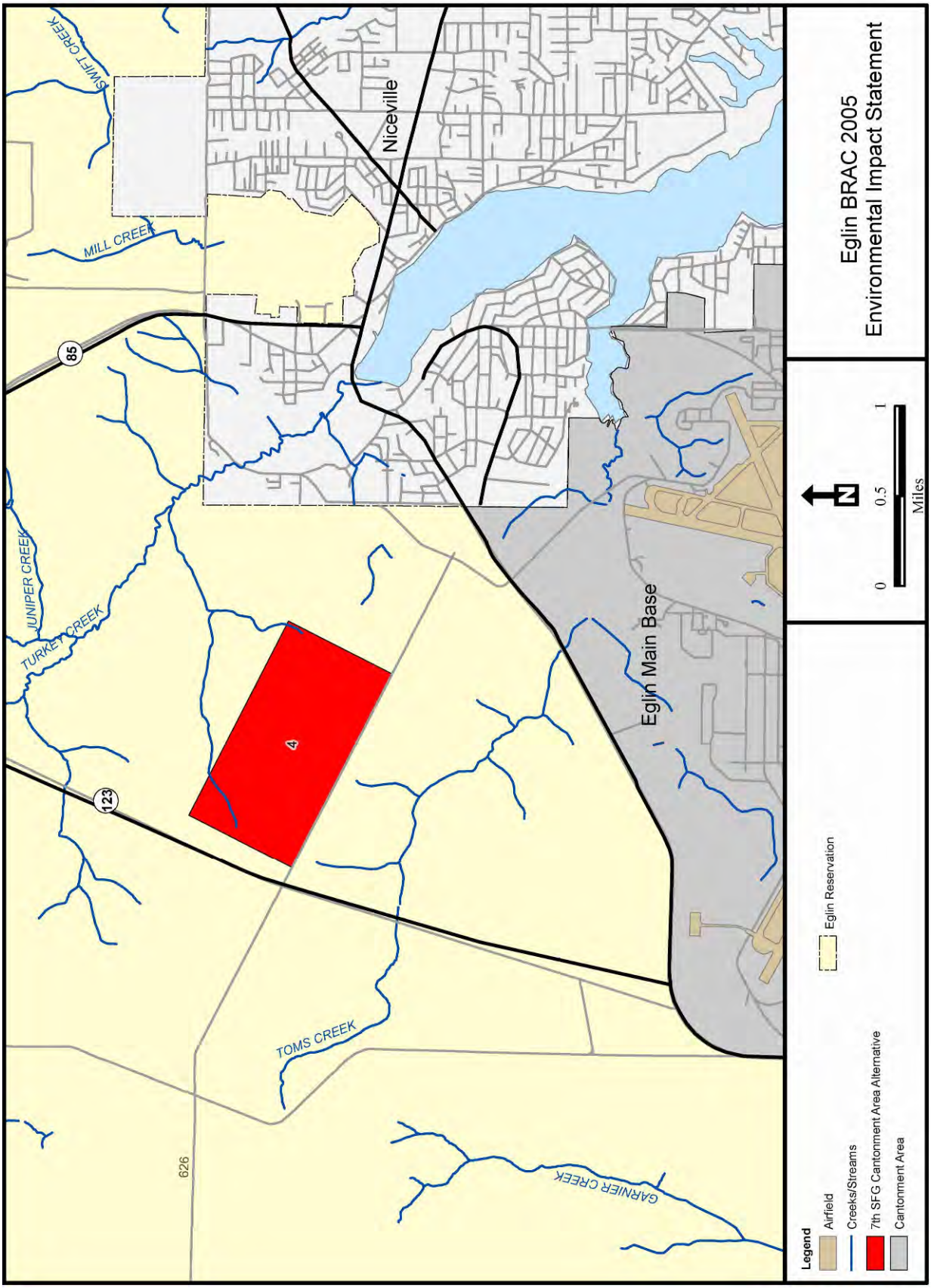

Figure 2-10. Alternative 4 Potential 7SFG(A) Cantonment Area Location

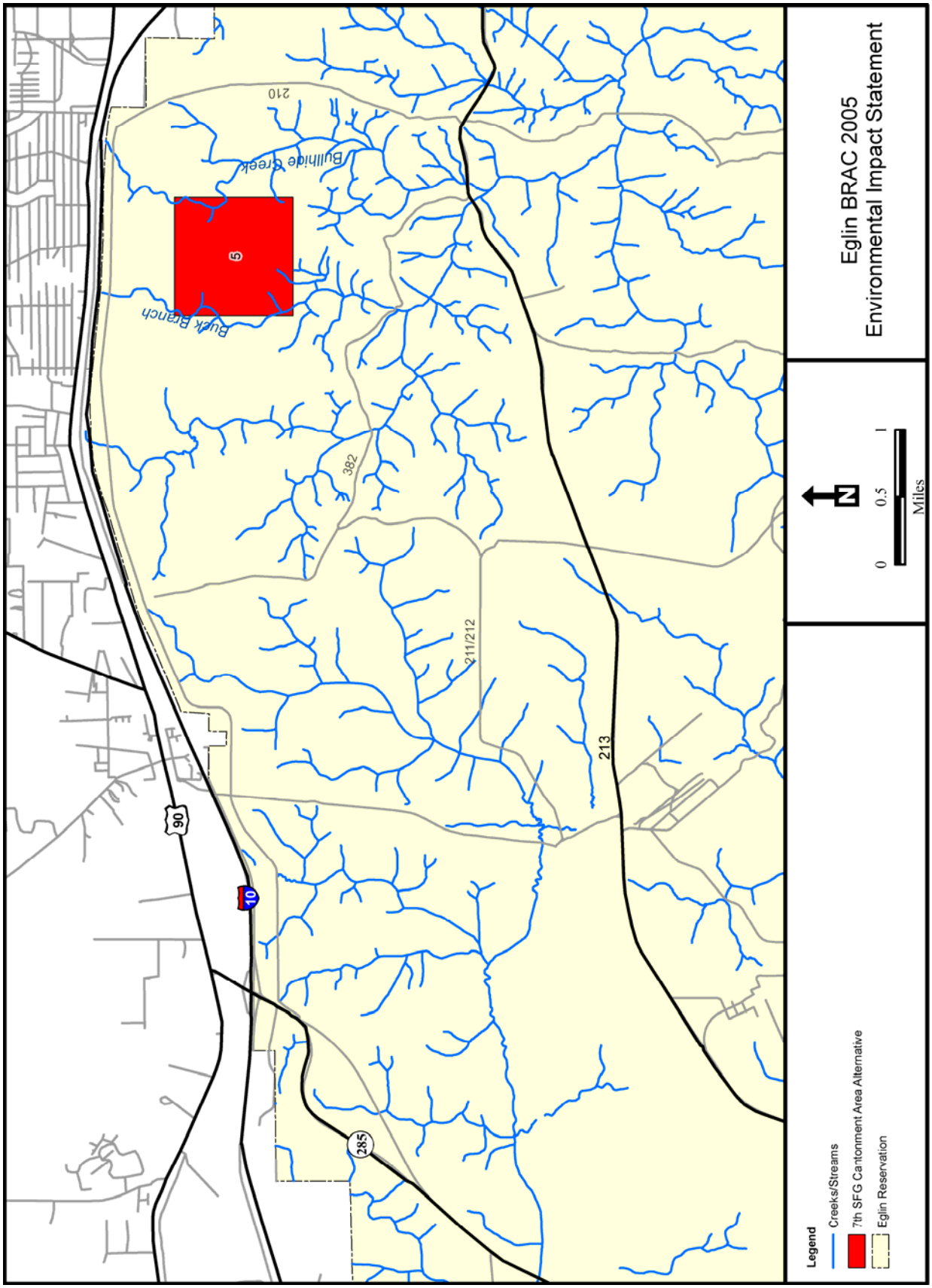

Figure 2-11. Alternative 5 Potential 7SFG(A) Cantonment Area Location

2.4 OPERATIONAL REQUIREMENTS FOR 7SFG(A) RANGE TRAINING

The 7SFG(A) Range Training component involves the activities described in Table 2-3. The 7SFG(A) requires utilization of the Eglin Range in three areas: (1) Firing Ranges, (2) Aircraft Operations, and (3) Water Operations and Ground Maneuvers. The specific training activities listed in Table 2-3 are generalized descriptions of tasks that are critical to the 7SFG(A)'s state of readiness to conduct special operations.

Table 2-3. Training Activities Associated With the 7SFG(A)

Activity	Specific Training
Firing Operations – Firing Ranges	Individual weapon
	Crew served weapon
	Team training
	Indirect fire system
	Explosives
Aircraft Operations – Fixed-Wing and Rotary	Infiltration/Exfiltration
	Insertion/Extraction Systems
	Container Delivery
	Close Air Support
	Airborne Operations
	Air Assault
Water Operations and Ground Maneuvers	Water Infiltration/Extraction
	Ground Infiltration/Extraction
	Ground Mobility
	Reconnaissance/Surveillance
	Medical Evacuation
	Stalking
	Convoy
	Visibility

Firing Ranges

The 7SFG(A) requires range land with facilities, utilities, roads, trails, and other assets necessary to fulfill weapons training certifications for individuals and team training. Table 2-4 summarizes the training facilities and assets that 7SFG(A) would use as Firing Ranges for weapons training and certification. The table describes the minimum requirement for acres of developed land as well as the total Surface Danger Zone (SDZ) buffer area for each Firing Range. The SDZ is the ground and airspace designated within the training complex for vertical and lateral containment of projectiles, fragments, debris, and components resulting from the firing, launching, or detonation of weapon systems to include ammunition, explosives, and demolition explosives (Departments of the Army, and the Marine Corps, 2003). These facility requirements would be the same across all 7SFG(A) Range Training alternatives. It is possible for the

footprint (including the SDZ) of these individual Firing Ranges to overlap so that the total affected area may be less than all of the individual footprints combined. Table 2-5 lists the annual estimated ammunition use for all 13 ranges associated with 7SFG(A) training. These numbers are based upon the requirements needed to train 2,200 troops. The ammunition expenditure would be the same for all 7SFG(A) Range Training alternatives.

Table 2-4. Required Weapons Training Ranges for the 7SFG(A)

Facility Description	Name	Size (acres)	SDZ (acres)	Total (acres)
SOF Shoot House The Shoot House would include a cluster of buildings around a courtyard, a 100-meter flat range, and an elevated sniper position and observer platform approximately 200 meters to 300 meters to the rear of the Shoot House.	SOF 1	0.72	2,682.48	2,682.48
SOF Sniper Range Suite The SOF Sniper Range Suite is an SOF-specific range where shooters engage targets up to the maximum range of the .50 caliber Sniper Rifle. It includes a Known Distance Range, field fire, a four-story urban hide and rooftop firing platform, a 10-foot perimeter fence, a general instruction building, a 500-by-1,000–meter helicopter landing zone, access control buildings, and training and support buildings.	SOF 2	182.88	6,413.88	6,413.95
SOF Breach Facility The Breach Facility consists of a retaining wall and door, window, and wall breaching structures. No automation is required for this facility. A latrine would be required if the facility is not co-located with another Range Operations Control Area (ROCA). The facility trains soldiers on the technical aspects of breaching techniques, as well as Techniques, Tactics, and Procedures (TTPs) and explosive techniques not trained on at any other type of facility.	SOF 3	4.00	193.09	197.10
SOF Shotgun Range The Shotgun Range would be an open range with no buildings. The range would consist of a Trap Target Area, 25-meter flat range, and a 10-meter Dispersion Range. An obstacle course is planned in addition to the range.	SOF 4	13.96	3,049.55	3,052.31
MK19/M203 Grenade Launcher Range The Grenade Launcher Range would include four firing stations. No automation would be required at this facility. All targets would be fixed at required distances. There would be no defined standalone MK19 range. Therefore, an evaluation of the MK19 component of the Multipurpose Machine Gun Range (which comprises 10 firing positions) has been included in the development of a combined range for MK19/M203 training. MK19 targets range from 400 to 1,500 meters.	SOF 5	180.88	1,034.17	1,034.18

Continued on the next page…

Table 2-4. Required Weapons Training Ranges for the 7SFG(A), Cont'd

Facility Description	Name	Size (acres)	SDZ (acres)	Total (acres)
Mortar Weapons System Range The Mortar Range would be a standard Army range. It requires surveyed firing points, a common dedicated impact area for all types of mortars, and should be at least 2,000 meters wide and 6,000 meters deep. The actual range would include range operations control, ammunition breakdown, and latrine areas. Due to the nature of the range activities, extensive clearing and grubbing may be required.	SOF 6	2,965.25	3,164.37	3,502.20
Hand Grenade Qualification Course Targets include bunkers, mortars, and trenches. Construction would include operations, logistics, and support areas. The qualification course allows soldiers to use fused practice hand grenades to engage targets in natural terrain under simulated combat conditions. This range description does not include throwing live hand grenades.	SOF 7	10.01	45.99	45.99
Urban Assault Course This facility is used to train individual soldiers, squads, and platoons on tasks necessary to operate within a built-up or urban area. The Urban Assault Course (UAC) would include a range with five stations consisting of multiple infantry target patterns in an urban setting. It would also have operations and storage buildings plus support facilities.	SOF 8	17.60	2,737.64	2,738.59
SOF Battle Area Complex The proposed SOF Battle Area Complex would provide opportunities to evaluate mounted and dismounted maneuvers and engagements. It would include the creation of villages, a road network, and a control center. The control center would house ammunition breakout, administration, range operations, and an area for After Action Reviews.	SOF 9	2,372.20	18,886.83	18,886.83
Anti-Armor Tracking and Live Fire The Anti-Armor Tracking and Live Fire range includes multiple targets that are stationary or mounted on rails. This standard Army range allows individuals and crews to identify, track, engage, and defeat stationary and mobile targets. Live ammunition would not be expended on this range. Accommodations for live fire would be made adjacent to this portion of the range.	SOF 10	741.31	2,759.52	2,759.52

Continued on the next page…

Table 2-4. Required Weapons Training Ranges for the 7SFG(A), Cont'd

Facility Description	Name	Size (acres)	SDZ (acres)	Total (acres)
Qualification Training Range* The Qualification Training Range (QTR) is a complex of standard Army ranges (Multipurpose Machine Gun, Modified Record Fire, Combat Pistol, and Sniper Field Fire Ranges) where shooters engage stationary and moving infantry and armor targets. The QTR includes multiple firing positions, lane markers, a security barrier, range operations and control areas, and an ammunition breakdown area. It also consists of a range operations center, range tower, storage building, general instruction building, latrine, covered mess, and an enclosed bleacher.	SOF 11	218.18	4,945.49	4,945.73
SOF Light Demolition Range The Army Standard Light Demolition Range would include six demolition points, an access road, and latrines.	SOF 12	26.93	2,583.20	2,583.20
SOF 25 Meter Zero Range The 25 Meter Zero Range is a standard Army range where shooters engage targets at 10 and 25 meters. The range is used to confirm a weapon's accuracy prior to its use on a qualification range. The actual range has no automation. It includes multiple firing positions, lane makers, and range operations and control areas. This range would also contain a range operations center, storage building, general instruction building, latrine, security barrier, covered mess, an enclosed bleacher, and an ammunition breakdown area.	SOF 13	2.72	4,669.42	4,669.42
Total		***6,736.64***	***53,165.63***	***53,511.5***

SDZ = Surface Danger Zone; SOF = Special Operations Forces

* The Qualification Training Range has four components:

Multipurpose Machine Gun Range: The Multipurpose Machine Gun Range would be an automated range that would cover 3,600 acres. The range would include multiple lanes, a range operations facility with tower, bleachers, latrine, storage, and an ammunition breakdown area.

Modified Record Fire Range: This range is used to train and familiarize soldiers on the skills necessary to identify, engage, and hit stationary infantry targets with the M16 and M4 rifles. The range would include stationary infantry targets and foxhole positions. All targets would be fully automated and computer-driven and scored from the range operations center.

Combat Pistol Qualification Range: The Combat Pistol Qualification Range is a standard Army range where shooters engage infantry targets at close range. It includes multiple firing positions, lane makers, and range operations and control areas. It also consists of a security barrier, range operations center with tower, storage building, general instruction building, latrine, covered mess, an enclosed bleacher, and an ammunition breakdown area.

Sniper Field Fire Range: This range is used to train soldiers on the skills necessary to detect, identify, engage, and defeat stationary and moving infantry targets in a tactical array. It is designed to satisfy training and qualification requirements of the M24 sniper rifle. It would include stationary and moving infantry targets along with four firing positions. All targets would be fully automated, computer-driven, and scored from the range operations center. Natural vegetation would be required in the target area to provide realistic obstacles for the sniper to negotiate.

Table 2-5. Estimated 7SFG(A) Ammunition Expenditure Per Range

TYPE	CURRENT TOTAL QUANTITY	EXTRAPOLATED QUANTITY	# Weapons Shooting Variants of Ammunition Type	SOF 1- Shoot House/100m Flat Range	SOF 2- Sniper Range Suite	SOF 3 - Breach Facility	SOF 4 - Shotgun Range/25 m Flat Range	SOF 5 - MK19/M203 Grenade Launcher	SOF 6 - Mortar Weapons Systems Range	SOF 7 - Hand Grenade Qualification Course	SOF 8 - Urban Assault Course	SOF 9 - Battle Area Complex	SOF 10 - Anti-armor Tracking and Live Fire	SOF 11 - Qualification Training Range (QTR)	SOF 12 - Light Demolition Range	SOF 13 - 25 Meter Zero Range
SMALL CALIBER																
.45 CALIBER	26,000	29,000	4	9,000										20,000		
5.56 MM	4,242,000	4,966,000	2106	1,000,000							1,000,000	1,000,000		1,000,000		966,000
7.62 MM	913,000	1,248,000	524	100,000	200,000						100,000	300,000		250,000		298,000
9 MM	1,944,000	2,100,000	1293	100,000			100,000							900,000		1,000,000
12 GAGE	33,000	34,000	153				15,000				15,000	4,000				
.50 CALIBER	230,000	300,000	156	2,000	150,000							90,000		50,000		
LARGE CALIBER																
40 MM	50,000	57,000	229					30,000				27,000				
60 MM	7,000	8,200	35						8,200							
81 MM	5,100	6,300	4						6,300							
84 MM	380	400	20										400			
MINES, DEMOLITIONS, GRENADES, ROCKETS																
MINES	2,200	2,500													2,500	
DEMOLITION		802118	Total includes variations of TNT, Shape Charges, Dynamite, and 769,306 feet of Detonation Cord. Total DOES NOT include various igniters (Miscellaneous Explosive Devices).													
Misc. Explosive Devices	NA	173882	To be expended across Demolitions Range (SOF 12), and Breach Facility (SOF 3)													
Total Demo/Devices		976,000														
HAND GRENADES	7,600	8,100										1,100			7,000	
FLARES	2,100	2,400	Assumption: These include hand-held type to include star clusters, etc., and would be dispersed among maneuver areas similar to the Ranger's utilization with the exception of the mortars illumination rounds. If this is the case, a breakdown of hand-held flares versus illum for mortars is needed.													
SIMULATORS	9,500	11,400	Assumption: These are artillery simulators, hand grenade simulators, etc., and would be dispersed among maneuver areas similar to the Ranger's utilization.													
ROCKETS	850	1,260											1,260			

Sources: U.S. Army, 2005; Dill, 2006a
m = Meter; mm = Millimeter; SOF = Special Operations Forces

Aircraft Operations

The 7SFG(A) range training would require the use of airspace for fixed-wing and rotary-wing operations. Table 2-6 describes the types of air operations, altitude required and annual estimated number of missions and hours. Also listed are the capabilities required for the type of air operation listed.

Table 2-6. Estimated Annual Requirements for 7SFG(A) Aircraft Operations

Type of Air Operation		Altitude	# of Missions	# of Hours	Capabilities Required
Rotary-Wing	Airborne Operations	1,500 feet maximum	68	272	DZ
	Helocast		9	96	Water DZ
	FRIES		111	666	HLZ
	Sling Load		20	340	HLZ
	Air Assault		79	948	HLZ
	TOTAL		**287**	**2,322**	
Fixed-Wing	Static Line Airborne Operations	1,500 feet maximum	157	628	DZ
	Military Free Fall Airborne Operations	22,000 - 35,000 feet	55	220	DZ
	RAPIDS		21	168	Landing Strip for C-130
	Container Delivery System Operations		17	68	
	Close Air Support		36	144	Targets
	TOTAL		**286**	**1,228**	
Air Operations Totals			***573***	***3,550***	

Source: U.S. Army, 2005; Dill, 2006b

DZ = Drop Zone; Helocast operations involve soldiers jumping from low flying helicopters into the water, usually no more than 40-foot high jumps at 40 knots speed; FRIES = Fast Rope Insertion/Extraction System; HLZ = Helicopter Landing Zone; RAPIDS = Rapid Infiltration/Exfiltration

Water Operations and Ground Maneuvering

The 7SFG(A) would require the use of rivers, Choctawhatchee Bay, and nearshore coastal areas (e.g., such as Santa Rosa Island) for water infiltration/exfiltration training. Water infiltration techniques would be initiated from surface or sub-surface mother craft, dropped by parachute from fixed-wing aircraft, or delivered by rotary-wing aircraft. Of the 72 Operational Detachment Alpha (ODA) teams, three 12-man teams can infiltrate or exfiltrate using scuba equipment. Nine 12-man teams are trained to infiltrate/exfiltrate by combat rubber raiding craft (or Zodiac boats). Twelve 12-man teams can infiltrate/exfiltrate by surface swim techniques. All surface swim operations

are limited to sea states not to exceed a 3-foot chop and 4-foot swell. Surface swim operations would not be conducted against currents in excess of 1 knot.

The water operations and ground maneuver requirements for the 7SFG(A) provide training for a wide variety of activities such as reconnaissance, surveillance, visibility training, convoy training, and so on. The water operations and ground maneuver requirements do not include any live fire activity, as all ammunition would be confined to the Firing Ranges. A maximum of 125 square kilometers (km^2) (48.26 mi^2) of area (not defined in any particular shape) is the Army guideline for one ground training mission (U.S. Army, 2004a). The infiltration/exfiltration training activities may involve any combination of ground operations, water operations, and air operations. The following summarizes the types of activities that would be included in the 7SFG(A) range training that does not involve the use of live fire.

Foot Movement

Ground training includes a number of activities, but is generally the movement of dismounted soldiers through wooded, interstitial areas. Troop movements are typically stealthy as units transit from one objective to another. Special Forces teams usually operate in groups of up to 12 troops. To increase the realism of the training events, some blank small-arms ammunition, hand flares, smoke grenades, or other training munitions are expended during certain operations. In almost all cases, ground training on foot involves movement under covert, clandestine conditions without leaving any evidence of troop presence. Troop movement also generally occurs in single file movement of a small group, so that large troop movements over a large land mass do not occur. Land navigation training may occur during daytime or nighttime and usually involves the use of a compass, maps, and global positioning system (GPS). Troop movement on foot may also be used for training in search and rescue, personnel recovery, and reconnaissance. Personnel movement may occur on established roads, along or across streams, through cleared areas, wooded areas, and on rare occasions through swamp environments. These types of activities would occur with teams of no more than 12 troops, and movements would occur in such limited frequency over the same area that the physical impact on the ground would be negligible.

Typical troop movement activity includes:

- Road March (done on existing roads for extended lengths of travel).
- 6- to 12-man team insertion/extractions from varying methods (parachute, boat, and helicopter). Insertions are clandestine activities. Regardless of how an insertion is accomplished, personnel would most often walk away.
- Clandestine movement by foot to training objective sites (most often culminating at firing ranges).

- Foot movement to Firing Ranges through the interstitial and on existing roads.
- Vehicle movement to Firing Ranges utilizing existing roads.

Aircraft and Vehicles

Aircraft and ground support vehicles are occasionally integrated into the training to deliver and retrieve the participating troops or provide support and logistics. Ground vehicle movement is normally restricted to the existing road and trail network, but some training integrates the use of all-terrain vehicles (ATVs) or small trucks. Airborne operations include the use of rotary or fixed-wing aircraft for the insertion, extraction, movement, or supplying of ground troops. This could include the delivery of paratroops or paradrops. Paratroops are personnel who jump from an aircraft and descend by parachute from varying altitudes. Paradrops are the delivery of equipment or supplies using parachutes. These equipment or supplies are palletized and rigged with multiple automatically deploying parachutes.

The 7SFG(A) would require the use of helicopter landing zones (HLZs) and parachute Drop Zones (DZs). The Eglin Range contains landing zones, HLZs, and parachute DZs within the interstitial area (the areas between test areas). These zones are established for user groups that conduct training and testing that integrate ground and air operations. Landing zones are used for touchdown and takeoff of fixed-wing and rotary military aircraft. HLZs are established for the landing and takeoff of military helicopters. HLZs may be improved surfaces such as concrete or asphalt; however, the majority of HLZs on the Eglin Reservation are cleared, grassy areas either on a test range or in the interstitial area. DZs are areas for inserting paratroops or paradropping equipment or palletized supplies. The 7SFG(A) would use existing HLZs and DZs. However, two new DZ locations have been proposed during the development of range alternatives.

Vehicle use is primarily on existing roads, though some off-road use may occur. Overall, there is minimal vehicle use associated with interstitial missions. The largest vehicle that may traverse off road is a High Mobility Multipurpose Wheeled Vehicle (HMMWV) (1/4 ton truck). This vehicle comes in varying sizes and can accomplish an array of diverse tasks. The vehicles would not traverse in wetlands or swamps. Tasks that may require leaving existing roads include setting up remote communication relay sites. Often, this requires one to two vehicles traveling to a known point for limited mission-specific activity. Other tasks include "Zone Recce" where a series of vehicles may temporarily conceal themselves off the existing travel routes for a short period. Small ATVs would also be utilized and in most cases would support establishment of DZs, HLZs, and occasional insertion to a remote area for other on-foot activities.

The 7SFG(A) would utilize Combat Rubber Raiding Craft (Zodiac Boats). These Zodiac Boats would be utilized for water DZ support. This activity merely requires the boat to remain in a mobile position in order to retrieve paratroopers from the water. The

watercraft would also be utilized for insertion into an area of operation. Personnel would come ashore on a river bank, bay shore, or beach shore and would clandestinely depart the area, leaving no trace of their presence. Boats may be abandoned at an insertion point and retrieved by varying means to include being towed back out to the water for pickup or hauled away by support personnel. Support personnel would hand carry boats to a vehicle-hauled trailer for movement out of the area via existing roads.

Bivouac

Troops use a number of different bivouac scenarios that vary from tents on concrete pads to primitive camping. Bivouac descriptions are given below and indicate the likeliness of the 7SFG(A) conducting these type of activities:

- No Bivouac: Training would normally include small teams, usually 12 men or less, that rarely halt movement for sufficient duration to establish a bivouac. The majority of the 7SFG(A) activities fall in this category. 7SFG(A) soldiers would not dig fighting positions under this category.
- Primitive Bivouac: On occasion units may establish primitive/temporary bivouac facilities (patrol bases) and would not stay in the same location for more than 48 hours. It is a tactical standard for units to ensure that sites used for bivouac are left with no evidence of their use. As a minimum, the site should not reveal the number of personnel that occupied it or the duration of the stay. In this context, significant effort is made to not impact the environment. Any other activities related to this scenario that are not included above in the "no bivouac" category would fall into this category.
- Temporary Tent Complex: Larger units with equipment and vehicles establish longer-term bivouac facilities in the open areas around auxiliary fields. These areas usually encompass larger unit staging areas and unit rear echelon support areas. Units using these sites make an effort to reduce the impacts on the environment for the same reasons as stated above; however, because of the equipment, this standard is not as easily attained. Once every six months, the support soldiers may have a small exercise with limited digging, grounding rods for generators and temporary set-up of communications antennae and vans. Once per year, the Battalion or the Group HQ may have a seven- to 14-day exercise. Normally concertina (coiled barbed wire) is temporarily placed around medium-sized tents, but digging is not involved.
- Reusable Hard Stand: Some units' training goals can be achieved using more established facilities. Auxiliary Fields 3 and 5 have often-used hardened bivouac sites. Hardstand tent pads and some framed structures exist at these bivouac sites. Water and electricity hook-ups are also provided. It is unlikely that the 7SFG(A) would conduct activities requiring such accommodations. However, should this type of facility be needed, existing sites can be used.

Regardless of the training type or bivouac, rations are Meals Ready to Eat (MREs) 90 percent of the time. 7SFG(A) support companies do not set up field kitchens to provide warm rations. However, any waste and other trash are bagged and transported to dumpsters for disposal or carried out in the individual soldier's pack. All bivouac sites would require Eglin approval and need to be scheduled.

The following represents a typical day for a 7SFG(A) event:

Time	Event
0530–0630	Movement into Compound (Cantonment Area)
0630–0800	Physical Training (PT) (Long runs all over Eglin vicinity)
0800–0900	Breakfast
0900–1200	Basic Ranges, Airborne Operations, Maintenance, Water Operations
1200–1300	Lunch
1300–1700	Cross-training classes, Advanced Ranges, Rotary-Wing Operations, additional PT
1700–1800	Dinner, some units would release
1800–0530	Night Ranges, Night Patrolling, Vehicle Operations and Night Airborne Operations

Key or highlighted events that are being executed in support of the 7SFG(A) mission include (Dill, 2006b) the following:

- Physical Training
  - Runs up to 15 kilometers in 108 or more small formations and ability groups
  - Weight lifting
  - Obstacle courses
  - Endurance events (rucksack march up to 20 kilometers)
- Airborne Operations
  - Rotary and fixed-wing aircraft (Army, Air Force, Coalition and civilian contract aircraft)
  - Tactical infiltration for exercise or airborne/air assault sustainment
- Range Operations (utilization of the Firing Ranges)
  - All weapons systems
  - Some dud-producing (high explosive ordnance that does not detonate)
- Vehicle Training
  - On- and off-road and Ground Mobility Vehicle (GMV) patrolling
  - Mounted and dismounted

- Water Operations (boat or aircraft infiltration)
- Close Air Support (CAS) Sorties (on existing live fire ranges)

Table 2-7 describes the equipment that would be utilized by the 7SFG(A) for water operations and ground maneuvering.

Table 2-7. Estimated 7SFG(A) Equipment Requirements for Water Operations and Ground Maneuvering

Equipment Type	Operation	Missions/Year	Hours/Year
Ground Vehicles – Wheeled			
HMMWV (1-1/4 Ton)	Mobility Training*	288	576
	Live Fire Platform	144	432
	Zone Recce	144	432
HMMWV (Heavy)	Convoy Training	40	80
	SPT Live Fire	20	60
HMMWV (Expanded)	Communication Exercises	20	60
	Range Support	3,665	29,323**
	DZ Support	816	3,264**
2-1/2 Ton Cargo Truck LMTV	DZ Support	816	3,264**
	Boat Transport	140	280
	Convoy Training	40	120
	Live Fire Platform	20	60
5 Ton Cargo LMTV	Exercise Support	20	80
	Ammo Transport	200	200
	Live Fire Platform	20	60
ATV/Motorcycle	Mobility Training	288	576
Watercraft			
Combat Rubber Raiding Craft (Zodiac Boats)	UWO Training (12 Scuba Teams)	120	480
	Water DZ Support	20	60

ATV = All Terrain Vehicle; CAS = Close Air Support; DZ = Drop Zone; HMMWV = High Mobility Multipurpose Wheeled Vehicle; LMTV = Light Medium Tactical Vehicle; SPT = Support; UWO = Underwater Ordnance
*Mobility training based on 72 12-man teams sharing the vehicles in the unit and conducting four events per 12-man team at two hours per event.
**Range/DZ Support Hours includes sitting at the range after ammo and supply transport, and not always moving.

2.4.1 Alternative Narrowing Process for the 7SFG(A) Range Training

The Eglin Range BRAC Implementation Study was conducted to develop alternatives that met the underlying purpose and need (i.e., to determine how to implement the requirements at Eglin AFB) (Borthwick, 2006). The study group's charter was to "codify detailed range requirements for the BRAC actions, gather baseline data concerning the range, community, and environmental features, and produce alternatives for implementing the BRAC recommendations for the Eglin Range Complex."

Based on input from the user groups associated with the Proposed Action as well as BRAC support documentation, the study resulted in the following set of range evaluation criteria for the 7SFG(A) range training alternatives:

1. Meet New and Existing User Needs

To assess if the Range Complex is "meeting new and existing user needs," it must be determined whether the configuration allows for the successful implementation of the users' proposed action and needs.

2. Minimize Cost

When determining how to "minimize cost," the following should be considered:

- The initial cost of an existing facility and the costs associated with relocating that facility: Relocating factors such as accessibility to utilities, ability to use existing roads, minimization of UXO clearance, and mission disruption during relocation must be considered.
- Cost considerations for entirely new facilities include accessibility to utilities, ability to use existing roads, and minimization of UXO clearance.
- Considerations for operational costs might include: Range manning (facility control) and equipment, increased number of facilities, and new contractors to manage the range. Reducing costs associated with the 13 ranges requires a layout that would decrease the difficulty of securing firing zones and safety footprints and would not require increased road closures or personnel to man road closures for continuous operations.

3. Sustain Mission Capability

In order to "sustain mission capability," the creation of new dudded munition areas, mission–community/cantonment interface, and environmental impacts must be minimized. At the same time, strategic capability should be maximized. (A dudded munition is an ammunition that upon impact to the target does not explode. Therefore, the explosive content becomes hazardous.)

Criteria that were used to further screen the locations that were suitable for 7SFG(A) range training consisted of two major questions that had to be considered: (1) does the area provide maneuver space and access for the 7SFG(A) and other users now and in the future, and (2) of the section selected, is there enough area available to create the required 13 training ranges (listed in Table 2-4). Other considerations included the following:

- Maintenance of future mission flexibility
- Safety
- Compliance with BRAC regulations
- Maintaining live fire within restricted airspace

- Minimizing range evacuation
- Minimizing environmental impacts
- Minimizing the creation of new dudded munition areas
- Minimizing conflicts with other major Eglin Range Complex users
- Minimizing impacts to outdoor recreation, including hunting and camping areas
- Minimizing sensitive public issues
- Protection of flight operations and approaches to active airfields
- Minimizing noise impacts to the community
- Considerations of future UAV missions and restricted airspace needs
- Location of manned facilities along the perimeter of the Reservation to avoid evacuation due to safety footprints
- Providing optimal night access to ranges
- Minimizing closures to easements, rights-of-way, transportation corridors, and public rights-of-way
- Locating ranges within 30 minutes' walking time or 10 minutes' driving time of a cantonment area

The ranges were divided into two separate groups, Group 1 and Group 2:

- Group 1 (four ranges)
  - Shoothouse (SOF 1)/Zero Range (SOF 1a)
  - Breach Facility (SOF 3)
  - Shotgun Range (SOF 4)/Zero Range (SOF 4a)
  - Hand Grenade Familiarization/Assault Course (SOF 7)
- Group 2 (nine ranges)
  - Sniper Suite (SOF 2)
  - MK19/M203 range (SOF 5)
  - 81 millimeter (mm) mortar range (SOF 6)
  - Urban Assault Course (SOF 8)
  - Battle Area Complex (SOF 9)
  - Anti-Armor and Tracking Range (SOF 10)
  - Qualification Training Range (SOF 11)
  - Demolition Range (SOF 12)
  - 25 Meter Zero Range (SOF 13)

Those that would be most frequently used (Group 1) could have any combination of 7SFG(A) personnel operating on that group of ranges on all available training days. Therefore, this group of ranges would be dedicated for use by qualified 7SFG(A) personnel and other special forces qualified to use these unique ranges. The ranges in Group 2 would also be heavily utilized by 7SFG(A) personnel. However, the siting of these ranges would be within the 30-minute travel time from any cantonment in the area, thus allowing access to other range user groups.

Applying the Criteria and Other Considerations to the 7SFG(A) Component of the Proposed Action

It was vital to site the Army ranges in restricted airspace and to locate manned areas or heavily used ranges near the perimeter of the range or outside large safety footprints to reduce evacuation during training. Additional consideration was given to minimizing the creation of new dudded areas (areas with unexploded ordnance) on the Eglin Range.

To minimize the amount of land that would have to be permanently closed, firing range SDZs were overlapped. Creating an obvious boundary around the SDZ areas reduces the potential for unauthorized personnel to enter the hazard area, so the boundaries around SDZs were created using existing roads and natural terrain features.

Attention was given to ensure that maneuver access and DZs could accommodate defined formations entering the Battle Area Complex (SOF 9). Environmental impacts would be minimized while ensuring suitable maneuver space existed. Minor adjustments would need to be made to minimize impact to current missions and to surrounding communities, including current recreational users. Careful consideration was given in identifying future land uses to accommodate sensible growth and possible expanding missions.

The above-mentioned criteria and considerations resulted in the development of five proposed 7SFG(A) Range alternatives (Figure 2-12):

- 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Base
- 7SFG(A) Range Alternative 2: East Side and North-South Corridor
- 7SFG(A) Range Alternative 3: East and West Side (Preferred)
- 7SFG(A) Range Alternative 4: East and Northeast Side
- 7SFG(A) Range Alternative 5: East Side

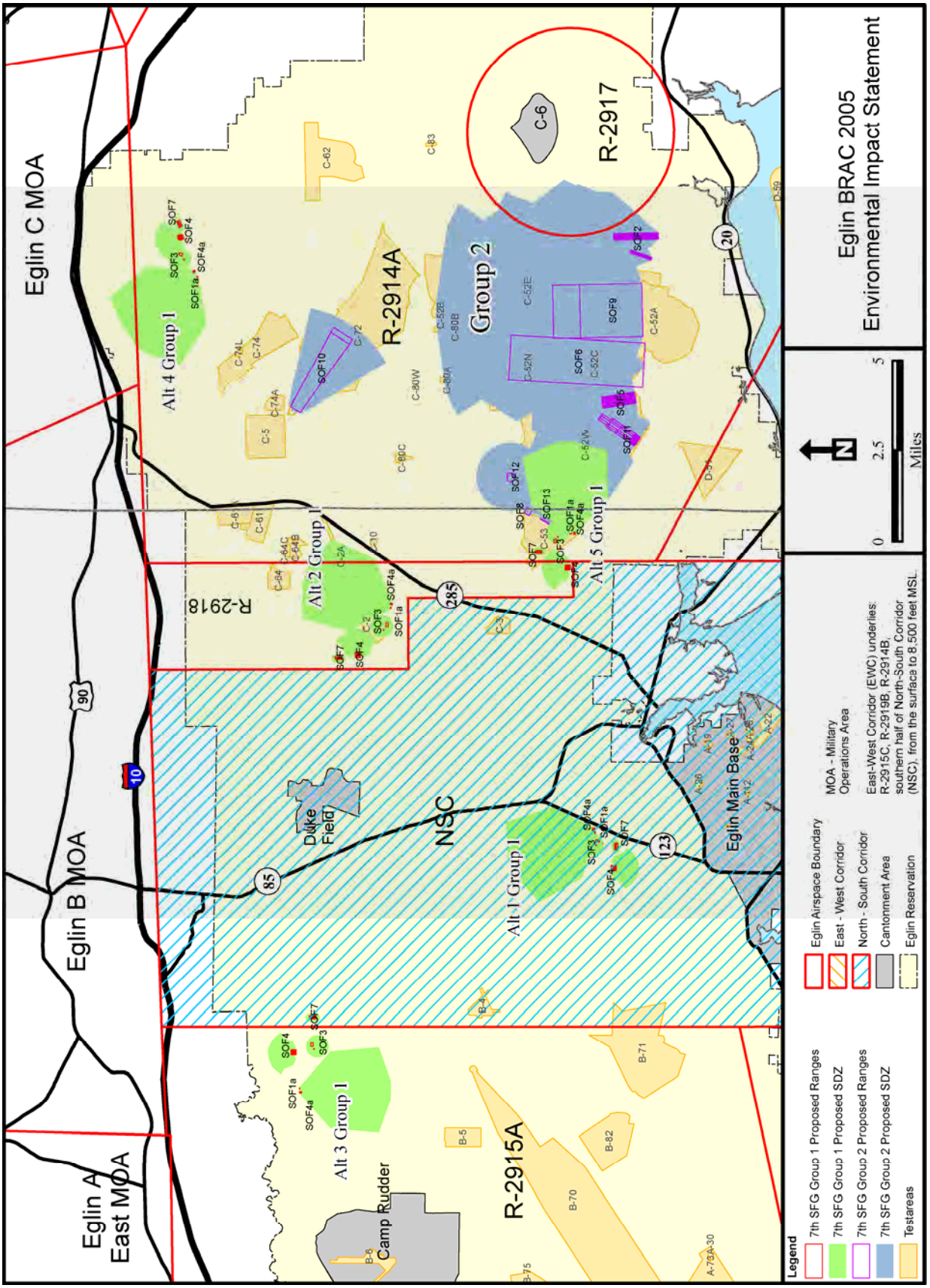

Figure 2-12. 7SFG(A) Proposed Range Training Locations, Alternatives 1–5

7SFG(A) Range Alternatives 3 and 5 are located under restricted airspace. Alternatives 1 and 2 have ranges located in the North-South Corridor that would need to be baffled to protect aircraft approaching Eglin Main Base or traveling through the Corridor from live fire. Note that Alternative 2 is technically in restricted airspace, designated as R-2918. However, it is only restricted when it is activated for testing. The majority of the time is not restricted, so that aircraft may approach Eglin Main's Instrument Landing System (ILS) runway. The majority of the SDZ for Alternative 4 is located in restricted airspace (R-2914A). However, a portion of the SDZ, as shown in Figure 2-12, is located under Eglin MOA C. Eglin MOA C has a floor that begins at 1,000 feet above ground level (AGL) and any small-arms ranges would be under that floor. As the area would be considered open airspace, not protected as a restricted area, it would be the Army's responsibility to have internal procedures in place that would include appropriate ground observers to spot for any low flying aircraft and have the ability to cease firing on the affected range. This procedure would apply to all small arms smaller than .50 caliber machine guns, which has a vertical danger zone of 6,365 feet.

The proposed location for the Group 2 Ranges were sited on or near Test Areas (TAs) C-52, C-53, and C-72 on the eastern side of the Eglin Reservation as shown in Figure 2-12. The selection of the locations was based on using existing dudded ranges and not creating additional ranges with UXO. The proposed locations of the Group 2 Ranges are a commonality among all alternatives carried forward for detailed analysis.

2.4.2 Alternatives Carried Forward for the 7SFG(A) Range Training

This section describes the common elements among the alternatives and provides details on the five proposed range training alternatives carried forward for detailed analysis. The common elements include the proposed location of the Group 2 Firing Ranges, aircraft operations, water operations, and ground maneuvers.

2.4.2.1 Common Elements Among Alternatives

Group 2 Firing Ranges

The location of the Group 2 ranges would be the same across all alternatives, with the exception of 7SFG(A) Range Alternative 3, where the urban assault range (SOF 8) would be co-located with the Group 1 Ranges. To minimize the creation of any new dudded or UXO-contaminated areas, all Group 2 Ranges, which have relatively large SDZs, are proposed to be located on existing Eglin Test Areas with UXO (Figure 2-13). With the exception of SOF 10, the Anti-Armor Tracking and Live Fire Range, these ranges are located on TAs C-52 and C-53 as shown in Figure 2-12. SOF 10 is proposed at TA C-72 because the live-fire component fits within the current safety profiles utilized at that location. The current configuration at TA C-72 is compatible with the SOF 10 activities identified in Table 2-4. Implementing any of the range training alternatives would require relocation of Navy Explosive Ordnance Disposal (EOD) activities from TA C-52W to the proposed SOF 12, or the 7SFG(A) Light Demolition Range (see Table 2-4).

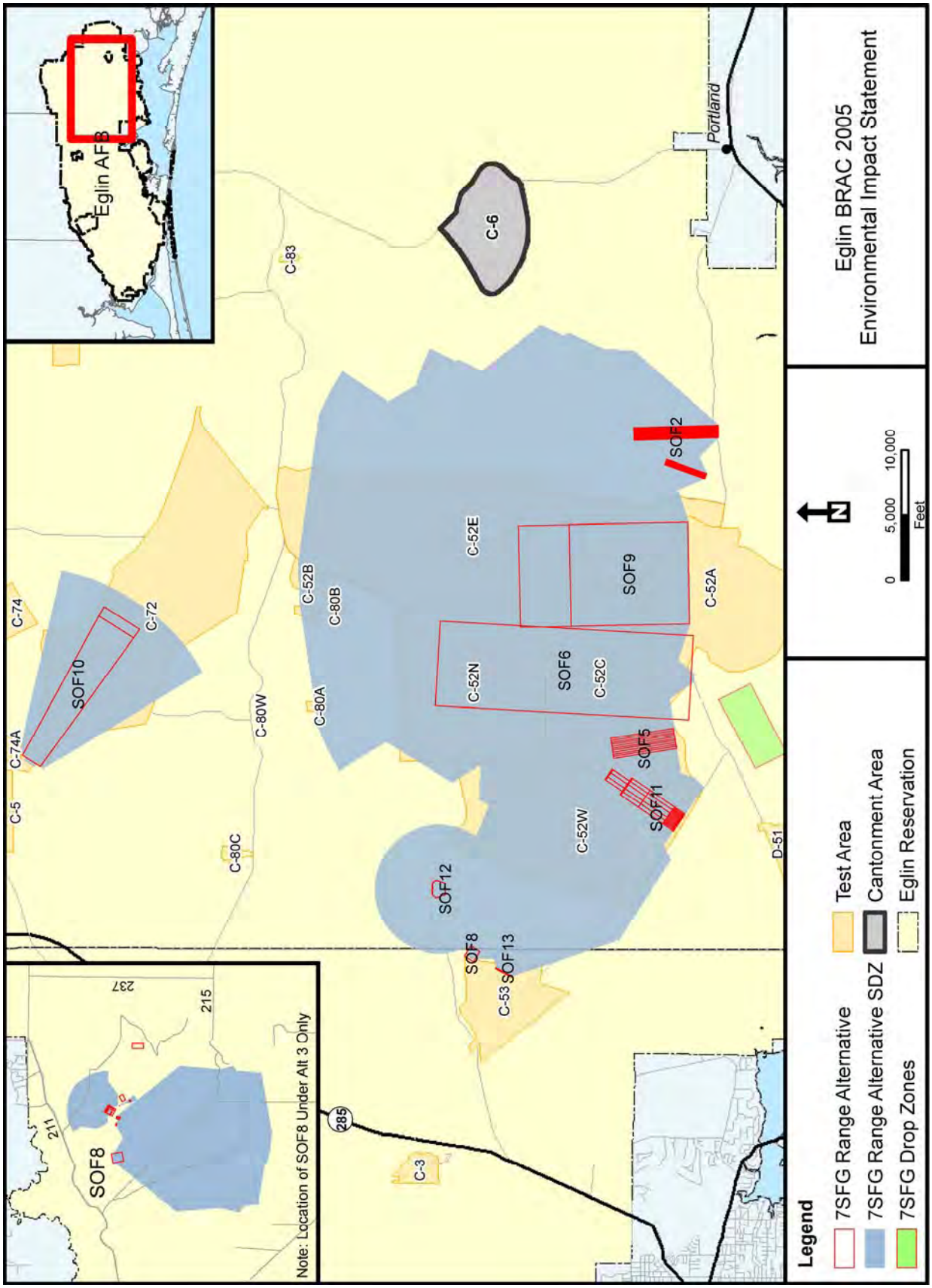

Figure 2-13. Location of 7SFG(A) Group 2 Ranges, Alternatives 1–5

Aircraft Operations

The 7SFG(A) would conduct air operations over the Firing Ranges listed previously as well as over the water operations and ground maneuver areas. The 7SFG(A) would require access to all airspace available within the Eglin Range (over land and coastal areas) to conduct the described air operations.

7SFG(A) would use existing HLZs and DZs. In addition, two new DZs are proposed as shown in Figure 2-14. The proposed DZs would be rectangles of approximately 1,500 meters by 700 meters. The DZ size is dictated by the number of parachutists, the altitude, and the speed of the drop. This size would allow for 32 total parachutists, released from a C-130 aircraft at 1,000 feet AGL. This size DZ would be able to accommodate a variety of airborne tasks including parachute drops, container delivery systems, and heavy vehicles, if necessary. The northern proposed DZ typically has pines and scrub oaks and is currently uncleared. The southern proposed DZ has been previously clear cut and consists of planted pines of various heights. Both areas would need to be cleared for parachute operations.

Water Operations and Ground Maneuvers

Water operations include infiltration and exfiltration to and from Eglin AFB through a water-to-land transition via boat operations and through air-to-water transitions from paratroops or paradrops. These activities would occur within the waters and adjacent shoreline of five major water bodies: Choctawhatchee Bay, Santa Rosa Sound, the Yellow River, East Bay, and East Bay River (Figure 1-4). Table 2-8 identifies the locations where water operations would occur.

Table 2-8. Water Operation Locations

Action	Choctawhatchee Bay	Santa Rosa Sound	Yellow River	East Bay	East Bay River
Water-to-Land Transition: Boat Operations	•	•	•	•	•
Air-to-Water Transition: Paratroop/Paradrop	•	•	•	•	

Figure 2-14 shows the specific locations in the major water bodies where water operations would occur.

The 7SFG(A) would perform the ground maneuver activities described in Section 2.4 on any land areas within the Eglin Reservation. Some proposed ground maneuver areas that have been historically open to public recreation would be conditionally closed (not open to the public during training events) during at least the first year of the 7SFG(A)'s training, which is scheduled for 2010.

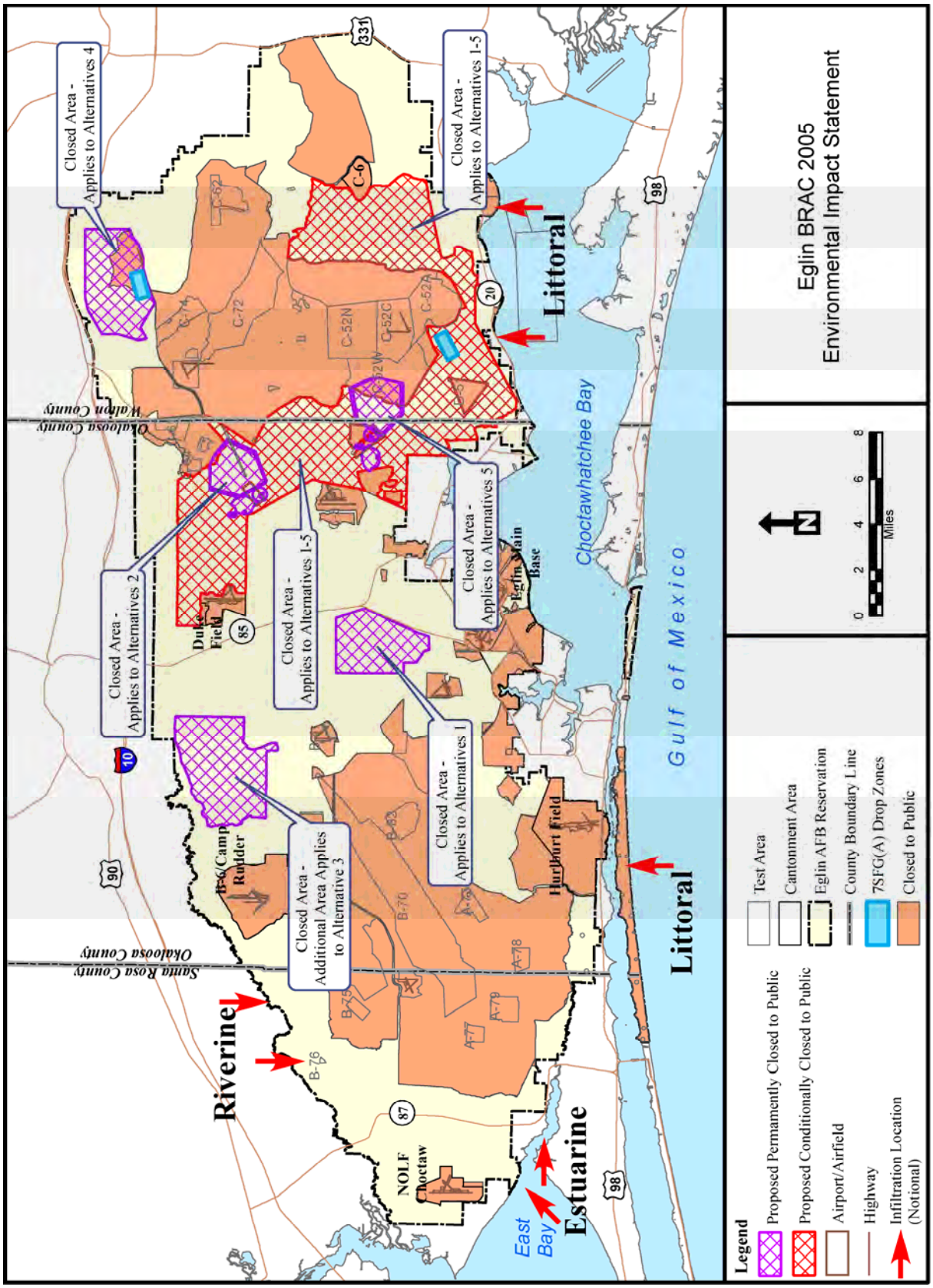

Figure 2-14. Proposed 7SFG(A) Drop Zones, Closed Maneuver Areas, and Infiltration Locations

Depending on the training missions, some areas may be closed to public use for safety reasons during the 7SFG(A) ground maneuvers. However, this is expected to occur infrequently. This policy is consistent with the Sikes Act (16 United States Code [USC] 670a-670f, last amended November 1977) which authorizes DoD to carry out a program for public recreation on military lands, subject to requirements necessary to ensure safety and military security. The Act specifies no net loss in the capability of military installation lands to support the military mission of the installation.

Table 2-9 lists the conditionally closed areas within the recreation management units.

Table 2-9. Acreage of Proposed Closed Areas Within Existing Recreation Management Units

Recreation Management Unit	Conditionally Closed Areas (Acres)			
	Alternative 1*	Alternative 3*	Alternative 4*	Common to all 7SFG(A) Range Alternatives
6N	430	8,630	-	-
6S	5,190	-	-	-
7	-	-	-	3,427
8A	-	-	-	506
9	-	-	-	2,828
9A	-	-	-	6,495
9B	-	-	-	1,824
11	-	-	-	1,887
13	-	-	5,697	35,860
13A	-	-	1,885	-
14	-	-	-	763
Total	5,620	8,630	7,582	53,590

Source: Eglin AFB, 2007a
*This amount does not include the area common to all five of the 7SFG(A) Range Alternatives.
Note: No additional closed areas would be needed for Alternative 2 or 5.

Figure 2-14 also shows the proposed conditionally closed areas. The larger area from Duke Field around TA C-52 would apply to all 7SFG(A) Range Alternatives 1–5. It covers approximately 53,590 acres. This conditionally closed area would provide access to the Group 2 Ranges and allow safe troop movement to those ranges. In addition, the Group 1 Ranges for the chosen alternative will be permanently closed.

The remainder of the conditionally closed areas shown in Figure 2-14 bound the Group 1 Ranges, including the SDZ, and would provide the maximum safety buffer. They were developed using natural and obvious boundaries (such as roads, streams, and fences) that could be easily identified and enforced. Each of these conditionally closed areas applies only to a particular alternative, noted on Figure 2-14. If one of the alternatives were selected, then the size of the conditionally closed area may change. For example, if Alternative 5 were selected, then the boundary to the east of TA C-52

would decrease from the Brier Creek boundary to RR 370, and the area from Duke Field to Ranger Camp would be open to the public as it is now. The final boundary of the conditionally closed areas would be further refined after detailed design plans were developed for the Firing Ranges.

The total conditionally closed areas for each alternative (Table 2-10) would include the closed areas common to all alternatives plus the closed areas associated with the respective alternative locations.

Table 2-10. Total Conditionally Closed Areas for Each 7SFG(A) Range Alternative

Alternative	Conditionally Closed Areas (Acres)		
	Common to all Alternatives	Alternative-specific	Total
1	53,590	5,620	59,210
2	53,590	0	53,590
3	53,590	8,630	62,220
4	53,590	7,582	61,172
5	53,590	0	53,590

The proposed conditionally closed areas in the 7SFG(A) Range alternative locations would not be open to the public during training events.

As the 7SFG(A) ground maneuvers guideline is a 125-km^2 area (or approximately 30,888 acres) that is not contiguous, a larger area than the stated minimum would be used because the Army would have to traverse the space between the training areas. As the mission of the 7SFG(A) matures and Eglin evaluates their usage of these conditionally closed areas, Eglin would reopen as much of the area as possible for recreational use. Eglin would look at the most efficient system for managing public recreation.

Other portions of the Eglin Reservation would be available to the 7SFG(A) for maneuver activities. Typically, the Army would schedule range areas about six weeks in advance, unless they were deploying. In that case, the planned use of the range would be scheduled about two weeks in advance.

Within the land area of the Eglin Reservation, there are some operating constraints, which are based on current agreements with the U.S. Fish and Wildlife Service (USFWS) to protect threatened or endangered species.

The 7SFG(A) would maintain a 450-meter buffer from known flatwoods salamander (a federally threatened species) habitat, which consists of wetlands. These areas would be identified by Eglin's Natural Resources Branch (also known as Jackson Guard). South

of the East Bay River, large troop movement and vehicle traffic would be restricted to established roads. When established roads are not used, silt fencing would be installed along roads in high quality flatwoods salamander buffer habitat during large training operations. The fencing would be removed after the training.

To protect the habitat of the federally endangered Okaloosa darter, the 7SFG(A) would use established roads, trails, and bridges when troops and vehicles are crossing Okaloosa darter streams.

Eglin follows the *Management Guidelines for the Red-Cockaded Woodpecker on Army Installations*, which details activities that are allowed and those that are restricted near active RCW buffers (U.S. Army, 2006). Only transient foot traffic and vehicular traffic on established trails or roads are allowed within 200 feet of active RCW trees. Activities that are not allowed within the 200-foot buffer include bivouacking, excavating, digging, and establishing command posts. RCW trees would be marked prior to any ground maneuver training by the 7SFG(A).

The 7SFG(A) would have access to the portion of Santa Rosa Island owned by Eglin AFB. Their activities would be restricted in areas where there is protected or critical habitat for threatened or endangered species. These restricted areas are shown in Figure 2-15, which protect a federally endangered lichen, *Cladonia perforata*, and the non-breeding (migration and wintering) critical habitat of the federally threatened piping plover. Their habitats are clearly marked or fenced on Santa Rosa Island and easily avoided.

Two federally listed sea turtle species regularly nest and hatch on Santa Rosa Island (SRI). Based on the Terms and Conditions in the SRI Mission Utilization Plan Biological Opinion (USFWS, 2005a), certain mission restrictions apply from 15 May to 31 October to protect nesting and hatching sea turtles. No beachfront activities may occur until after Eglin AFB has marked or relocated nests daily during nesting season. Troops and personnel must avoid sea turtle nests by at least 50 feet, and must not interfere with nesting sea turtles, impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico, or obscure signs of sea turtle activity. Eglin AFB will clearly mark watercraft landing, movement, and crossover corridors during sea turtle nesting season. Vehicles, helicopters, and watercraft must be staged at least 200 feet away from any nest that is found past 60 days into the incubation period. Troops must avoid sand dunes greater than 5 feet high, and any beach and dune habitats that are impaired by mission activities must be restored. Immediately after an operation is completed during August and September, all holes must be refilled and all ruts deeper than 2 inches must be removed at nests that are at incubation day 60 or greater. Eglin AFB must distribute a handbook to mission participants that provides information about the coastal ecosystem and protected species, Eglin's policies related to natural resource protection, and the requirements to be implemented for the activities.

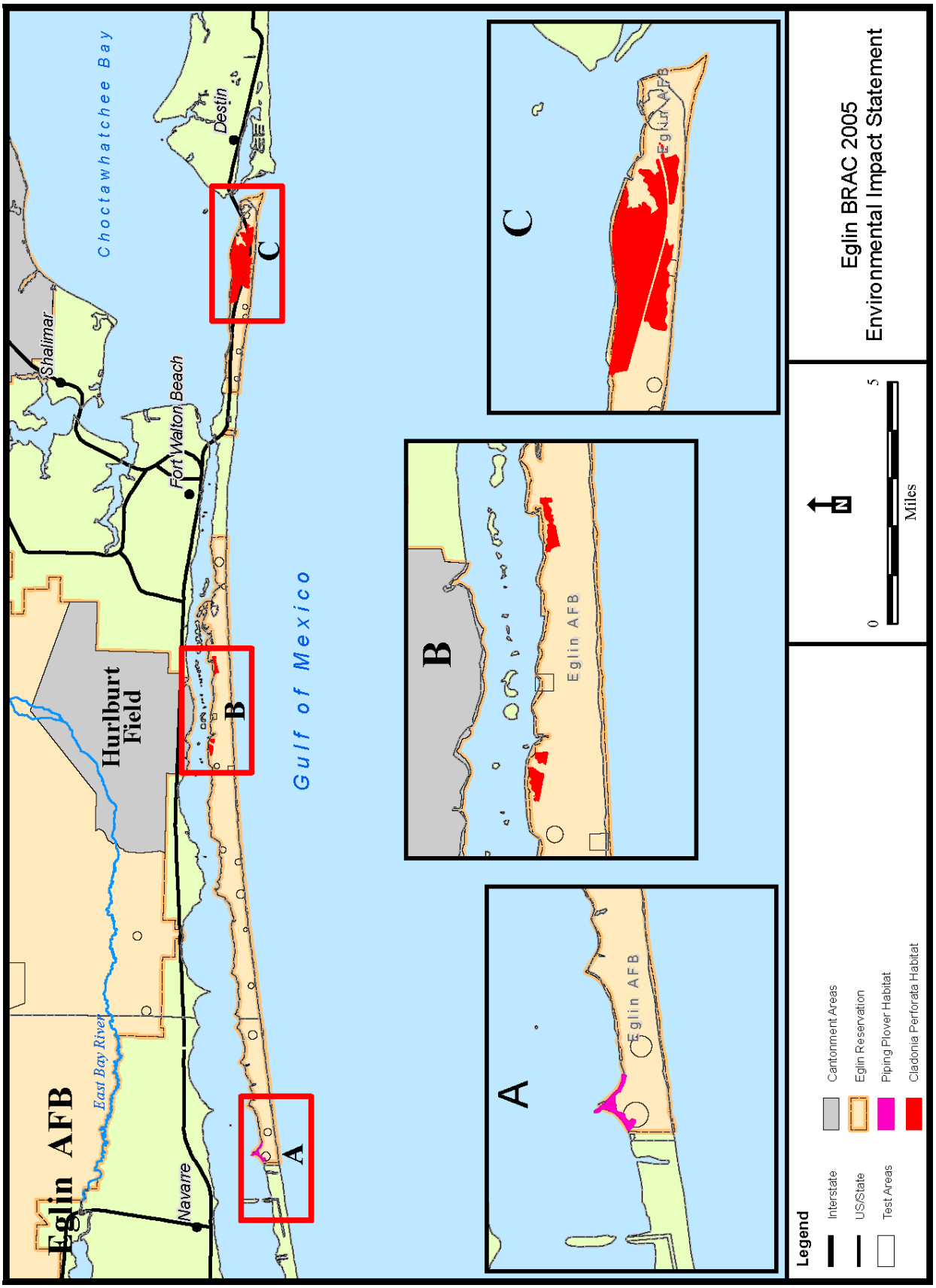

Figure 2-15. Restricted Areas on Santa Rosa Island

As described in Section 2.4 under the Temporary Tent Complex bivouacking activities, once every six months the support soldiers may have a small exercise with limited digging. Because the entire Reservation has not been surveyed for cultural resources, the Army would be restricted in their annual digging to those areas (approximately 50 percent of the Reservation) that have either been surveyed and no cultural resources have been found or where there is a low probability of finding cultural resources.

Any ground-disturbing activity or action that could potentially impact historic structures must be coordinated with the Eglin Cultural Resources Branch (96 CEG/CEVH) on Eglin AFB prior to the training.

The following sections describe the five proposed 7SFG(A) Range alternatives, which differ in the location of the Group 1 Ranges. (The Group 2 Ranges are the same for all five alternatives.) None of the Group 1 Ranges produce duds, including the Hand Grenade Range (SOF 7), which is not a live-fire range. Each alternative includes the commonalities described above.

2.4.2.2 7SFG(A) Range Alternative 1: East Side and North of Eglin Main

Group 1 Ranges would be located west of Hwy 85 and north of Eglin Main Base as shown in Figure 2-16. Selection of this alternative would result in restrictions on the vertical safety distance due to the ILS Approach to Eglin Main Runway 19. Therefore, two Firing Ranges (SOF 1a and SOF 4a, the 100-meter and 25-meter flat ranges, respectively) located in this area would need to be baffled (i.e., designed and constructed to ensure ricochets are totally contained within the limits of the range), which would add expense to this alternative.

2.4.2.3 7SFG(A) Range Alternative 2: East Side and North-South Corridor

Alternative 2 would locate the Group 1 Ranges just east of the North-South Corridor (under R-2918) (Figure 2-17). Selection of this alternative would result in restrictions on the vertical safety distance due to the Duke Field ILS Pattern and ILS Approach to Eglin Main Runway 19. Therefore, two Firing Ranges (SOF 1a and SOF 4a, the 100-meter and 25-meter flat ranges, respectively) located in this area would need to be baffled (i.e., designed and constructed to ensure ricochets are totally contained within the limits of the range), which would add expense to this alternative.

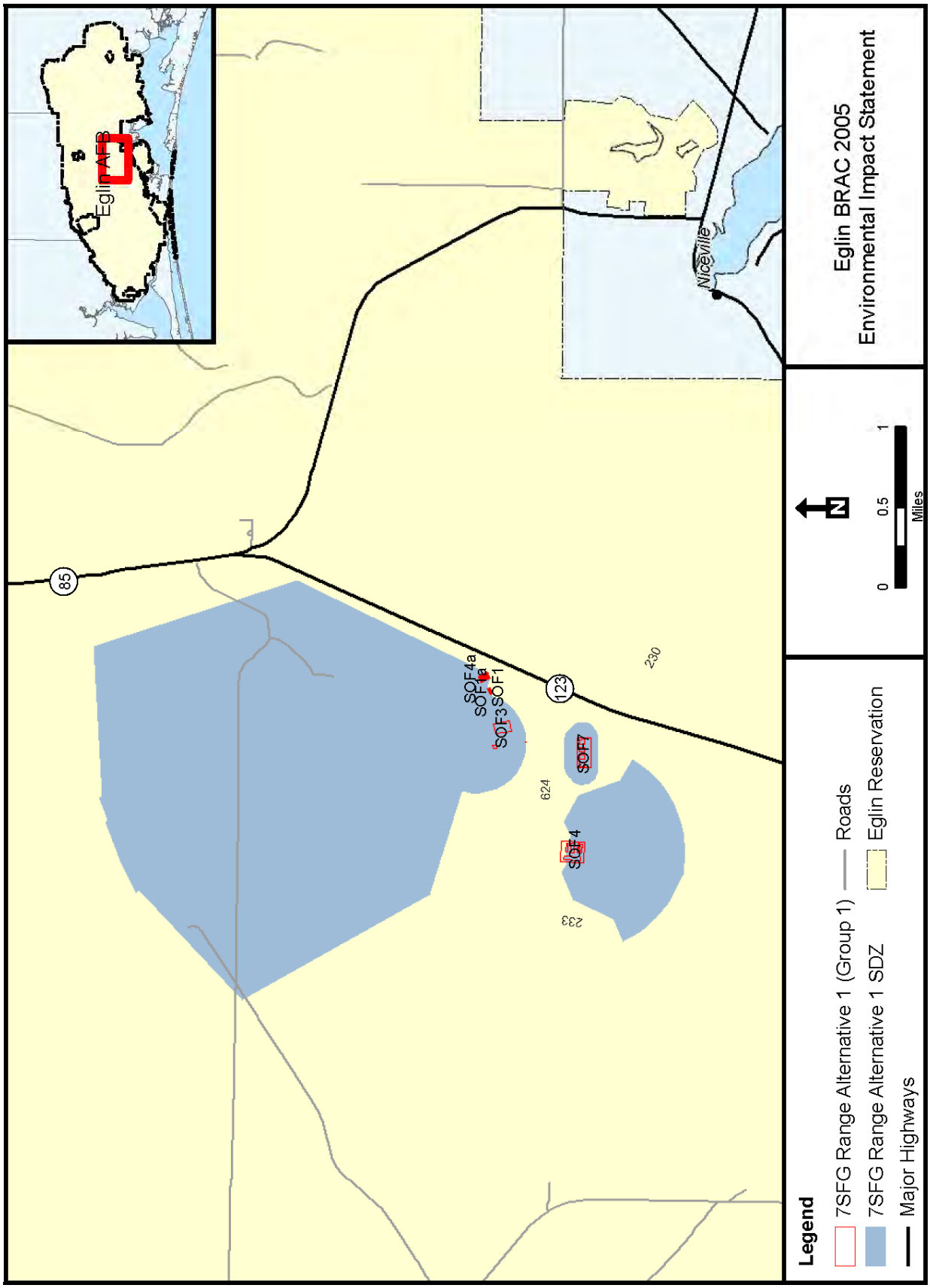

Figure 2-16. Location of 7SFG(A) Range Alternative 1 Group 1 Ranges

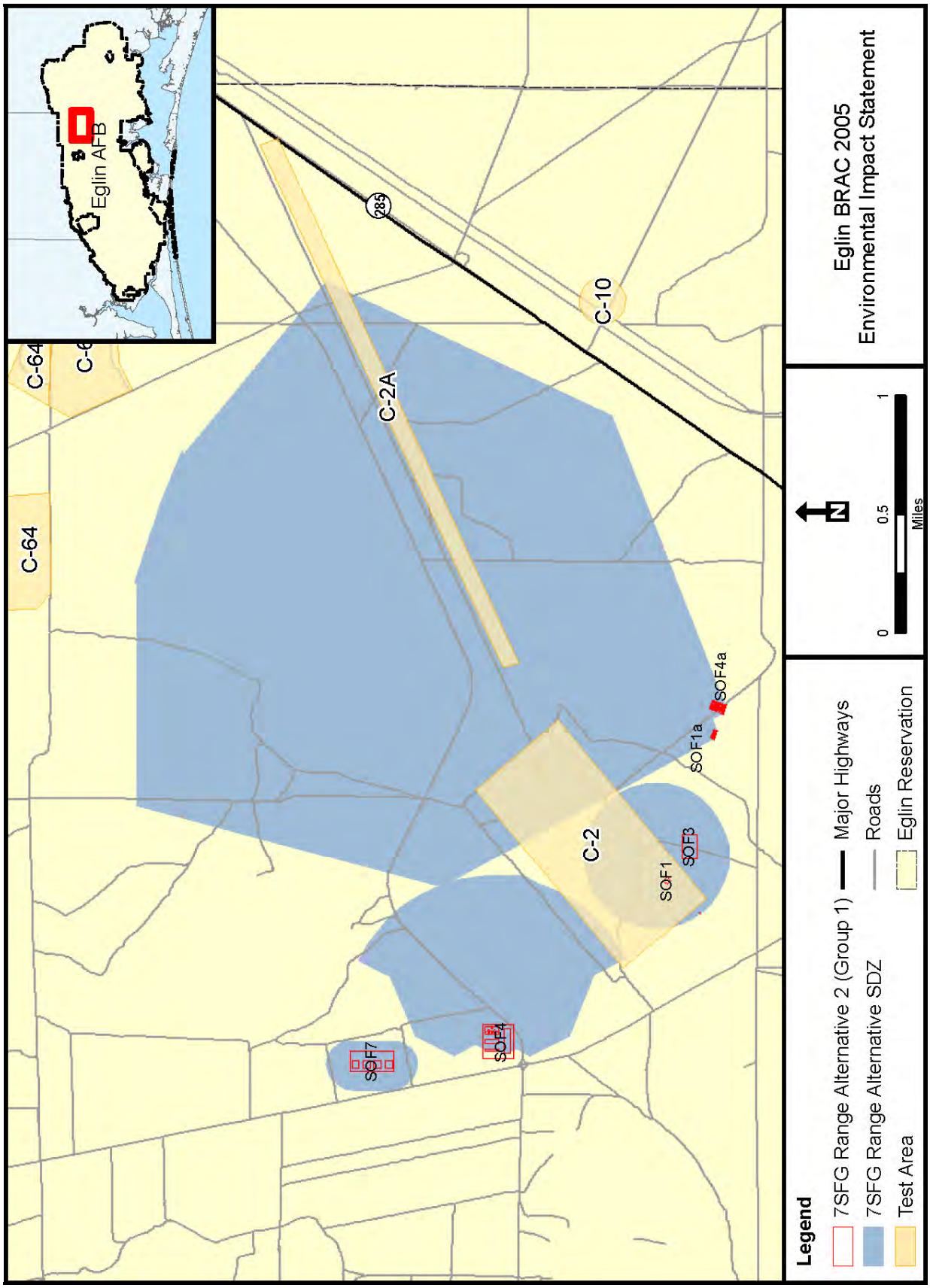

Figure 2-17. Location of 7SFG(A) Range Alternative 2 Group 1 Ranges

2.4.2.4 7SFG(A) Range Alternative 3: East and West Side (Preferred Alternative)

Alternative 3 would locate the Group 1 Ranges on the western side of the range, to the east of Camp Rudder (Figure 2-18). In addition, the urban assault range (SOF 8) would be co-located with the Group 1 Ranges. There would be no vertical safety distance restrictions on the proposed location of Firing Ranges in this Alternative 3 as they would be in restricted airspace. This Alternative would require a distinct marked boundary between the 6th Ranger Training Battalion (6 RTB) maneuver area on the east side of Camp Rudder and the SDZ area to the west of the ranges. The 6RTB currently has sufficient maneuver areas to the west and east of Camp Rudder and would not be impacted by this action. However, future mission changes for the 6RTB would be restricted from moving training further east of its current training location.

2.4.2.5 7SFG(A) Range Alternative 4: East and Northeast Side

This alternative would locate the Group 1 Ranges on the northeastern portion of the Eglin Reservation as shown in Figure 2-19. The majority of the SDZs for this alternative are in restricted airspace (R-2914A). The remainder is located in Eglin MOA C, which would require the Army to implement internal procedures that would include appropriate ground observers to spot for any low flying aircraft and have the ability to cease firing on the affected range. This procedure would apply to all small arms smaller than .50 caliber machine guns, which has a vertical danger zone of 1,940 meters (6,365 feet).

2.4.2.6 7SFG(A) Range Alternative 5: East Side

Alternative 5 would locate the Group 1 Firing Ranges on or around TA C-53 as shown on Figure 2-20. Figure 2-20 identifies the type of Firing Ranges proposed to be placed in or around each test area. The dudded ranges would be located on TA C-52, where contamination already exists. The Firing Range SDZs on TA C-52 overlap to minimize ground area required and have no vertical danger zone restrictions because they are within restricted airspace. This alternative would not require increased road closures; it would provide maneuver access from littoral (or coastal) areas and would have numerous suitable sites for DZs.

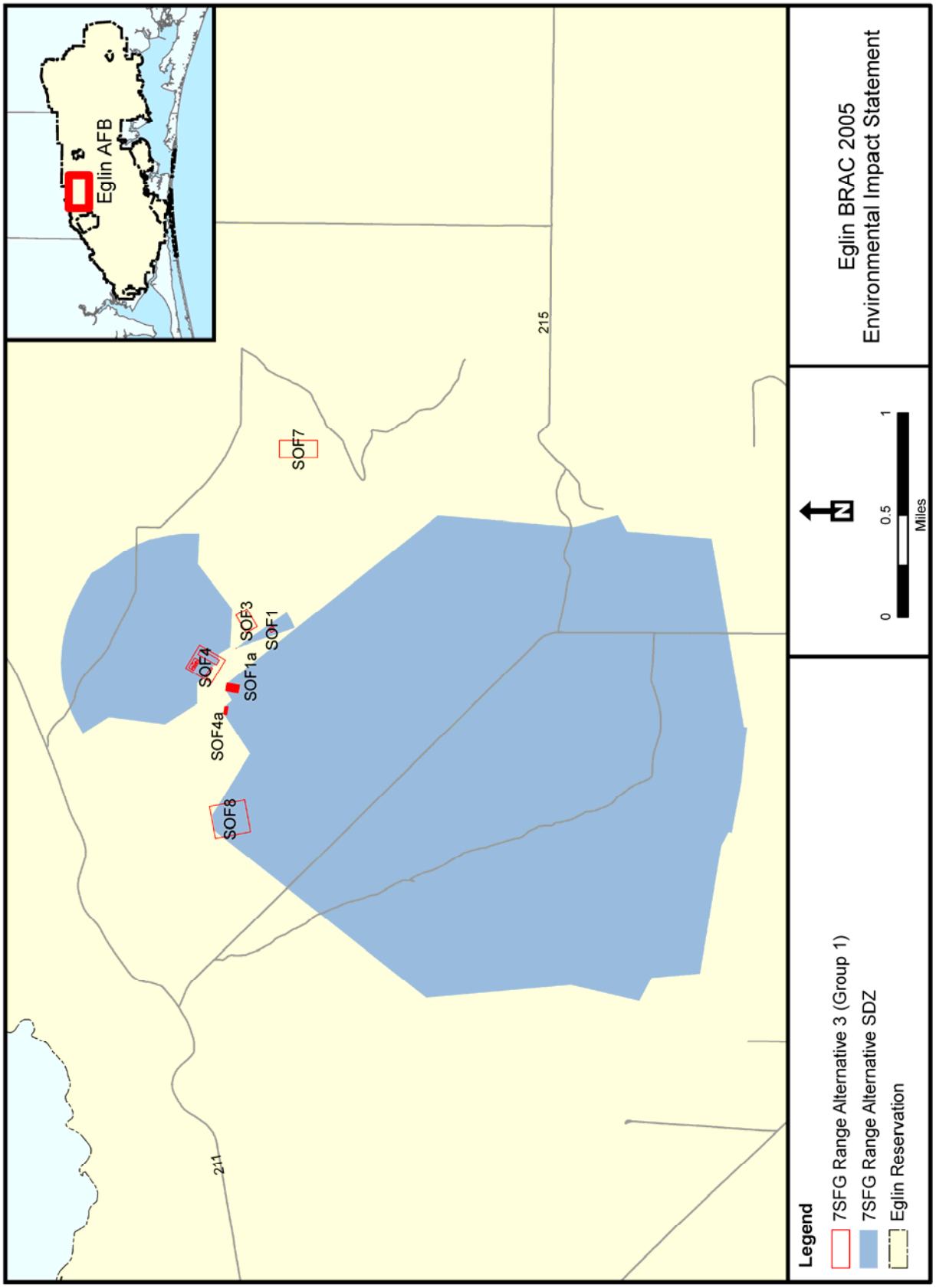

Figure 2-18. Location of 7SFG(A) Range Alternative 3 Group 1 Ranges

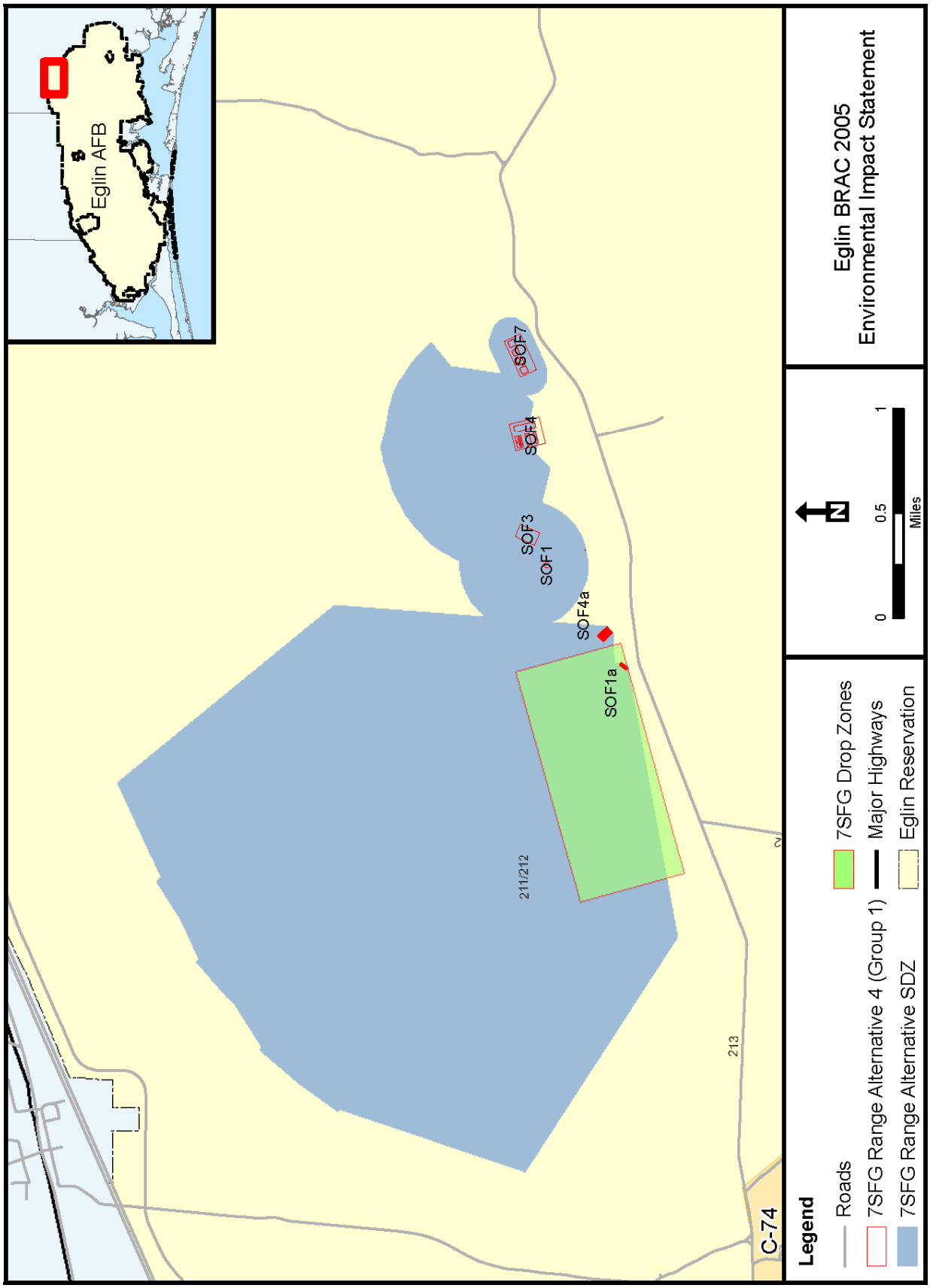

Figure 2-19. Location of 7SFG(A) Range Alternative 4 Group 1 Ranges

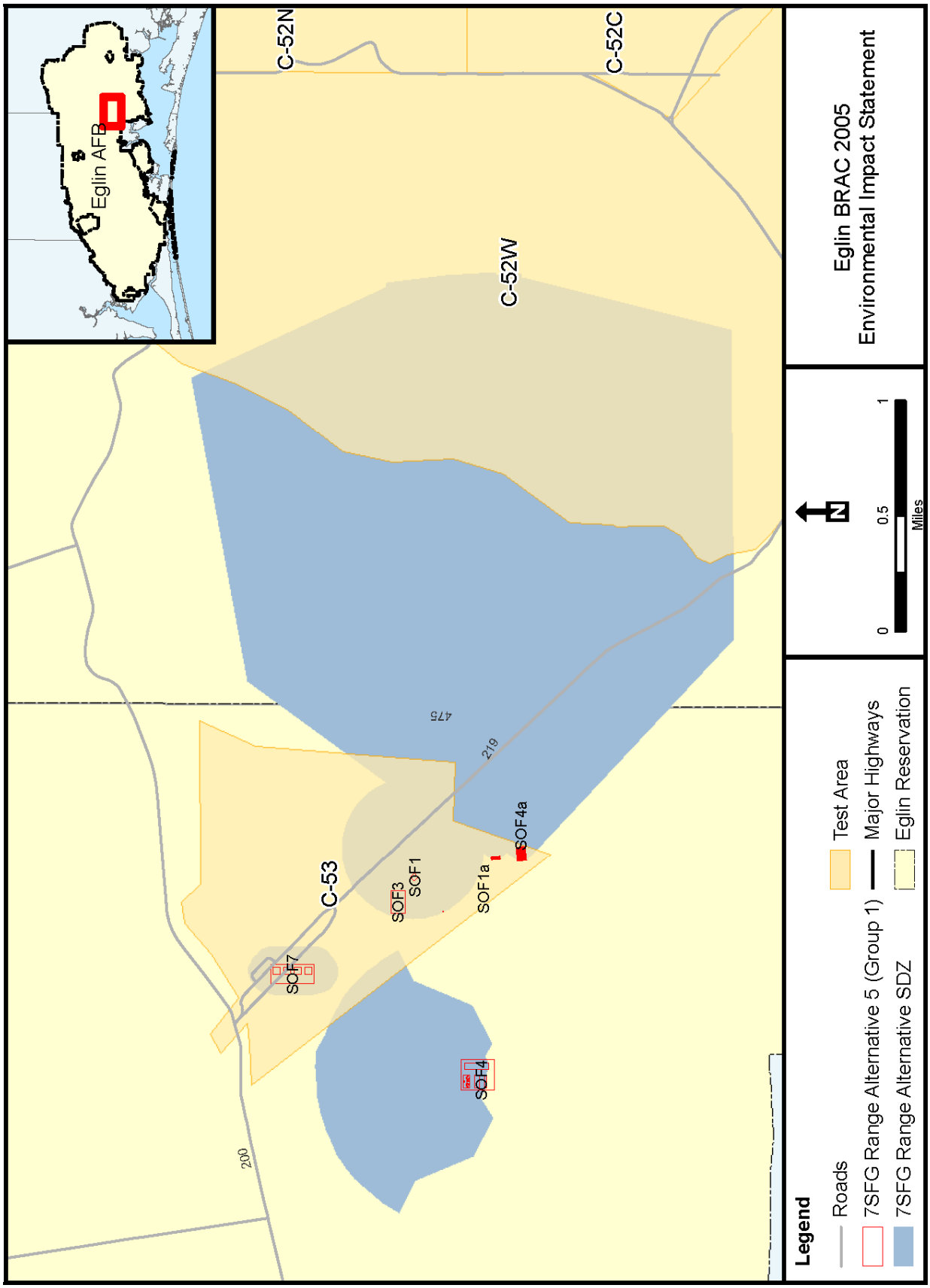

Figure 2-20. Location of 7SFG(A) Range Alternative 5 Group 1 Ranges

2.5 OPERATIONAL REQUIREMENTS FOR THE JSF IJTS CANTONMENT

The 2005 BRAC Report included the decision to establish an IJTS at Eglin AFB for the Air Force, Navy, and Marine to teach aviators and maintenance technicians how to properly operate and maintain the new JSF aircraft (DBCRC, 2005). The BRAC Commission recommendations became official on November 9, 2005. The Air Force, as the lead agency (in concert with the Navy, Army and Marine Corps), has until September 15, 2011, to implement the BRAC recommendations at Eglin AFB. Completion of this EIS and issuance of a Record of Decision (ROD) are time-sensitive components of the implementation.

Compliance with the Defense Base Closure and Realignment Act of 1990 (Public Law [PL] 101-50), as amended, requires specific IJTS activities to be in place when the first aircraft begin to arrive at Eglin AFB, which would allow both initial flying and classroom training for instructor pilots to begin. The compressed schedule for implementation of the BRAC recommendations is exacerbated by the "immature" nature of the JSF operational aircraft, which has had only limited operational activity to date.

In order to implement the BRAC recommendations by September 2011, the EIS was prepared using currently available data related to the JSF performance characteristics, noise data, and actual training syllabus. For example (and as described more fully in Appendix K, *Noise Evaluation*), as preparation of the EIS began, the only JSF-specific noise data available to the JSF Program Office was from the X-35 prototype aircraft. The data analyzed from the noise modeling of the X-35 indicated significantly high noise levels. The indicated noise levels were ultimately questionable because the noise data were based on a prototype aircraft that would be superseded by an operational aircraft.

Once data from the first operational JSF aircraft (the F-35 AA-1) became available, a series of five sequential noise modeling analyses (or scenarios) were conducted to develop a more realistic picture of the potential noise impacts at Eglin AFB. Results from the initial run were incorporated into the second scenario, the results of which were incorporated into the third, and so on. The scenarios were then used to develop alternatives for inclusion in this EIS that were considered reasonably viable from a noise and operational perspective.

Given the confluence of the mandatory BRAC implementation deadline and the immaturity of the JSF aircraft and its performance data, the Air Force recognizes that there is incomplete and unavailable information but will continue to work to obtain requisite information and adjust training operations as the JSF training program at

Eglin matures. This will be accomplished using, for example, an ongoing process of adaptive management and other planning tools and principles.

Appendix K provides background on the efforts made to capture the most current noise data and performance characteristics of the JSF aircraft.

As directed by the Under Secretary of Defense (Acquisition, Technology and Logistics) the Secretaries of the Navy and Air Force suspended initial planning for basing of the JSF, deferring to the "… selection process for the [JSF] Initial Training Site [to] be conducted within the Base Realignment and Closure (BRAC) (sic) process initiated by the Secretary of Defense" (Aldridge, 2003). Consequently, as part of the planning process for submitting recommendations to the BRAC Commission, the Secretary of Defense established the Education and Training Joint Cross-Service Group (E&T JCSG). This Group was chartered to conduct a review of DoD common, business-oriented education and training functions, which included Flight Training (E&T JCSG, 2005) as required by the Defense Base Closure and Realignment Act of 1990 (PL 101-50 Section 2903(c)(5)), as amended. The Group performed a detailed analysis of existing education and training capacity using certified data and developed recommendations that best satisfied current and future DoD requirements. The Flight Training Subgroup assessed sites for the JSF graduate-level IJTS. The E&T JCSG performed initial screening of installations and then used two primary analyses to further identify suitable sites for the JSF: (1) capacity analysis and (2) military value analysis. The JCSG used Military Value as the primary consideration, while balancing other selection criteria and the future force structure, to evaluate realignment and closure recommendations.

The guiding principles of the E&T JCSG included:

- Advance jointness and Total Force capability
- Eliminate excess capacity, redundancy, and duplication
- Achieve synergies
- Reduce costs by increasing effectiveness, efficiency and interoperability
- Exploit best business practices

In the capacity analysis, the subgroups focused on each installation's existing capability to perform specific functions. Each subgroup calculated physical and operational capacity for functions using defined attributes and metrics. The two primary resources the Flight Training subgroup measured were runway(s) and airspace capacity. In the basing criteria for the JSF, the subgroup established criteria for the Main Operating Base runway and for auxiliary runways. The Main Operating Base is the location where the aircraft would be launched and recovered; where aircraft maintenance would occur;

where the school house would be located; where the logistical support would be; and where the ramp for nighttime beddown would be. Auxiliary airfields, on the other hand, do not need to meet the same requirements as the Main Operating Base. For the JSF, the auxiliary field would need to minimally have an 8,000-feet-by-150-feet runway, air traffic control, and crash and rescue support. Details of the subgroup's criteria and the analysis are found in the E&T JCSG BRAC Report, Volume VI, Appendix A: Capacity Analysis Report to the Infrastructure Steering Group, 20 April 2005 (http://www.brac.gov/finalreport.html).

The subgroup noted the importance of considering the amount of airspace and its location relative to the Main Operating Base in the analysis. One of the airspace criteria included a desired distance of less than 120 NM from the Main Operating Base. Other airspace criteria considered the distance to air refueling tracks from the Main Operating Base and the number of low level routes (with a minimum of two required). Secondary resources measured included ramp area (space for 140 aircraft) and ground training facilities. Ground training facilities criteria consisted of the number of simulators and classroom facilities and their design capacity for maximum student population.

For the capacity analysis, the Flight Training subgroup evaluated 965 airfields in the continental United States to determine those best suited to perform the JSF training mission. Using Service-endorsed JSF basing criteria to screen and identify airfields, the subgroup identified installations that met basic infrastructure criteria and warranted further analysis (E&T JCSG, 2005). Most of the airfields (934) were eliminated from consideration as the Main Operating Base based on one or more of the following (E&T JCSG, 2005):

- Airfield is designated Civilian, Air National Guard, or Air Reserve use.
- Airfield elevation is higher than 3,000 feet above mean sea level (MSL).
- Airfield main runway is less than 8,000 feet long.
- No second runway or second runway is less than 8,000 feet long.
- Airfield is greater than 550 NM from the coastline.
- Traditional weather is a cloud deck or ceiling less than 3,000 AGL and visibility is less than 3 miles for more than 200 days per year.

The remaining 31 airfields were further screened using "first tier" criteria, which included the following for the JSF:

- Runway of 8,000 feet long by 150 feet wide
- Runway elevation less than 1,000 feet above MSL
- Distance to coastline within 550 NM

This screening left 11 airfields, including Eglin AFB, which were subject to more detailed analysis. The Services requested that four additional candidates be added back to the list for a total of 15 candidate airfields for detailed analysis.

The final recommendation from the JCSG, which became official on November 9, 2005, was to realign a number of bases by relocating a sufficient number of instructor pilots, operations support personnel, maintenance support personnel, front-line and instructor-qualified maintenance technicians, and logistics support personnel to stand up the Air Force, Marine Corps, and Navy portions of the JSF IJTS at Eglin AFB.

Throughout the BRAC process, the Flight Training Capacity Analysis for the JSF IJTS evaluated the ability of each potential site's existing infrastructure and existing capacity to perform the required functions. In particular that analysis evaluated the runways of the Main Operating Base of particular airfields and the location of potential airspace relative to the Main Operating Base. From the initial list of 965 potential sites, 15 candidate airfields that had a Main Operating Base with two major runways at least 8,000 feet long and airspace available within less than 120 nautical miles (NM) from the Main Operating Base were evaluated in detail. The E&T JCSG's and BRAC Commission's focus on the Main Operating Base and the guiding principles of the BRAC statute and process, which included elimination of excess capacity, redundancy, and cost reduction, demonstrated to the Air Force that the BRAC Commission's direction to site the JFS IJTS at Eglin AFB was intended to refer to Eglin Main Operating Base and its existing runways. Consequently, the potential alternative locations for the JSF cantonment and the associated beddown of the JSF aircraft were sited at Eglin Main Operating Base. The Air Force did not consider alternatives that would have involved realigning or modifying auxiliary airfields or constructing new runways because such alternatives would have been inconsistent with the E&T JCSG and BRAC guiding principles of using existing capacity, reducing costs, and achieving synergies.

Establishing the JSF IJTS would require construction of a cantonment area that would accommodate JSF personnel. The Air Force would accommodate this need through the MILCON process by renovating existing facilities and/or constructing new facilities, depending on the alternative selected. Some building demolition would also be required. The JSF IJTS MILCON phase is proposed to begin in CY 2009 and conclude in CY 2015. The JSF IJTS requirements are considered initial requirements due to various factors, the primary of which is the relative immaturity of the JSF Program to the DoD. The Air Force anticipates a continued learning curve in terms of overall training

requirements and associated facilities and infrastructure. Facility needs proposed for the JSF IJTS are listed for each alternative in Section 2.5.2. The requirements vary somewhat for each alternative, depending on the location and the proximity to other existing facilities. It should be noted that these are subject to modification; site survey and activation details are being further defined as the JSF Program Office continues coordination of their facility requirements with Eglin AFB. Total acreage and total square footage are estimated and may vary during actual construction. Required acreage for the JSF IJTS would range from 100 to 200 acres.

Initial and replenishment training of pilots and maintenance personnel (maintainers) would be conducted at the JSF Integrated Training Center (ITC) or "schoolhouse." Training in the ITC would be accomplished by instructor-led classroom activities, independent study via interactive courseware workstations, training in virtual simulators, and training on aircraft mock-ups. Actual on-aircraft training and associated brief and de-brief activities would be conducted at the Training Squadron, which would be separate from the ITC facility. The training devices and courseware associated with the JSF ITC's training system would be maintained and upgraded by a Training System Support Center organization resident in the JSF ITC. In addition, propulsion training would be conducted using two engines supported with one or two trailers.

JSF training would include initial training, transition/conversion training, refresher/re-qualification training, and instructor training. Students entering the JSF ITC would be graduates of each Service's undergraduate aviator and maintainer training programs. Pilots and maintainers entering the program from another aircraft platform would go through a transitional training program, which would provide the requisite skills to meet the mission-qualified pilot or mission-qualified maintainer graduation criteria.

Of the full JSF IJTS personnel complement, pilot and maintainer instructors as well as government civilian and contractor support personnel would be required to execute the proposed academic training course. The total number of instructors proposed for the JSF IJTS would be approximately 200, of which 134 are pilot instructors (both military and contractor) and 66 are maintainer instructors. The estimated maximum number of students attending the JSF IJTS at one time would be approximately 545 (109 pilot and 436 maintainer students). Table 2-11 lists the maximum number of personnel associated with the JSF that would occur at the installation at any one time. Housing for the students and instructors is addressed in the socioeconomics analysis.

Table 2-11. JSF IJTS – Estimated Maximum Daily Load of Personnel at Eglin AFB

Personnel	Number
Pilot Instructors	134
Maintainer Instructors	66
Pilot Students	109
Maintainer Students	436
Government Civilians	30
Contractors	150
Aircraft Maintainers	1,076
Aircraft Maintenance Squadron	325
Total Daily JSF Personnel	**2,326**
*Spouses**	1,163
*Children**	1,396
Total People New to Area	**4,885**

*Due to lack of demographic data for the JSF IJTS program, it is assumed there is a 50% distribution of married personnel and a 30% distribution of personnel with no more than two children.

The aircraft accompanying the JSF IJTS and beddown is the F-35. The F-35 is a supersonic, single-seat, single-engine aircraft capable of performing and surviving lethal strike warfare missions. There are three variations of the F-35:

- F-35A, Conventional Take-Off and Landing (**CTOL**) – Uses conventional Air Force aircraft launch and recovery techniques.
- F-35B, Short Take-Off and Vertical Landing (**STOVL**) – Permits short takeoff launch and vertical landing recovery from Navy Aircraft Carrier Nuclear (CVN), Landing Helicopter Amphibious (LHA), and Landing Helicopter Dock (LHD) class ships (e.g., Nimitz, LHA 6, and Wasp) and UK Carrier Vehicle Future (CVF) aircraft carriers.
- F-35C, Carrier Variant (**CV**) – Permits use on CVN (Nimitz) class aircraft carrier by using larger, foldable wings to reduce landing approach speed and space needed to store, operate, and maintain the F-35 CV while on the ship.

Table 2-12 compares the dimensions and weights of the three variants, while Figure 2-21, Figure 2-22, and Figure 2-23 provide a representative example of each F-35 variant. The F-35 Air System includes the Air Vehicle (aircraft and associated systems) and Autonomic Logistics (AutoLog) System. AutoLog is an integrated, knowledge-based system encompassing numerous functions associated with operating and maintaining the F-35, such as maintenance planning, supply support, and pilot and

maintenance training, to include an interface that facilitates coordinating with mission planning, engineering, safety, and command and control functions.

Table 2-12. Comparison of F-35 Variant Dimensions and Weight

Variant	Wing Span (ft)	Wing Area (ft^2)	Length (ft)	Weight Empty (lbs)[1]	Internal Fuel (lbs)
CTOL F-35A	35	460	50.5	28,975	18,431
STOVL F-35B			51.2	32,555	13,961
CV F-35C	43	620	50.8	34,468	20,327

Source: JSF, 2006a
ft = feet; ft^2 = square feet; lbs = pounds
1. Includes 6% uncertainty margin

Figure 2-21. F-35A (CTOL) Aircraft Variant
(Source: JSF, 2006b)

Figure 2-22. F-35B (STOVL) Aircraft Variant
(Source: JSF, 2006b)

Figure 2-23. F-35C (CV) Aircraft Variant
(Source: JSF, 2006b)

The basic organizational unit in the Services is a squadron. A squadron may be a mission unit or a functional unit and may vary in size according to responsibility. The composition of a squadron is determined by the type of airplane it operates and the nature of its mission. The IJTS will include three Air Force squadrons each with 24 Primary Assigned Aircraft (PAA), one USMC Fleet Replacement Squadron, with 20 aircraft, and one USN Fleet Replacement Squadron with 15 aircraft. (The PAA are those that have flying hours and personnel associated with them.) A total of 107 F-35 (72 CTOL, 20 STOVL, and 15 CV) PAA are proposed for JSF IJTS training missions at Eglin AFB. Delivery of F-35s at Eglin AFB would begin in CY 2010 and would be completed in CY 2016. Table 2-13 reflects the proposed number of F-35s that would be phased in annually until the full complement of 107 training aircraft is reached in CY 2016.

Table 2-13. Proposed Delivery Schedule for F-35 Aircraft at Eglin AFB

Fiscal Year	Aircraft Variant (Quantity)			Cumulative Total
	CTOL	STOVL	CV	
2010	6	0	0	6
2011	9	9	0	24
2012	3	2	2	31
2013	3	4	4	42
2014	31	5	9	87
2015	20	0	0	107
2016	0	0	0	107
Total	***72***	***20***	***15***	***107***

CTOL = Conventional Take-Off and Landing; STOVL = Short Take-Off Vertical Landing; CV = Carrier Variant

*This information was provided by the JSF Program Office in June 2008 (Gigon, 2008) and only includes Primary Assigned Aircraft. However, there would be six additional, backup aircraft. Aircraft numbers beyond FY 2012 are subject to change as they are outside of the current Five-Year Defense Plan. Yearly numbers may vary as aircraft move to support other locations and operations.

Figure 7-6 (in Chapter 7, JSF Flight Training, Affected Environment and Environmental Consequences) shows the total number of aircraft at Eglin AFB over time, including the proposed F-35s detailed in Table 2-13. The figure also identifies key milestones in the F-35 acquisition program.

2.5.1 Alternative Narrowing Process for JSF IJTS Cantonment

Based on input from the user groups associated with implementing the JSF IJTS at Eglin AFB as well as BRAC supporting documentation (E&T JCSG, 2005), the following minimum requirements were used to evaluate siting options on Eglin Main Base and determine the candidate Alternative locations for the JSF IJTS cantonment.

Physical Requirements:

- Based on facility requirements, approximately 190 acres are necessary for the cantonment area, of which 170 to 180 acres should be contiguous to the Eglin Main Base flight line. The required buildings and their associated parking areas would be approximately 190 acres, and some should be contiguous to Eglin's flight line to reduce commute time and to maximize training time.
- The classroom setting and simulation training center should be in close proximity (walking distance) to the housing and student support facilities, such as the dining hall and physical fitness areas.
- Physical security would be essential since the training facilities would need to operate as a Special Access Program Facility (SAPF).
- Utilities and fueling access must be available and in physical proximity to the aircraft as well as auxiliary ground equipment.
- The cantonment area must have existing infrastructure, including utilities and roads. Parking of 75 aircraft initially, expandable to 140, is needed.
- Arming and de-arming areas should be available with expansion potential.

Miscellaneous:

- Wetlands and floodplains should be avoided.

2.5.2 Alternatives Carried Forward for JSF IJTS Cantonment

Two proposed alternative locations for the IJTS were identified within Eglin Main Base because of the proximity to the main airfield. This section describes the common elements among the two alternatives for the JSF IJTS cantonment and the other features of each alternative.

2.5.2.1 Common Elements Among Alternatives

The MSA would be same for either of the two proposed JSF IJTS cantonment alternatives. The JSF IJTS would use the existing MSA for the 46 TW, which is centrally located for access from either runway (Figure 2-24). This configuration would differ from that proposed for the 7SFG(A) Cantonment Alternative 1 (see Section 2.3.3.1) in that there would be fewer storage areas required for just the JSF munitions. If the JSF and the 7SFG(A) were both located on Eglin Main Base, then the MSA described for the 7SFG(A) would be constructed (see Section 2.3.3.1). This configuration for just the JSF munitions would be constructed if the 7SFG(A) were located at one of the other proposed alternative locations other than on or near Eglin Main (7SFG(A) Cantonment Alternatives 1 and 4).

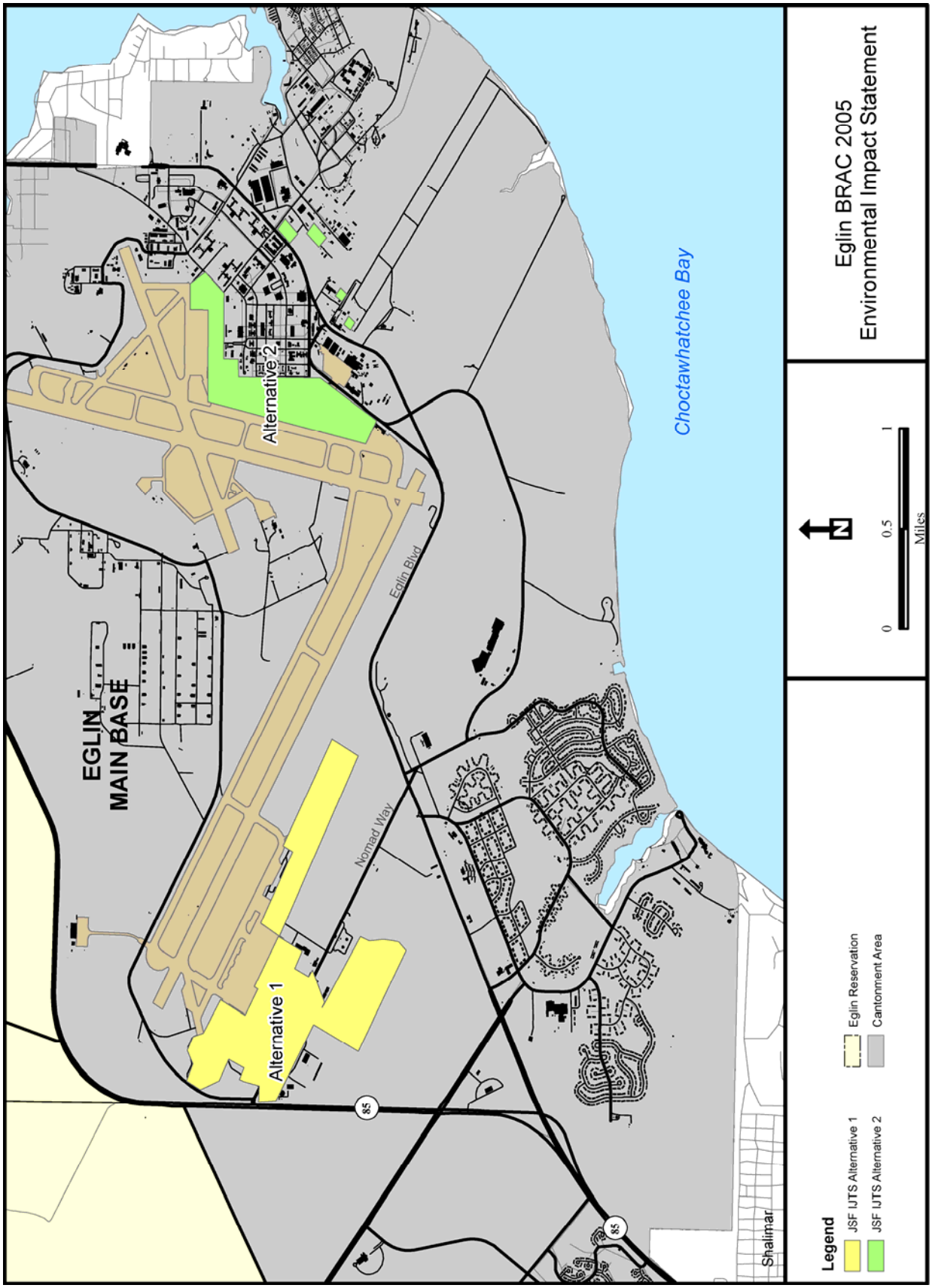

Figure 2-24. JSF IJTS Complex Alternative 1 and Alternative 2 Proposed Locations

The explosives storage would be within the confines of the existing MSA fence. The proposed operating facilities would be located outside the fence and along the western edge of the MSA. The removal of administration/supervisory buildings 1278, 1284, 1289, and Gazebo J would be required to achieve storage capability. The current parking area for privately owned vehicles (facility 1278C) would change from privately owned to government-owned vehicle parking. The supervisory facilities would be combined into a new supervision building of approximately 7,000 ft² on Perimeter Road, where the gate to the 46 TW area is located.

2.5.2.2 JSF IJTS Alternative 1: The 33rd Fighter Wing Area on Eglin (Preferred Alternative)

JSF IJTS Alternative 1 would be one contiguous campus environment to accommodate the JSF IJTS facility requirements. This alternative would consist of constructing a combination of new buildings as well as renovating existing facilities/buildings located in the 33 FW area (Figure 2-24). As shown in Table 2-14, initial facility requirements involve constructing approximately 23 new facilities or buildings, taxiways, and runways for a total construction of approximately 3,400,000 ft². Road construction would add an additional 506,000 ft². In addition, JSF IJTS Alternative 1 would include the renovation and demolition of nearly 600,000 ft² of existing facilities, plus nearly 1,500,000 ft² of renovation to the West Apron and more than 1,000,000 ft² of road and pavement renovation. These requirements should be considered initial and may change as the JSF Program matures. Figure 2-25 provides a notional layout of the JSF IJTS cantonment, exclusive of the munitions facilities for JSF IJTS Alternative 1.

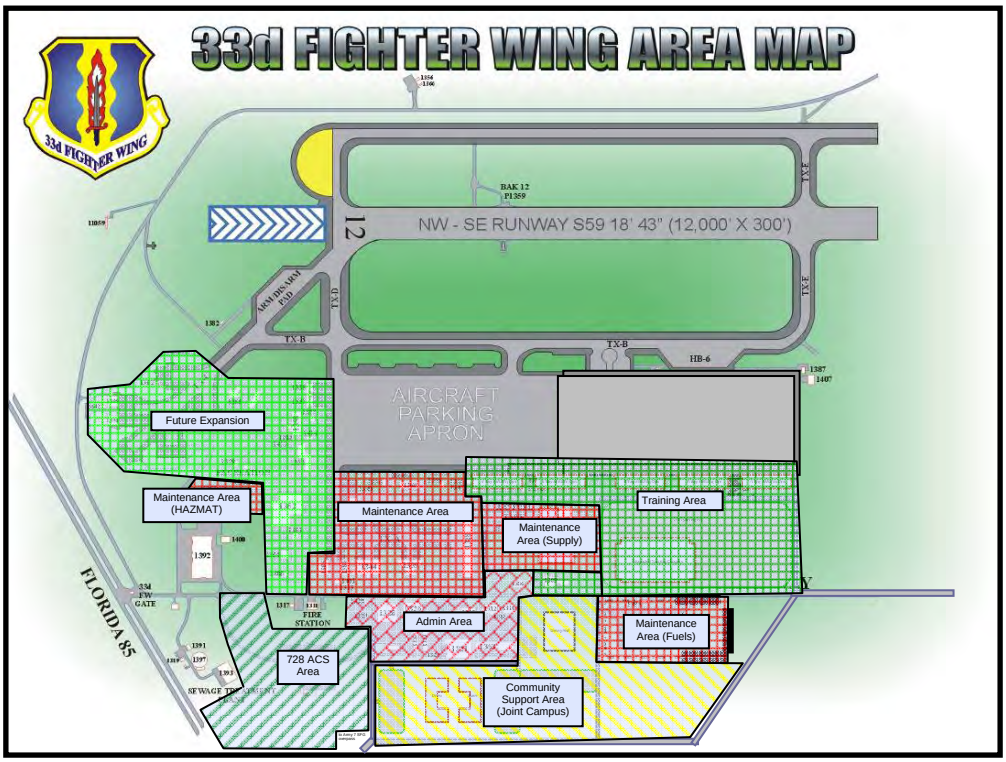

Figure 2-25. Notional JSF IJTS Complex Alternative 1 Layout

Table 2-14. Proposed Facilities Associated With JSF IJTS Alternative 1

MILCON Project	Disposition			Square Footage
	Demo	Ren	New	
Sqd Ops/AMU (AF-1)			X	77,644
Integrated Training Center (ITC)			X	200,000
Munitions Maintenance			X	39,468
Dorm (100 Room)			X	40,479
Dorm (100 Room)			X	40,479
Dining Facility			X	14,010
Duke Tower			X	1,041
POL Hydrant Pits			X	8 Each
POL West Side Tank Headers			X	4 Each
POL West Side Ops Facility			X	5,000
POL Fillstands Flightline			X	2 Each
POL Bulk Storage Tanks			X	100 MBBL
Sqd Ops/AMU (Marines)			X	49,830
Sqd Ops/AMU (Navy)			X	49,830
Sqd Ops/AMU (AF-2)			X	74,147
Sqd Ops/AMU (AF-3)			X	74,147
Rinse Facility "Bird Bath" N			X	3,000
Rinse Facility "Bird Bath" S			X	3,000
New Apron			X	864,000
Taxiway Extension			X	879,300
Live Ordnance Loading Area			X	850,500
TAMS			X	22,500
Flare			X	2,000
AME Maintenance			X	5,000
Wash Rack			X	11,000
Wing/Group HQs			X	20,000
Satellite Medical Facility			X	
Utilities			X	1 LS
Roads			X	506,000
STOVL Pad (Eglin)			X	30,000
STOVL Tower (Eglin)			X	1 Each
STOVL Pad (Duke)			X	30,000
STOVL Tower (Duke)			X	1 Each
West Apron		X		1,410,658
Renovate 1318 (Phase 1)		X		22,963
Renovate 1404—Storage		X		48,001
Renovate 1309—SimBay		X		17,595
Renovate 1318 (Phase 2)		X		34,445
Renovate 1344—WLT		X		27,321
Renovate 1326—Groups HQ		X		19,764

Continued on the next page…

Table 2-14. Proposed Facilities Associated With JSF IJTS Alternative 1, Cont'd

MILCON Project	Disposition			Square Footage
	Demo	Ren	New	
Renovate 1312—AF/DoN Ops		X		17,740
Renovate 1321—OSS		X		34,868
Renovate 1315—Wing HQ		X		21,317
Renovate 1343—AME		X		36,998
Comm Support Flight		X		8,870
Munitions Maintenance Facility(ies)		X		5,219
Munitions Maintenance Facility(ies)		X		4,624
Munitions Maintenance Facility(ies)		X		7,360
Renovate 1363—FTD		X		23,462
Tech Training Det/Sqd CC Staff		X		8,870
Add/Alter Calibration Lab		X		14,654
MXS 1328		X		27,609
Pavement Improvements		X		500,000
Roads		X		506,000
Demo Jet Engine Shop	X			7,400
Demo Fuel Shop	X			18,807
Demo Storage Facility	X			100
Demo 58th AMU Hangar	X			33,998
Demo 60th AMU Hangar	X			36,968
Demo Pump Station	X			1 Each
Demo Chaplain	X			439
Demo LOX Storage	X			3,395
Demo Engine Shop	X			62,481
Demo AGE	X			15,783
Demo Weapon Release Shop	X			9,680
Demo Aircraft Shop	X			1,440
Demo LOX Plant	X			672
Demo Jet Engine Shop	X			3,200
Demo Pavilion	X			1 Each
Petroleum Ops	X			567
Weapon Systems Management	X			630
Munitions Control	X			800
Munitions Accountability/Ops	X			800
Building 1278	X			1,789
Gazebo "J"	X			(negligible)

Source: Roxstrom, 2006

AF/DoN = Air Force/Department of the Navy; AGE = Aerospace Ground Equipment; AME = Alternate Mission Equipment; AMU = Aircraft Maintenance Unit; CC = Commander; Demo = Demolish; Det = Detachment; FTD = Field Training Detachment; HQ = Headquarters; LOX = Liquid Oxygen; MBBL = Thousand Barrels; MILCON = Military Construction; MXS = Maintenance Squadron; Ops = Operations; OSS = Operational Support Squadron; POL = Petroleum, Oil, or Lubricant; Ren = Renovate; Sqd = Squadron; STOVL = Short Take-Off and Vertical Landing; TAMS = Tactical Aircraft Maintenance Specialist; WLT = Weapons Load Trainer

2.5.2.3 JSF IJTS Alternative 2: The 46th TW Area (East Side of Eglin Main Runway)

Under Alternative 2, the JSF IJTS infrastructure would be located on the east side of the main runway (shown previously in Figure 2-24). The conceptual footprint for JSF IJTS Alternative 2 is shown in Figure 2-26. As shown in Table 2-15, initial requirements involve constructing approximately 21 new facilities/buildings and additional open area facilities for a total construction of nearly 3,000,000 ft^2 plus over 500,000 ft^2 of new roads. In addition, JSF IJTS Alternative 2 would include the renovation and demolition of over 3,000,000 ft^2 of existing facilities and over 1,000,000 ft^2 of roads and pavements. These requirements should be considered initial and may change as the JSF Program matures.

Table 2-15. Proposed Facilities Associated With JSF IJTS Alternative 2

MILCON Project	Disposition			Square Footage
	Demo	Ren	New	
Squad Ops/AMU (AF#1) (end-state)			X	77,644
JSF Integrated Training Center (ITC)			X	260,000
JSF Student Dormitory (steady state)			X	121,437
Dining Facility			X	14,010
POL Hydrant Pits			X	8 Each
POL Fillstands Flightline			X	2 Each
POL Bulk Storage Tanks			X	100 MBBL
Squad Ops/AMU (Navy) (end-state)			X	49,830
Squad Ops/AMU (Marines) (end-state)			X	49,830
Squad Ops/AMU (AF#2) (end-state)			X	74,147
Squad Ops/AMU (AF#3) (end-state)			X	74,147
Freshwater Rinse Area North (Bird Bath)			X	4,000
Freshwater Rinse Area South (Bird Bath)			X	4,000
Taxiway to TW "F"			X	875,000
Live Ordnance Loading Area			X	1,200,000
Aircraft Wash Rack			X	11,050
JSF Wing HQ Building (end-state)			X	20,000
Modular Storage Magazine			X	4,164
Modular Storage Magazine (small)			X	1,926
Conventional Munitions Mx Fac			X	9,921
Aircraft Munitions Training Facility			X	23,457
Munitions Supervisory Facility (Approx)			X	7,000
Utilities			X	1 LS
Roads			X	506,000
STOVL Pad (Eglin)			X	30,000

Continued on the next page…

Table 2-15. Proposed Facilities Associated With JSF IJTS Alternative 2, Cont'd

MILCON Project	Disposition			Square Footage
	Demo	Ren	New	
STOVL Tower (Eglin)			X	1 Each
STOVL Pad (Duke)			X	30,000
STOVL Tower (Duke)			X	1 Each
Munitions Arming Area		X		100,000
Hot Gun/De-arming Area		X		200,000
AME Maintenance		X		16,068
AME Maintenance		X		8,000
East Parking Apron Repairs		X		2,133,423
Backshop (Wheel/Tire/Batteries/AGE)		X		63,796
Storage		X		40,000
Renovate 1309—SimBay		X		17,595
Weapons Load Training		X		15,666
Operations Support Group		X		32,459
JSF Wing HQ Building		X		31,979
Munitions Maintenance Facility(ies)		X		5,219
Munitions Maintenance Facility(ies)		X		4,624
Munitions Maintenance Facility(ies)		X		7,360
Add/Alter Calibration Lab		X		14,654
Pavement Improvements		X		500,000
Roads		X		506,000
Corrosion Control Utility Storage		X		500
Duke Tower		X		1,041
Squad Ops/AMU (Navy/Marines)		X		129,766
Squad Ops (2 Squadrons) (initial)		X		38,000
AMU (AF#1) (initial)		X		38,440
AMU (AF#2) (initial)		X		38,340
Corrosion Control		X		31,832
HQ Center	X			4,518
Law Center	X			4,518
Education Center	X			28,764
Communication Facility	X			13,082
Communication Facility	X			12,602
Munitions Control	X			800
Munitions Accountability/Ops	X			800
Munitions Entry Control Facility	X			1,789
Gazebo "J"	X			(negligible)

Source: Roxstrom, 2006

AF = Air Force; AGE = Auxiliary Ground Equipment; AME = Alternate Mission Equipment; AMU = Aircraft Maintenance Unit; Demo = Demolish; HQ = Headquarters; MILCON = Military Construction; Mx Fac = Maintenance Facility; MBBL = Thousand Barrels; Ops = Operations; POL = Petroleum, Lubricant, or Oil; Ren = Renovate; STOVL = Short Take-Off Vertical Landing; TW = Taxiway

Siting of the JSF IJTS cantonment in the 46 TW area would require the 46 TW personnel and functions to be relocated to the 33 FW area, which would be vacated around 2010 (see discussion of No Action Alternative in Section 2.7). Facilities associated with this relocation are listed in Table 2-16.

Figure 2-26 shows the conceptual use of 46 TW facilities by the JSF IJTS. This would require the construction of new facilities for the 46 TW, and the renovation and demolition of existing facilities in the 33 FW area. New construction would total approximately nearly 400,000 ft^2, and renovation and demolition would be approximately 215,000 ft^2.

An issue associated with the siting of the JSF IJTS in the 46 TW area relates to three aprons used for parking combat aircraft loaded with explosives or those being loaded, unloaded, or awaiting loading. The aprons are referred to as Hot Gunline One, Hot Gunline Two, and Hot Gunline Three, respectively.

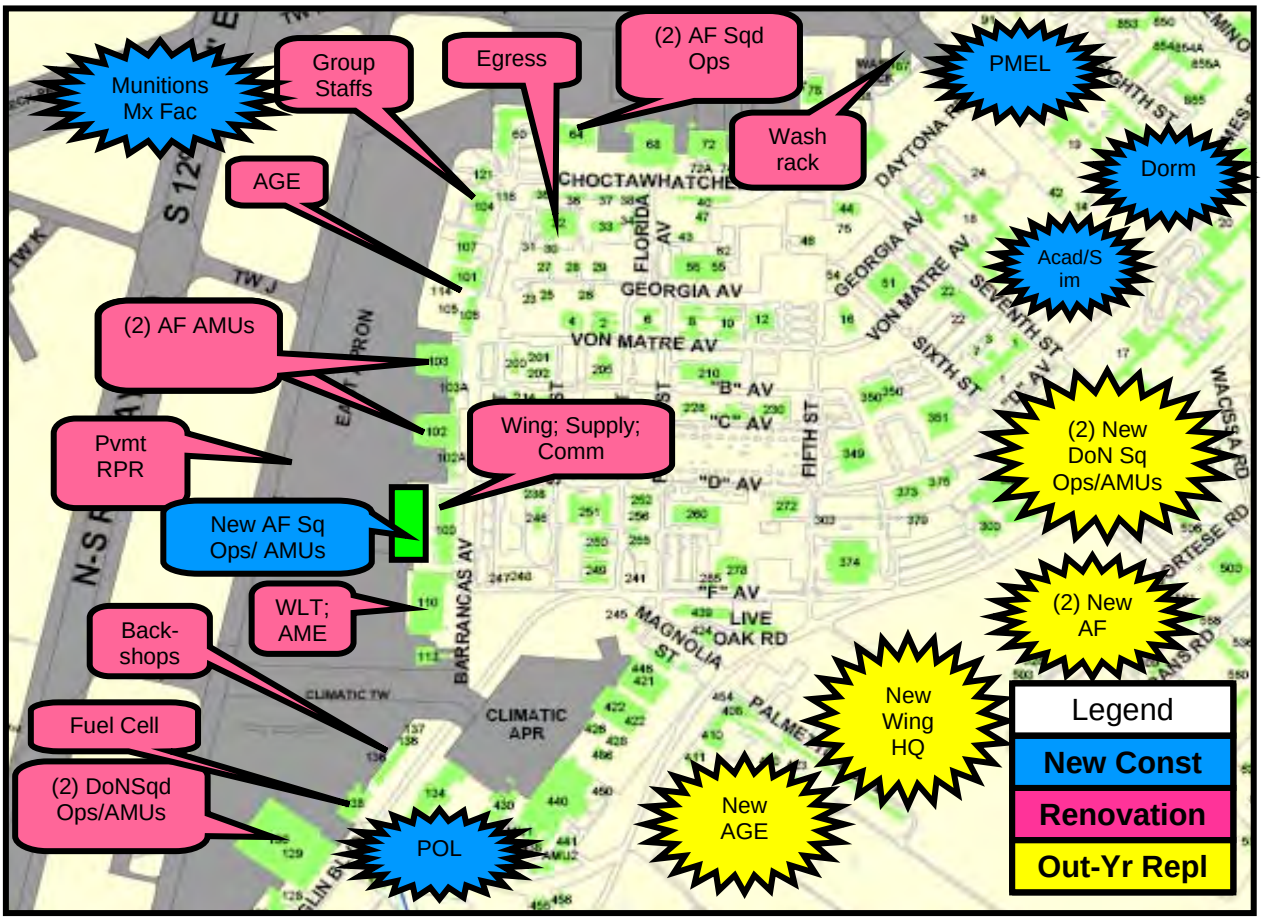

Figure 2-26. Notional JSF IJTS Complex Alternative 2 Layout

Table 2-16. Facilities to be Constructed, Renovated, or Demolished Due to JSF IJTS Siting in Existing 46 TW Area

Project	Disposition			Square Footage
	Demo	Ren	New	
New Hangar			X	129,766
Taxiway to new hangar			X	90,000
New Hangar			X	38,440
New Hangar			X	38,340
New Squadron Operations			X	38,000
New Administration			X	60,000
Renovate 1315—Wing Headquarters		X		21,317
Renovate 1312—Squadron Operations		X		17,740
Renovate 1339—Fuel Barn		X		18,807
Renovate 1321—Warehouse Supply		X		34,868
Renovate 1404—Storage for 600		X		48,001
Backshop (Wheel/Tire/Batteries/AGE)		X		57,408
Demolish (Demo) Jet Engine Shop	X			7,400
Demo Pump Station	X			1 Each
Demo Chaplain	X			439
Demo Liquid Oxygen (LOX) Storage	X			3,395
Demo LOX Plant	X			672
Demo Jet Engine Shop	X			3,200

Source: Roxstrom, 2006

Parking of explosives-loaded JSF aircraft on the 46 TW hot gunlines would be restricted by a variety of factors. Hot Gunline One is limited by its proximity to a joint-use taxiway and runway. Hot Gunlines Two and Three are restricted by encroachment from unrelated facilities built in their vicinity, by private aircraft transiting taxiway T, and by the frequent nearby parking of tankers and other large airframes. As a consequence of these restrictions, the JSF IJTS would be limited to only a handful of parking spots on Hot Gunline One.

Parking JSF aircraft on Hot Gunline One would exacerbate an existing violation of explosive safety separation requirements to the adjacent Perimeter Road. In October 2000, the DoD raised the required separation from 0 to 750 feet. The requirement has not been enforced yet due to a grandfather clause. However, a mission change from longstanding research and development explosives operations to Air Education and Training Command (AETC) training operations would void the grandfathering; such a change would necessitate either closing Perimeter Road to all but munitions traffic or obtaining a formal exception to the explosives safety rules (Burke, 2007).

2.6 OPERATIONAL REQUIREMENTS FOR JSF FLIGHT TRAINING

JSF Flight Training is the most fluid of the issues being addressed in this EIS. This EIS addresses three F-35 IJTS training alternatives (i.e., scenarios), including the two action alternatives and the No Action Alternative, for implementing the BRAC 2005 JSF IJTS at Eglin AFB. To help illustrate the gradual change in aircraft operations over time, an approximation, or "snapshot" scenario projected for a specific point along the JSF delivery curve in CY 2013, was also developed. Table 2-17 represents the total number of annual operations of all aircraft at Eglin AFB distributed among the three airfields.

Table 2-17. Annual ATC Operations Associated With 2013 Snapshot Scenario

Aircraft Type	Airfield			Total
	Eglin	Duke	Choctaw	
F-35	57,284	52,283	17,876	127,443
Other	74,253	24,643	76,467	175,363
Total	**131,537**	**76,926**	**94,343**	**302,806**

JSF flight training requirements are considered initial requirements due to various factors, primarily the relative immaturity of the F-35 aircraft. The Air Force anticipates a continued large learning curve in terms of overall capabilities-related training requirements. Given this learning curve, and other reasons discussed below, the Air Force will manage evolution in the JSF training programs at Eglin by incorporating an adaptive management approach to the ongoing basing of the F-35 aircraft.

Throughout the planning process to execute the requisite JSF flight training activities at Eglin AFB, it has become apparent that there may be various uncertainties until the operations can be learned and tested over time. Also, the area around Eglin AFB is a dynamic system that is continually evolving: it is likely that there will be unanticipated changes in baseline conditions, that new information may become available, or that the effectiveness of mitigation measures may be different than expected. The variables analyzed in this EIS and their relationship to biological, physical, and social systems are complex. In the analysis of anticipated impacts, the Air Force has done its best to accurately predict potential impacts and anticipate future conditions using the best available information and tools at the time of analysis, including the 2013 "snapshot" scenario.

Even so, an understanding of various assets that are part of a complex interrelated JSF IJTS will not be achieved without a more long-term process built around a continuous cycle of experimentation, evaluation, learning, and improvement over time. Using an adaptive management approach allows for examination and testing of various hypotheses regarding the F-35 presence, while allowing meaningful data to be gathered, evaluated, and used for sound program management decisions.

Adaptive Management is an approach recognized by the President's Council on Environment Quality to facilitate meeting NEPA Section 101 goals. This approach is the continuous modification of management practices in order to achieve both project objectives and environmental protection. Such an approach shifts thinking away from the old project paradigm of "predict, mitigate, and implement" to "predict, mitigate, implement, monitor, and adapt." "Adaptive management recognizes the limits of knowledge and experience and moves iteratively toward goals in the face of uncertainty" (CEQ, 1997).

Until the flying operations are initiated and tested over time, there are some uncertainties associated with how the JSF flight operations may be implemented and what the resulting impacts might be. The JSF training program at Eglin will be managed in such a way as to allow various alterations as the program matures and new program specifics are learned. Consequently, an adaptive management approach will be implemented to assist in this maturation process.

Figure 7-6 (in Chapter 7, JSF Flight Training, Affected Environment and Environmental Consequences) shows the total number of aircraft at Eglin over time, including the proposed F-35s detailed in Table 2-13. The table identifies the proposed delivery schedule for F-35 aircraft at Eglin AFB, including the number of JSF aircraft reflected in the 2013 "snapshot" scenario.

The 33 FW aircraft will be completely deactivated by 2010 and the first six F-35A aircraft will arrive and begin flying in 2010. Aircraft will continue arriving at a relatively slow pace through 2013. Beginning in 2014, the program will likely begin full-rate production of the aircraft, and the number of aircraft delivered to Eglin will increase at a faster pace until all 107 PAA aircraft have been delivered by the end of 2015 (Table 2-13). To help the reader understand the gradual change in the noise environment, Chapter 7 contains a description of the decrease in operations resulting from the deactivation of the 33 FW and the gradual increase in operations resulting from F-35 deliveries through 2016. The two alternatives present a high and low number of operations at each airfield based on the 2016 projected aircraft numbers and the current syllabus.

As previously mentioned, a "snapshot" of operations and expected noise is presented in Chapter 7 of this EIS. The snapshot is a representative point in time of the progressive increase of F-35 aircraft projected for Eglin AFB. The snapshot represents the anticipated number of operations for all aircraft at Eglin AFB with the distribution of the JSF aircraft among the three airfields for the year 2013 based on low-rate initial production. This is based on the anticipated operations of all aircraft, not limited to the JSF aircraft, anticipated to be present at Eglin AFB by 2013 and before full-rate production decision of the F-35 aircraft. The full-rate production decision involves review of the JSF Program to determine whether it is sufficiently mature to begin full-scale production of the aircraft.

2.6.1 JSF Flight Training Elements

2.6.1.1 Flying Operations

DoD Services prepare a syllabus or training manual for all required military training. Because the JSF Program is new, a final syllabus has not yet been validated by the Joint Services. However, the JSF Program Office has developed a preliminary syllabus that gives the required training events per student for each of the aircraft variants, CTOL (designated as F-35A), STOVL (designated as F-35B), and CV (designated as F-35C) (JSF Program Office, 2007). The flights typically follow time in the simulator and are designed to teach the students various skills. For example, students transitioning from F-16 to F-35 aircraft already know how to fly fighter aircraft, but would be required to have transition flights to train them on flying the F-35 aircraft. Other types of training events would include such skills as flying in formation, advanced aircraft handling, and tactics and weapons used when approached by enemy aircraft. During flight training, students typically require about seven to eight months to complete the syllabus, with about half of the time in the simulator and the other half of the time actually flying the aircraft.

Around an airfield, ***air traffic control (ATC) operations*** are categorized as takeoffs, landings, closed patterns (which would include activities referred to as touch-and-gos, go-arounds, or low approaches), or inter-facility transfers. Each takeoff or landing constitutes one operation. A closed pattern occurs when the pilot pulls the aircraft steeply to pattern altitude, within approximately 1.5 miles of the runway, to set up for another landing. Since a closed pattern operation essentially consists of a landing and a takeoff, it is considered two operations. An inter-facility transfer occurs when an aircraft flies from one airfield to another airfield to perform a training event. So, if more than one airfield is used, then there are additional ATC operations than if only a single airfield is used. In the example above, if six touch-and-gos were all performed at Eglin Main Base, then there would be a total of 12 ATC operations (one for each take-off and one for each landing). If however, the pilot did four touch-and-gos at Eglin Main Base and then flew to Duke Field for the two remaining touch-and-gos, then there would be a total of 13 ATC operations, 12 for the take-offs and landings, and one for the inter-facility transfer. For analyses in this EIS, each training event in the syllabus is converted into the number of ATC operations as described above. Each of the alternatives will be described in terms of the number of ATC operations.

The term ***sortie*** refers exclusively to the flight of a single aircraft from takeoff through landing, including performance of a mission or training event.

A typical training sortie would be that the students and instructors depart Eglin Main Base runway and then head out for the warning areas over water, such as W-151. They would typically spend about one hour over water in flight training. Use of the warning areas (such as W-151) over the Gulf of Mexico provides a very large airspace from 0 to 50,000 feet AGL and can accommodate the tactical maneuvers that may involve up to eight aircraft simultaneously. The students would then head to an auxiliary field for an

additional half-hour of training that involves various field approaches and landings, such as a straight-in landing, an overhead break (overflying the airfield, then maneuvering within visual sight of the runway to get in a position to safely land), touch-and-go landings, conventional landings, closed patterns, or simulating a flameout (where the pilot reduces thrust to idle and rapidly descends from over the field to a low approach). Students may also use the Eglin Main Base airfield for field approaches, depending on how busy the main airfield is. Typically, most of the activity at the main airfield would be launches and recoveries of aircraft.

The following sections describe the requirements for the JSF flying operations, which include operations from Eglin Main Base and auxiliary airfields and in the special use airspace.

JSF Airfield Operations Overview

Based on the preliminary syllabus, Table 2-18 provides the estimated sorties required by the syllabus at Eglin AFB airfields.

Table 2-18. Average Estimated Sortie Activity per Day for Eglin AFB Airfield Operations for Implementation of JSF IJTS

Type of Activity	CTOL	STOVL	CV	Total
Takeoff/Landing	74	24	24	122
Closed Pattern	10	12	30	52

CTOL = Conventional Take-Off and Landing; STOVL = Short Take-Off Vertical Landing; CV = Carrier Variant; N/A = Not Applicable

On average, approximately 122 sorties would be conducted per day, of which approximately 74 would be for CTOL students, 24 for STOVL students, and 24 for CV students, as shown in Table 2-19. Of the total sorties per year, at least 8 percent additional flights may be required for re-fly requirements, whereby students conduct additional work as a result of not completing a particular flight/mission profile. In addition, approximately 15 percent of the total sorties for continuation training (CT) and cost of business (COB) is captured into the proposed number of sorties. CT is associated with maintaining instructor training currency, while COB addresses instructor proficiency, ferry flights, maintenance checks, etc., associated with the day-to-day training requirements.

Table 2-19. Proposed Number of Sorties by Aircraft Variant for JSF Training

Sorties	CTOL	STOVL	CV
Per Day	74	24	24
Per Year	14,235	4,617	4,617
With 8% Re-fly	15,473	5,018	5,018
With 15% CT/COB	18,204	5,904	5,904
UTE rate (Average Number of Sorties per Month per aircraft)	21	25	33

Source: JSF Program Office, 2007
CT/COB = Continuation Training/Cost of Business; CTOL = Conventional Take-Off and Landing; CV = Carrier Variant; STOVL = Short Take-Off Vertical Landing; UTE = utilization

2.6.1.2 Airspace Requirements

The FAA has designated the airspace within the United States as Controlled, Special Use, Other, and Uncontrolled airspace. For a more detailed explanation of each of these, see Section 3.1 (Airspace). Military training routes (MTRs) are training areas that are used primarily for low-level flight training. For proposed JSF flight training, "low-level" is generally at 1,000 feet AGL. Special Use Airspace (SUA) identified for military and other governmental activities is charted and published by the FAA. SUA is designated airspace within which flight activities are conducted that require confinement of participating aircraft, or may place operating limitations on non-participating aircraft. SUA includes restricted areas, MOAs, and warning areas. Warning areas consist of airspace off the coast of the United States. MOAs and warning areas serve to alert non-participating pilots of potential hazards associated with the airspace. Generally, most of the airspace over the Eglin Reservation is restricted airspace, with some exceptions (Figure 1-1). Restricted airspace means that there are restrictions to aircraft flying through the area due to activities that may be hazardous to aircraft. Most of the airspace in the Gulf of Mexico extending outward from Eglin AFB is classified as a warning area (Figure 1-4). When Eglin is performing tests over land or in the Gulf, then other aircraft are restricted or warned about entering into that airspace. The MOAs near Eglin are used for separating certain military training from other uses. The large number of sorties and diversity of JSF training requirements identified in the JSF training syllabus can be accommodated within the nearly 130,000 mi^2 of airspace overlying Eglin's land and water ranges (U.S. Air Force, 1996a). The E&T JCSG acknowledged the importance of considering the amount of airspace and its location relative to the Main Operating Base in the analysis. One of the airspace criteria included a desired distance of less than 120 nautical miles (NM) from the Main Operating Base. Other airspace criteria considered the distance to air refuel tracks from the Main Operating Base and the number of low-level routes (with a minimum of two required). For the proposed number of JSF students to be able to complete the flight training syllabus, there would be approximately 122 sorties per day or about 30,000 sorties per year. These sorties would replace the F-15 sorties, currently performed by the 33 FW. The change in sorties would result in a net increase of approximately 80 sorties per day and 20,000 sorties per year. Some training would include supersonic speeds at distances greater than 25 miles from the shore.

2.6.1.3 Ordnance Use

JSF flight training would use ordnance, such as laser and GPS-guided guided bomb units (GBU). Table 2-20 lists the annual ordnance requirements for training. Some of the required JSF training includes the use of 25 millimeter (mm) ammunition during strafing runs. Most of these strafing events would be associated with Basic Air-to-Ground (BAG) and Close Air Support (CAS) training events. Ordnance use would include both live and inert bombs identified in Table 2-20.

Table 2-20. Annual Ordnance Requirements for JSF Training

Type of Ordnance	Annual Quantity
GBU-12 (live)	635
GBU-12 (inert)	219
25 mm (TP)	208,518
Flares (MJU-8/27)	1,363

GBU = Guided Bomb Units; TP = Target Practice

JSF students would also expend flares during a portion of their flights. The flares proposed for use include the MJU-8/27. Current procedures for flare use are found in AAC Instruction 11-201, *Air Operations*, and would be used during JSF flight training.

Flares may be used over the Eglin Reservation with a minimum altitude release over the test areas of 200 feet AGL and 500 feet AGL over other areas. They may be employed within W-151 provided the aircraft is above 1,500 feet AGL or the aircraft is below 1,500 feet AGL and at least 3 NM from any surface vessel, platform, or land mass.
JSF pilots are not planning to train with chaff.

2.6.2 Alternative Narrowing Process for the JSF Flight Training

2.6.2.1 Airfield Narrowing

The BRAC decision to establish the JSF IJTS at Eglin AFB means that the initial beddown of the aircraft would occur on Eglin Main Base and its two runways (refer to detailed discussion at page 2-56). The basing studies produced for the 2005 BRAC decisions identified the requirement for an auxiliary field similar to those for the Main Operating Base (E&T JCSG, 2005): (1) must have a runway of 8,000 feet by 150 feet; (2) must be less than 1,000 feet above mean sea level (MSL); and (3) within 50 NM from the Main Operating Base (Eglin Main). Table 2-21 lists the auxiliary airfields considered for JSF training. Using those criteria, five airfields were identified within 50 NM of the Eglin Main Base runway and with lengths of 8,000 feet as shown in Figure 2-27 and as indicated by the shaded cells in Table 2-21. The fields were also required to be military, which would eliminate the Bob Sikes airfield from consideration. Both Pensacola NAS and Hurlburt Field were considered to be too busy, and their use would not be compatible with existing aircraft. This left Choctaw and Duke Fields for consideration as auxiliary fields for the JSF (Figure 2-28). Other criteria included weather-permitting use over 250 days per year, 24-hour operations, and capability for Fleet Carrier Landing Practice (FCLP) and Simulated Flame Out (SFO) approaches.

The FCLP training simulates an aircraft carrier landing and requires specialized visual landing equipment, runway lighting, and communications equipment. Choctaw Field has the capability to be improved to conduct both day and night FCLPs. Runway arresting gear platform is available but has not been installed. In addition to runway arresting gear installation, procurement and installation of an Improved Fresnel Lens Optical Landing System would be required. This system upgrade/installation is required to meet current fleet FCLP requirements.

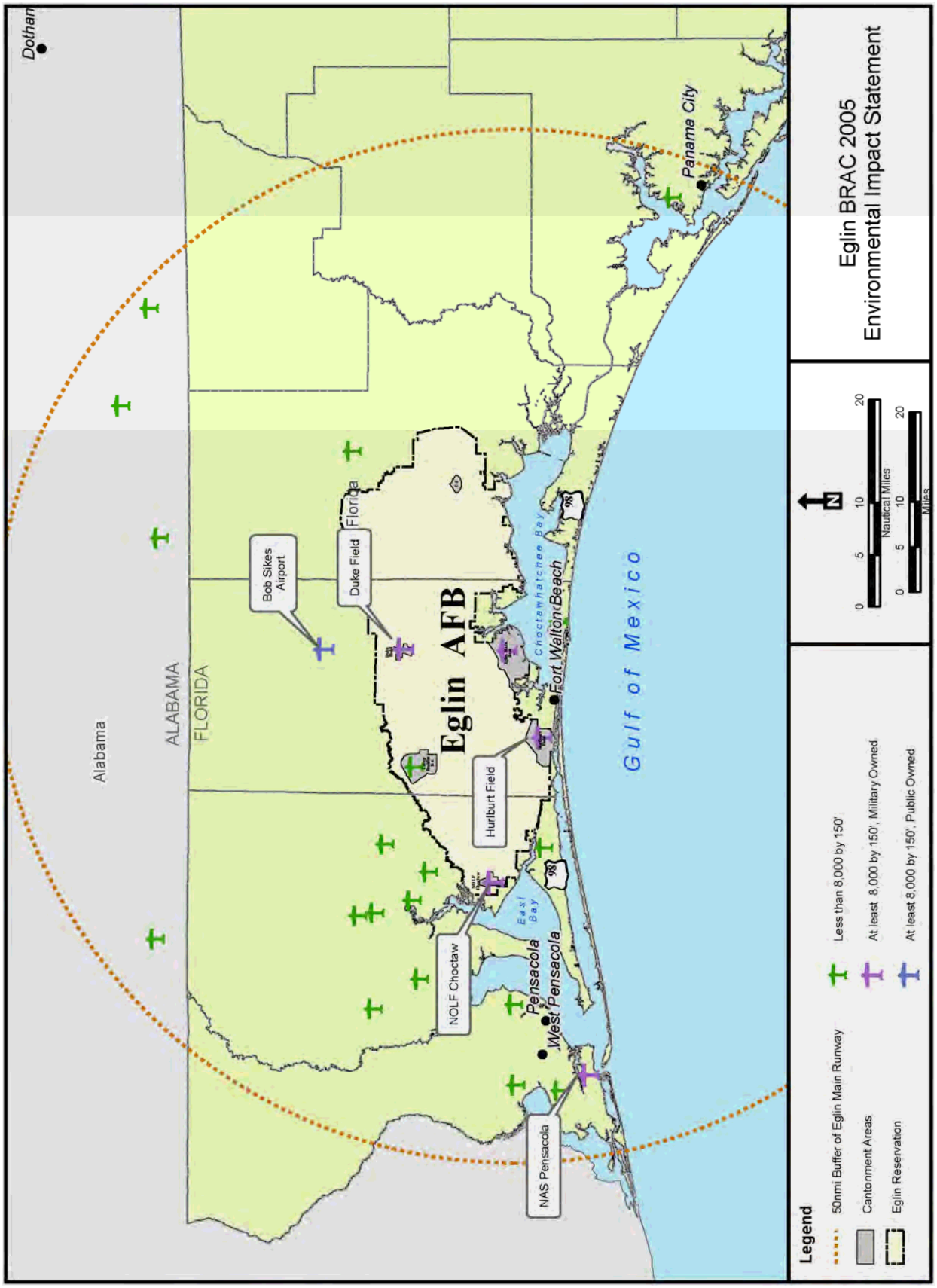

Figure 2-27. Evaluation of Potential Airfields as Auxiliary Fields

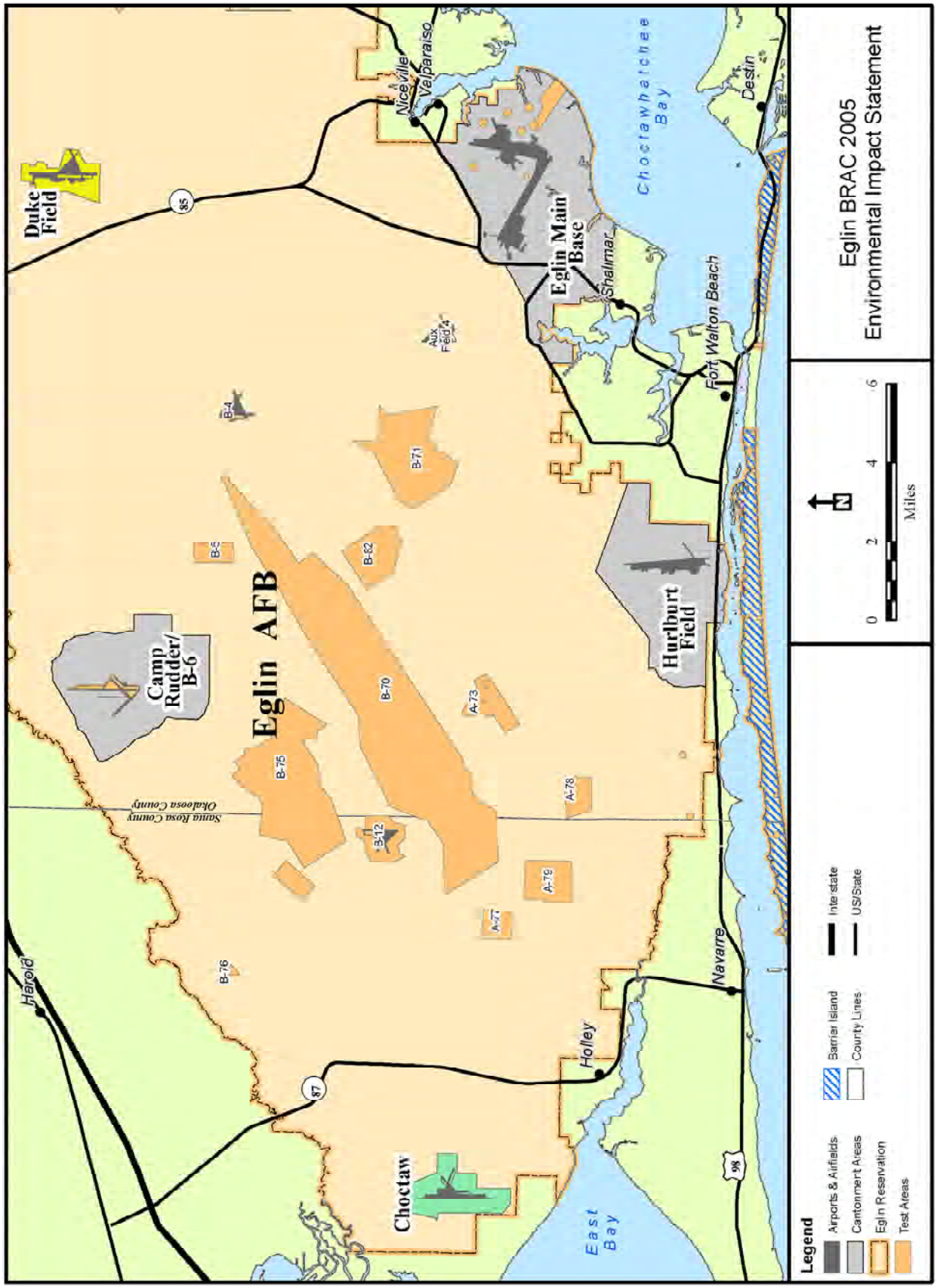

Figure 2-28. Existing Functional Airfields on Eglin AFB

For Duke Field, this FCLP equipment could be purchased. The SFO is a practice approach at idle thrust to the runway. The approach may either be a circular approach, starting at a relatively high altitude above the runway, or a straight-in approach. Both have fairly steep descents when compared to normal approaches. The approach may start above a runway and may continue on a relative high and wide downwind leg with a continuous turn to final approach. It terminates in landing or a low approach (FAA, 2006a). This training requires fire and rescue equipment, which is available at both airfields.

Table 2-21. Auxiliary Airfields Considered for JSF Training

Name	FAA Identifier	Elevation (feet [ft])	Approximate Size (ft)	Owner	Runway Criteria
Brewton Municipal	12J	99	5,066 x 150	Public	< 8,000 by 150 ft
DeFuniak Springs	54J	289	4,100 x 60	Public	< 8,000 by 150 ft
Destin Fort Walton Beach	DTS	23	5,000 x 100	Public	< 8,000 by 150 ft
Eglin Auxiliary Field 6	Z01	120	5,000 x 64	U.S. Air Force	< 8,000 by 150 ft
Ferguson	82J	27	3,200 x 200	Public	< 8,000 by 150 ft
Florala Municipal	0J4	314	3,197 x 75	Public	< 8,000 by 150 ft
Geneva Municipal	33J	101	3,984 x 98	Public	< 8,000 by 150 ft
Harold NOLF	NZX	150	5,000 x 1400	U.S. Navy	< 8,000 by 150 ft
Holley NOLF	NKL	39	3,600 x 150	U.S. Navy	< 8,000 by 150 ft
Logan Field	1A4	200	3,256 x 75	Public	< 8,000 by 150 ft
Pace NOLF	NVI	180	3,000 x 3,000	U.S. Navy	< 8,000 by 150 ft
Panama City Bay County International	PFN	20	6,308 x 150	Public	< 8,000 by 150 ft
Pensacola Regional	PNS	121	7,000 x 150	Public	< 8,000 by 150 ft
Peter Prince Field	2R4	82	3,700 x 75	Public	< 8,000 by 150 ft
Santa Rosa NOLF	NGS	150	4,500 x 150	U.S. Navy	< 8,000 by 150 ft
Saufley Field NOLF	NUN	85	4,000 x 200	U.S. Navy	< 8,000 by 150 ft
Spencer NOLF	NRQ	151	1,800 x 150	U.S. Navy	< 8,000 by 150 ft
Whiting Field NAS North	NSE	199	6,000 x 200	U.S. Navy	< 8,000 by 150 ft
Whiting Field NAS South	NDZ	178	6,000 x 200	U.S. Navy	< 8,000 by 150 ft
Bob Sikes	CEW	213	8,000 x 150	Public	≥ 8,000 by 150 ft
Choctaw NOLF	NFJ	102	8,000 x 150	U.S. Navy	≥ 8,000 by 150 ft
Duke Field	EGI	191	8,000 x 150	U.S. Air Force	≥ 8,000 by 150 ft
Hurlburt Field	HRT	38	9,600 x 150	U.S. Air Force	≥ 8,000 by 150 ft
Pensacola NAS	NPA	28	8,000 x 200	U.S. Navy	≥ 8,000 by 150 ft

Note: shaded cells represent auxiliary airfields that meet all narrowing criteria.
Source: The original source spatial data for runways came from the National Geospatial-Intelligence Agency (National Geospatial Intelligence Agency, 2007) and the runway dimension attribution came from the FAA based on information provided on the following website: http://www.airnav.com/airports (AirNav, LLC, 2006).
FAA = Federal Aviation Administration; NAS = Naval Air Station; NOLF = Navy Outlying Field; U.S. = United States

2.6.2.2 Alternatives Development

The airfields being considered for JSF Flight Training were narrowed to Eglin Main Base, Choctaw Field, and Duke Field as described previously. Given the large number of F-35 operations per year (over 200,000), a BRAC study group decided that all three airfields should be used for any alternative. The proposed alternatives would therefore differ in the number and types of operations performed at each airfield. The BRAC study group consisted of Eglin Range, Operations, and Air Traffic Control (ATC) and JSF Joint Program Office personnel.

The BRAC study group established a limited number of operational criteria for selecting the alternatives to be evaluated. The criteria included the following:

- Airfield capacity – Addition of the proposed JSF operations would not displace existing or planned operations at the airfield.
- Maximize efficiency – Minimize the number of different types of aircraft (e.g., jets, turboprops, helicopters, UAVs). The mixing of large numbers of operations of different types of aircraft will reduce the efficiency due to the different types of patterns and the aircraft speeds.
- Use existing airfield capabilities to minimize additional expenditures – For example, several ILSs exist on Eglin Reservation: two at Eglin Main, one at Duke, one at Hurlburt Field.
- Minimize congestion in airspace that would have required displacing current turboprop training activities.

To address the airfield and airspace capacity issue, Eglin AFB used a simulation model called the Naval Aviation Simulation Model, or "NASMOD," (ATAC Corp., 2007) to look at a range of JSF training alternatives. The model input included current and planned operations for each airfield and airspace unit. It simulated airfield and airspace conditions for the year in which all training operations in the F-35 would be accomplished at Eglin. Airfield and airspace conditions within NASMOD included other actions in addition to the F-35 proposal. For example, the model considered that the F-15s associated with the 33 FW would not be located at Eglin, as discussed in Section 2.7. The model analyzed several different scenarios for airfield use (U.S. Air Force, 2006c; U.S. Air Force, 2007a; U.S. Air Force, 2007b).

2.6.3 Alternatives Considered but not Carried Forward for the JSF Flight Training

After comparing the narrowing criteria to the possible auxiliary airfields, several were eliminated: Navy Outlying Field (NOLF) Saufley Field, Sherman Field (NAS Pensacola),

Hurlburt Field, NOLF Holley, NOLF Santa Rosa, Ferguson, Auxiliary (Aux) Field 6, Peter Prince Field, NAS Whiting Field, Brewton Municipal, Crestview (Bob Sikes Airport), Florala, Destin/Fort Walton Beach, Geneva Municipal, DeFuniak Springs, Panama City Bay County International, and Pensacola Regional.

Based on NASMOD modeling results, several alternatives were not carried forward due to their inability to meet operational requirements. Those eliminated included a "Choctaw heavy," "Duke heavy," and a "Blended Mix" identified during the 2007 scoping meetings. Details regarding these eliminated scenarios are provided in Appendix K. Each of these alternatives was eliminated due to constraints on the number of additional airfield operations that could be supported without impacting the current or existing operations.

During the public scoping meetings in November 2007, the Blended Mix was proposed as a potential alternative before the NASMOD model results were available. Use of this model demonstrated that Duke Field could not support the number of operations proposed in the preliminary description of the alternative. In addition, the number of ILS approaches to Eglin Main Base was not realistic, based on historic weather conditions.

2.6.4 Alternatives Carried Forward for the JSF Flight Training

Two proposed alternatives were developed to meet initial JSF flight training requirements described in the preliminary syllabus (the JSF training curriculum). The alternatives presented represent the potential range of actions that could be implemented in whole, in part, or in combination to accomplish the BRAC-directed beddown of the F-35 at Eglin.

Each of these alternatives analyzes a different aspect of the potential framework that could be implemented at Eglin AFB. The alternative or combination of alternatives selected in the forthcoming Record of Decision (ROD) for this EIS would constitute the JSF flight training scenario that would be implemented at Eglin AFB. It is anticipated that as the JSF training program evolves and matures at Eglin AFB, elements of the program may change. Consequently, the JSF will adaptively manage program issues over time throughout the delivery and basing of the aircraft through approximately CY 2020.

The proposed flight training would be conducted on average 246 days per year, which equates to approximately 20.5 training days per month. Training operations would occur five days per week, with most flights occurring during the day in compliance with operating procedures that govern flight rules. An estimated 12 percent of the total proposed flights would occur at night.

Common Elements Among Alternatives

This section describes the common elements associated with the JSF flight training, including airspace operations and delivery of ordnance.

Airspace Operations

To perform flight training identified in the syllabus, the JSF would utilize a variety of SUA on a routine basis. As shown in Figure 1-3 of Chapter 1, the over-water airspace consists of Warning Areas (e.g., W-151) over the Gulf of Mexico. The over-land airspace is shown in Figure 1-3 and Figure 1-4 and consists of MOAs and restricted airspace ("R-number"). Figure 1-4 also shows the corridors (Part 93 airspace) through Eglin AFB ("NSC" for North-South Corridor and "EWC" for East-West Corridor).

The distribution of the proposed sorties in SUA would be dictated by the use, scheduling priorities, and training requirements. Eglin AFB performed an analysis of current and proposed airspace use with the F-35 using NASMOD (U.S. Air Force, 2006c). Table 2-22 is based on this study and shows the proposed distribution of sorties at the end state in each type of airspace.

Table 2-22. Estimated Annual Sorties for Each Type of Airspace

Airspace Element	End State	
	F-35	Other Aircraft
R-2914A	3,278	6,772
R-2914B	3,278	302
R-2915A	3,278	24,439
R-2915B	3,278	1,929
R-2915C	3,278	1,135
R-2919A	3,278	704
R-2919B	3,278	428
Eglin MOA - A	3,278	629
Eglin MOA - C	3,278	264
Tyndall MOA C/D/E/F	546	4,094
W-151A	24,046	3,543
W-151B	24,046	3,265
W-151C	24,046	3,653
W-151D	12,023	3,225
W-151E	12,023	2,528
W-151F	12,023	2,447
VR-1082	295	173
VR-1085	295	73

The airspace in the Eglin AFB area is heavily used by a number of Eglin and regional units. Restricted areas (R-2914/15/18/19) are primarily used by the 46 TW, 16 SOW, 33 FW, and 53 WG for extensive multi-use air-to-surface, surface-to-air, ground detonations and test and evaluation activities. The JSF flight training would primarily

use this area for air-to-surface munitions drops and strafing runs. In addition, the JSF flight training would use this area to simulate attacks on threat emitters and to practice evasive maneuvers.

Warning Area W-151 is principally used by the 33 FW, 16 SOW, and 46 TW for broad multi-use air-to-air, air-to-surface, and surface-to-air training activities, aircraft flying activities, and test and evaluation activities. This would be the primary airspace utilized by the JSF flight training. This area would be used for air-to-air maneuvering against Red Air (or "enemy") attacks as well as air-to-ground activities prior to entering the restricted airspace for munitions release. This airspace would be used for air refueling missions, flare expenditures, sensor work, and supersonic flight.

Warning Area W-470 is used mainly by the 325 FW located at Tyndall AFB for training jet pilots in the F-15 and F-22 aircraft. The 53 WG also uses W-470 for multi-use air-to-air, air-to-surface, and surface-to-air training activities, aircraft flying activities, and test and evaluation activities. The Air Combat Maneuvering Instrumentation (ACMI) utilized in scoring pilot efficiency is located in this area. The JSF flight training would use this area as a backup in the event that W-151 is not available. The Tyndall MOAs are predominantly used by the 325 FW. These MOAs are scheduled by Tyndall AFB and would be used in the JSF flight training for low-level operations. The low-level operations would normally culminate with an actual or simulated attack on a target located in the restricted area.

Ordnance

Table 2-20 identified the ordnance required as part of the JSF flight training syllabus. To provide flexibility and diversity to the students, the Air Force proposes that the live and inert ordnance be used on existing targets on the eastern and western sides of the Eglin Range. For strafing, the JSF flight training would use TA C-62 on the east and TA B-75 on the west (Figure 1-2). For both inert and live bombs, TAs C-52E on the east and B-82 on the western side would be used (Figure 1-4). All munitions fired over the Gulf of Mexico into W-151 would be inert. Use of other test areas would be approved by Eglin AFB on a case-by-case basis.

Flares would be used according to established Eglin procedures over W-151 and the Eglin Reservation. Pilots would avoid expending flares over populated areas, structures, or personnel.

2.6.5 Alternatives for JSF Flight Training

This section discusses the proposed alternatives for JSF flight training at Eglin AFB. Each of these alternatives provides for a different mix of operations at each of three airfields: Eglin Main, Duke Field, and Choctaw Field. Each of the alternatives considers the Eglin Main Base airfield as the Main Operating Base from which aircraft depart for training activities (departures) and terminate their training activities (terminations)

consistent with BRAC requirements. This accounts for approximately 60,000 annual operations at Eglin Main airfield or about 25 percent of the total proposed operations for the JSF at the Eglin Reservation. The other fields identified in these alternatives are considered auxiliary airfields.

Ideally, all training events would occur on Eglin Main Base because it would be more efficient. That is, it would take less time than flying to one of the other two airfields. It would also result in fuel savings. However, this would not be operationally feasible due to the number of daily JSF operations (over 700) that would be added to the existing operations.

Because Duke and Choctaw Fields met the minimum requirements discussed in Section 2.6.2, the BRAC study group analyzed the distribution of operations between Eglin Main, Duke, and Choctaw Fields. However, much of their analysis depended on the training syllabus, which is merely a forecast—it is intended to evolve over time, as the capabilities and constraints of the JSF develop. Further, the possible permutations of operations disbursed between the three airfields would present an exceedingly cumbersome number of alternatives, with environmental impacts varying but little between them, and thus presenting very little value for comparison purposes.

Thus what emerged instead from the study group is a range of alternatives. The actual distribution between Eglin Main Base, Duke, and Choctaw Fields may vary somewhat as time goes on. Consequently, the JSF Program will adaptively manage program issues over time throughout the delivery and basing of the aircraft and flight training through approximately CY 2020.

With these considerations in mind, two alternatives represented a reasonable range of alternatives to carry forward. These alternatives presented environmental impacts that varied enough to provide both the public and the decision maker with valuable information on which to make comparisons. Thus, in analyzing these varied environmental impacts, these alternatives cover the "full spectrum of alternatives," required for analysis under 32 CFR 989.8(b). Table 2-23 shows the proposed alternatives in terms of average annual ATC operations at an airfield in comparison to the baseline. As noted in Table 2-23, the total numbers are not the same for each alternative. This is due to the differences in the number of interfacility flights, which add to the ATC operations. As shown in Table 2-23, JSF Flight Training Alternative 2 would have fewer total operations than Alternative 1 due to the lower number of interfacility operations. The primary difference in the number or operations is between the number of F-15s currently operating and the number of F-35s that would be operating at the end state. The number of other aircraft is identical at Choctaw and Duke Fields, while the number of other aircraft would be reduced by 2,329 annual operations at Eglin Main Base for either of the flight training alternatives. The table shows that the total number of operations would more than double with the F-35 beddown at Eglin AFB, regardless of the alternative.

Table 2-23. Comparison of Annual ATC Operations Associated With the Baseline Year (2005) and With the F-35s at the End State

Alternative	Aircraft Type	Airfield			Total
		Eglin Main	Duke	Choctaw	
Baseline (2005)	F-15 (33rd FW)	29,206	0	0	29,206
	Other	76,582	24,643	76,467	177,692
	Total	**105,788**	**24,643**	**76,467**	**206,898**
Alternative 1	F-35	121,286	84,956	33,633	239,875
	Other	74,253	24,643	76,467	175,363
	Total	**195,539**	**109,599**	**110,110**	**415,238**
Alternative 2	F-35	175,013	35,762	23,997	234,772
	Other	74,253	24,643	76,467	175,363
	Total	**249,266**	**60,405**	**100,464**	**410,135**

ATC = Air Traffic Control; 33 FW = 33rd Fighter Wing

2.6.5.1 JSF Flight Training Alternative 1 (Preferred Alternative)

For this alternative, the numbers of operations at Duke and Choctaw Field were maximized as much as operationally feasible based on previous NASMOD modeling. The remainder of the operations were located at Eglin Main Base.

2.6.5.2 JSF Flight Training Alternative 2

For this alternative, all the F-35A model training events would occur on Eglin Main Base (Table 2-23). The F-35B models would be split near 50 percent to Eglin Main Base and Duke Field, with slightly more occurring at Duke Field (58 percent versus 42 percent), due to the unique ability to perform the short take-offs on the 1,000-foot surface at Duke Field. For the F-35C models, the training operations are approximately split between Eglin Main and Choctaw (44 percent versus 47 percent, respectively), with minor operations at Duke Field. Again, the only training events at Choctaw Field would be the F-35C model training.

2.7 NO ACTION ALTERNATIVE

The CEQ regulations (40 CFR 1502.14(d)) require the alternatives analysis in the EIS to "include the alternative of no action." "No action" in this case means the proposed BRAC actions would not take place, and the resulting environmental effects from taking no action would be compared to the other action alternatives. The regulations require the analysis of the No Action alternative even if the Air Force must, by law, implement the BRAC decision. The No Action analysis provides a benchmark, enabling the Air Force decision maker to compare the magnitude of environmental effects of the action alternatives.

The description of the "No Action" alternative was developed by evaluating predictable actions on Eglin AFB property that would occur even if the 2005 BRAC decisions were not implemented. Eglin's Air Base Wing Plans and Programs office, the 96 ABW/XPS, provided a list of actions that they considered as predictable by year 2015 (Purcell, 2006). In addition, the Eglin Base Comprehensive Plan was reviewed for relevant projects.

In order to facilitate impact comparisons, the activities associated with the No Action Alternative are categorized in relation to activities that would occur under the BRAC action; in this respect activities occurring under BRAC can then be specifically compared to activities under the No Action Alternative. As an example, activities associated with JSF flight training would occur under the BRAC action, and similar air operations with other aircraft may occur under the No Action Alternative. However, other actions such as ground training activities or construction that may occur under the No Action Alternative would have no bearing on JSF flight training. Similarly, air operations under the No Action Alternative would have no bearing on ground training activities and construction associated with the 7SFG(A) under the Proposed Action. As a result, comparison of the No Action Alternative to the Proposed Action alternatives can be specifically tailored to relevant actions within each alternative.

The activities associated with the No Action Alternative are categorized as (1) Personnel, (2) Facilities/Infrastructure, (3) Air Operations, (4) Ground Training, and (5) Munitions Use (from ground operations and air delivery). The following provides descriptions of activities under the No Action Alternative within these categories.

2.7.1 Personnel

While these are only actions that have been currently approved by Eglin AFB through 2006, they are representative of the types of actions that are expected to occur over time. There would likely be other minor personnel (less than or equal to 50) changes that have not yet been identified. These would be the result of new or expanded programs to support existing missions and would likely involve the renovation or expansion of existing facilities on Eglin AFB.

Florida Army National Guard (FLARNG). The FLARNG has requested that Company C, 3rd Battalion, 124th Infantry, which currently trains at Eglin AFB, be relocated from Panama City, Florida, to Eglin AFB. Eglin's proposed site is D-51. Information was provided by the Air Base Wing Planning Office (96 ABW/XPS) regarding the proposed FLARNG beddown at Eglin (Talley, 2007). FLARNG submitted a formal beddown request (December 2002) with the following initial notional requirements:

- 5 officers, 155 enlisted, 0 civilians
- 3 full-time support personnel

- Approximately 25,000 ft^2 of facilities (drill hall, offices, weapons vault, etc.)
- Parking for 100 personal vehicles covering approximately 25 acres
- Subsequent to the initial request (January 2004), the FLARNG changed their request of 25 acres to 3 to 5 acres on the cantonment to build a permanent facility of approximately 2,400 ft^2 to house 3 to 5 full-time support personnel. They requested 2,600 ft^2 for warehouse storage for their 136-member unit, 5,500 ft^2 of paved parking for vehicles, and 328 ft^2 for an arms vault with secure fencing. Eglin recommends that building 30 be provided as a temporary facility, with a later evaluation of a permanent beddown.

U.S. Army Corps of Engineers (USACE). The Department of the Army requested to relocate the Gulf Coast Area Office, located in Shalimar, Florida, and co-locate with the Eglin Resident Office on base in building 50519. The Gulf Coast Area Office manages the MILCON programs for Eglin AFB, Tyndall AFB, and Hurlburt Field. The Eglin Resident Office manages the MILCON contracts at Eglin AFB, Duke Field, and Santa Rosa Island. Co-locating the two offices would enable more timely support to Eglin projects and would allow economies of scale, thus reducing the cost of doing business. No information is available on the number of personnel to be relocated onto base.

Air Force Cost Analysis Agency (AFCAA). To improve the Air Force cost analysis capability, the Air Force proposed establishing a new satellite office for the AFCAA in building 11 at the AAC.

33 FW drawdown and President's 2007 Budget. Major changes at Eglin AFB that are predictable by 2016 include two major actions (Purcell, 2006):

- Drawdown of the 33 FW
- Drawdown of base personnel due to the President's 2007 Budget

The drawdown of the 33 FW is expected to begin in government FY 2009 and would be complete by September 2010. During that time, 1,638 personnel would lose their positions. The 33 FW drawdown would occur even without the BRAC implementation because ACC (the 33 FW's HQ command) is transitioning to the F-22 aircraft, which is not scheduled to come to Eglin AFB. In addition to the personnel loss, there would be a loss of F-15 aircraft. This would reduce the annual number of sorties in 2016 by about 10,000, which currently represents about 70 percent of the annual sorties at Eglin AFB.

In addition, the President's Budget for government FY 2007 (01 October 2006 through 20 September 2007) required a drawdown of DoD personnel. This drawdown would result in the loss of a total of 569 personnel from Eglin AFB, beginning in October 2006 and continuing to October 2011. This loss would not result in any loss of aircraft.

Based on the current total personnel assigned to Eglin AFB of 17,451, this loss of 2,207 personnel by 2016 represents a reduction of approximately 12.6 percent.

C-130 Drawdown. A predictable action that would be included in the No Action Alternative would be the loss of C-130 aircraft belonging to the Air Force Reserve's 919 SOW located at Duke Field. The 919 SOW trains at Eglin AFB to provide aerial refueling of helicopters and supports troop infiltrations in support of AFSOC. These aircraft would leave the Air Force inventory beyond the year 2013. Approximately 1,400 personnel assigned to the 919 SOW would move to Hurlburt Field (Farmer, 2006). They would fly or be associated with Hurlburt Field active-duty aircraft, and there would be no additional aircraft added to the inventory at Hurlburt Field.

Air Force Special Operations Command Assets Beddown – Cannon AFB New Mexico. The Air Force recently signed a ROD associated with the BRAC-related realignment of the AFSOC mission to Cannon AFB, New Mexico. This action would involve the movement of 108 AFSOC aircraft to Cannon AFB, along with associated personnel (approximately 1,000).

2.7.2 Facilities/Infrastructure

Eglin Main Comprehensive Plan. Based on review of the Eglin and Duke Field Comprehensive Plan, there are 24 planned MILCON projects (including facility construction and runway projects) planned beyond FY 2006 at Eglin Main Base with a total of more than approximately 581,000 ft^2.

New facilities planned for Eglin Main Base include:

96th Security Forces Squadron Complex. Eglin AFB plans to build a new 40,673 ft^2 complex for the 96th Security Forces Squadron to house all of the squadron's administrative, confinement, mobility, and control activities in one location. The facility would be located on Nomad Way. A facility parking lot, sidewalks, a bridge/roadway, and a stormwater retention pond or swales would be constructed, and buildings 272, 883, and 796 would be demolished.

EOD Complex. Eglin AFB proposed plans to relocate and construct a new EOD complex on the southwest side of Nomad Way adjacent to the current military dog training facility. The 17,505-ft^2 facility would also include utilities, parking, and landscaping. The existing EOD facility would be demolished. An environmental assessment (EA) has been conducted, and a Finding of No Significant Impact (FONSI) was signed in November 2006.

Precision Measurement Equipment Facility. On Eglin AFB there are plans to build a new 28,330-ft^2 Precision Measurement Equipment Laboratory Facility for the 46 Maintenance Squadron Test, Measurement, and Diagnostic Equipment Flight

(MXS/TMDE) to the east of building 613, off Eighth Street. In addition to the facility, construction would include a stormwater retention pond or swales.

Recreational Field Improvements. Future plans to develop the area in and surrounding the existing softball fields located to the north of Foster Road and to the east of Eglin Boulevard on Eglin AFB have been proposed. These plans include realigning the existing softball fields in their current location and constructing two athletic fields, eight tennis courts, two basketball courts, and a parking lot east of the softball fields to create a base recreational sports compound. A fitness/aquatic center and an exercise pad are proposed for construction just south of Foster Road to create a base fitness compound.

Motorcycle Training Platform. On Eglin AFB there are plans for the construction of a concrete slab as a permanent training area for the Motorcycle Safety Training Program. It would be located on a currently forested area north of building 721 on Foster Road. The construction of this training area would include a stormwater retention pond or swales. In the future, a storage shed would be built upon a concrete foundation adjacent to the motorcycle training area. Construction of this training area will result in about 60,240 ft^2 of land disturbance.

Federal Prison Camp Closure. There are plans to close the Federal Prison Camp located on Eglin AFB. This action would open up several buildings for Eglin's use. However, no specific use for these buildings has been identified.

Community Services and Hospital Expansion. Eglin AFB plans to use the Ben's Lake area and a portion of the Wherry housing area for future development of community services and hospital expansion. These plans are in the early concept phase, and the Air Force only considers them as "desirables" for these areas.

Bayou Village Mobile Home Park Closure. The Air Force currently plans to close the Bayou Village Mobile Home Park, which has fewer than 100 families (with that number steadily declining), in June 2008.

Duke Field Comprehensive Plan. Based on review of the Eglin and Duke Field Comprehensive Plan, there are nine planned MILCON projects (including facility construction and runway projects) planned beyond FY 1999 at Duke Field with a total of more than approximately 3,000,000 ft^2.

Hurlburt Field General Plan. The plan identifies more than 50 transportation and capital improvement projects (U.S. Air Force, 2005k) over the next seven years. These projects include demolition and new construction of facilities and roadways on Hurlburt Field. Specific information on each project and the potential impacts associated with the General Plan can be found in the *Hurlburt Field General Plan Environmental Assessment* (U.S. Air Force, 2005k).

Military Family Housing Privatization Initiative. The Air Force is currently in the process of privatizing all military family housing for both Eglin AFB and Hurlburt Field. This process would involve the demolition and construction of more than 2,000 houses. Details regarding exact square footage associated with these activities is currently unavailable as the project is still in the planning stages. However, it is expected that all demolition and construction activities would occur on Eglin Main Base and Hurlburt Field.

6th Ranger Training Battalion Facilities. In May 2005, the Air Force approved the initiation of activities under the Ranger Training Brigade Recapitalization Master Plan for the 6th Ranger Training Battalion at Camp James Rudder on Eglin AFB. These activities included constructing six pre-engineered metal buildings, replacing the gymnasium, renovating the student and cadre barracks, and building a controlled environment storage facility (boat house, new building 6070), a consolidated company operations facility and a consolidated maintenance and storage facility. The plan also involved the demolition of 16 buildings encompassing 41,150 ft^2 (U.S. Air Force, 2005l).

Veterans Administration Community-Based Outpatient Clinic (CBOC). Eglin AFB and the Veterans Health Administration are currently building a 16,200-ft^2 (0.372-acre) outpatient clinic on a 10-acre parcel of land adjacent to the Eglin Regional Hospital. In addition to the facility parking lots and sidewalks, the Veterans Health Administration will build an access road and a stormwater retention pond. The total amount of land to be cleared for this development is approximately 4.02 acres. The action was analyzed in an EA that resulted in a signed FONSI on 28 June 2005 (U.S. Air Force, 2005a and 2005b). This action would result in about a 2-percent increase in traffic volumes, which was considered minor and did not impact the Level of Service (LOS, or the amount of traffic on roadways) of the intersections. The CBOC would require the employment of 35 full-time equivalent employees during the first year of operation.

Okaloosa Regional Airport (ORA) Rental Car Parking Area. The ORA on Eglin AFB is proposing construction of a separate rental car parking and maintenance area. The proposal involves utilizing 36 acres of land adjacent to the ORA, leased from the Air Force, to construct a new rental car facility. The ORA would develop the proposed 36-acre site to provide parking areas for five rental car agencies totaling 800 parking spots; two new access points; a truck inspection area; an office, maintenance bay, car wash, and fueling area; an electrical duct extension from Florida Highway (Hwy) 85; and expanded stormwater management facilities. Environmental documentation has not identified any significant impacts to resources associated with the project.

University of Florida Research and Engineering Education Facility (REEF) Expansion. The University of Florida REEF may expand its facilities on Eglin AFB property to include a research park and other support facilities. No detailed information is

currently available on this proposal, as it is currently in the initial concept phase. However, it is likely that this development would utilize land areas adjacent to the existing REEF site and would involve construction and land clearing activities.

Joint Strike Fighter Reprogramming Facility (JRF). The Air Force proposes to renovate and build an addition to building 614 in support of the JRF at Eglin AFB. The JRF would support the 53rd Wing (53 WG)/53rd Electronic Warfare Group (53 EWG), who are currently located in building 614 and would not result in an increase in personnel. The F-35 reprogramming capability would involve the development, testing, distribution, and updating of mission data for all F-35 aircraft. The proposed project would include the construction of a 6,700-ft^2 building addition, a parking lot, interior renovations, existing pavement demolition, force protection standoff measures, new chillers, a transformer, a back-up generator, and associated infrastructure. The proposed project would provide a lab, control room, conference room, and supporting spaces for the JSF Stimulation System Integration System equipment necessary to test mission data.

Facilities planned outside Eglin Main Base on the Reservation would include:

Alabama Army National Guard Master Plan, Cobb Training Site. Eglin AFB is evaluating the establishment of an approximate 12,000-acre Military Ground Training Area for maneuver and individual/crew/squad training. The majority of this type of training would be dismounted movements supported by wheeled vehicles. Included in this acreage is a 300-acre cantonment area. In addition, a separate Small Arms Range Complex (SARC) would be developed for small arms weapons live-fire training and qualification on a range that is constructed to meet Army standards. The complex would include the construction of five small arms weapons qualification ranges: a combat pistol range, an automated record fire range, a 10/25-meter "zero range," a multipurpose machine gun range, and a sniper range. These facilities would be located west of Hwy 87 near the Cobb Training Site, with the SARC developed on TA B-75, and would be developed over a period of 10 years. The facilities would total approximately 82,000 ft^2.

Construction of a Controlled Environment Storage Facility (Boat House) at Camp Rudder. The proposed boat house would be a 4,800-ft^2 construction with 5,060 ft^2 of demolition.

C-74 Office Construction. Eglin has proposed to construct a 2,310-ft^2 metal facility at Range C-74. A new septic system would be installed to accommodate the proper disposal of waste water from the new facility. A new crushed limestone driveway (estimated 200 feet by 12 feet) would also be constructed from the existing asphalt roadway to the new facility so the temperature conditioning van could be properly stored. This project would require 0.75 acre and would result in an increase of impervious surface.

Construct new LADAR Test Laboratory and Establish Outdoor Test Range West of TA C-53 (between TA C-53 and State Route 285). Eglin is constructing a 14,000-ft^2 facility for laboratory space, office space, meeting space, and equipment storage space. Currently no utilities (water, power, etc.) exist at this site. A parking lot and small, paved access road (roughly 4,320 ft^2) from Range Road 200 will be constructed. No RCW cavity trees need to be cleared in the area, but some inactive tree sites are found east, north, and west of the proposed construction and range site. Part of this area is considered a longleaf pine restoration project area. This area does not cross any streams and is outside the zone for high probability of finding cultural resources. However, the outdoor LADAR test range does fall within a Recreational Area (Hunting Management Area # 10). The LADAR range is in proximity to the Rocky Bayou Airport, which is located south of the test range. No wetlands or other depressional areas occur in the area.

Construction of Range Road 218 Bypass Road at TA D-51. On the Eglin Range, construction of a paved, two-lane bypass road, approximately 2.3 miles long, along the northern boundary fence line of TA D-51 (Navy EOD School) is proposed. The typical range road width is approximately 20 feet with a cleared shoulder edge of approximately 24 feet to a forested tree line. The bypass road would likely be constructed to this general specification. The bypass road would intersect Range Road 218 on either side of TA D-51. The bypass would be outside the security gates for TA D-51. The project would involve tree removal and soil disturbances.

Mill Creek Restoration Project. Eglin AFB proposes to redesign portions of Mill Creek that run through the Falcon Golf Course. The redesign would consist of stream channel and floodplain restoration, culvert removal and replacement, bridge construction, and native vegetation re-establishment. The *Okaloosa Darter Recovery Plan* (USFWS, 1998) identifies the Mill Creek darter population to be the most imperiled, and considers the improvement of conditions in Mill Creek as a vital step to the downlisting and delisting of this species. While approximately 279 feet of suitable darter habitat originally would be impacted, Eglin would build approximately 2,000 feet of hydrologically connected stream channel, along with habitat structures and riparian vegetation plantings. To provide fill for floodplain creation, Eglin would construct ponds.

2.7.3 Air Operations

The difference in the No Action Alternative and the baseline (2005) is due primarily to the loss of F-15s associated with the 33 FW. Differences in airfield utilization would occur only at Eglin Main Base. There would be no changes at Choctaw Field or Duke Field associated with the No Action Alternative. Table 2-24 compares the annual ATC operations associated with each airfield under the baseline and No Action Alternative. The overall annual ATC operations would decrease by 31,535 (or 15 percent of the baseline) with the majority (nearly 93 percent) associated with the move of the 33 FW.

The remainder of the decrease would be associated with loss or relocation of transient aircraft.

Table 2-24. Annual ATC Operations Under the Baseline and No Action Alternative

Alternative	Aircraft Type	Airfield			Total
		Eglin Main	Duke	Choctaw	
Baseline (2005)	F-15 (33 FW)	29,206	0	0	29,206
	Other	76,582	24,643	76,467	177,692
	Total	**105,788**	**24,643**	**76,467**	**206,898**
No Action (End-State)	F-15 (33 FW)	0	0	0	0
	Other	74,253	24,643	76,467	175,363
	Total	**74,253**	**24,643**	**76,467**	**175,363**

ATC = Air Traffic Control; 33 FW = 33rd Fighter Wing

Airspace utilization would follow a similar change, with the loss of the 33 FW and a small decrease in the transient aircraft as shown in Table 2-25. Relatively small changes in airspace would occur in the restricted areas or MOAs. Use of the warning areas would decrease by about 70 percent.

Table 2-25. Estimated Annual Sorties for Each Special Use Airspace Under the Baseline and No Action Alternative

Airspace Element	Baseline (2005)		No Action (End-State)		Percent Change
	F-15s from 33 FW	Other Aircraft	F-15s from 33 FW	Other Aircraft	
R-2914A	1,552	6,772	0	6,684	-20
R-2914B	11	302	0	298	-5
R-2915A	770	24,439	0	24,121	-4
R-2915B	66	1,929	0	1,904	-5
R-2915C	66	1,135	0	1,120	-7
R-2918	0	640	0	632	-1
R-2919A	66	704	0	695	-10
R-2919B	66	428	0	422	-14
Eglin MOA - A	0	629	0	621	-1
Eglin MOA - B	0	276	0	272	-1
Eglin MOA - C	0	264	0	261	-1
Eglin MOA - D	0	210	0	207	-1
Eglin MOA - E	0	61	0	60	-1
Eglin MOA - F	0	686	0	677	-1
Tyndall MOA C/D/E/F	30	4,094	0	4,041	-2
W-151A	8,267	3,543	0	3,497	-70
W-151B	7,619	3,265	0	3,223	-70
W-151C	8,523	3,653	0	3,606	-70
W-151D	7,525	3,225	0	3,183	-70
W-151E	5,898	2,528	0	2,495	-70
W-151F	5,710	2,447	0	2,415	-70

33 FW = 33rd Fighter Wing; MOA = Military Operating Area; R-#### = Restricted Area; W-### = Warning Area

2.7.4 Ground Training

Ground training occurs throughout the Eglin Reservation in the interstitial areas, riverine and estuarine areas, and on test and training areas. Proposed ground training projects include:

Alabama Army National Guard (ALARNG) implementation of a portion of their Master Plan at Cobb Training Site on Eglin AFB. The ALARNG is proposing to implement some of the improvements described in the ALARNG Master Plan for Cobb Training Site (U.S. Air Force, 2007c). The Cobb Training Site would be an expansion of the Henry Cobb Tank Range on Eglin AFB and would include development of a Military Ground Training Area (MGTA) containing a cantonment area, a small arms range complex (SARC), and new training facilities on TA B-75. Improvements are focused on Army National Guard training requirements, but facilities would be available for other armed services' training and requirements.

The ALARNG has conducted training at Eglin AFB for more than 20 years pursuant to a license issued in 1982. The ALARNG constructed and operates the Henry Cobb Tank Range on a segment of TA B-75, and has an exclusive use license for building 1073 and approximately 47.3 acres of land. The ALARNG also has a joint use license for approximately 2,498 acres of land on TA B-75 for a tank range. That real estate agreement would need to be modified for the development of the Cobb Training Site.

The ALARNG has proposed to establish the following elements at Eglin AFB by 2018:

1) Military Ground Training Area (MGTA) – The ALARNG proposes to use 12,000 acres for maneuver and individual/crew/squad training west of Hwy 87 on the western side of Eglin AFB. The majority of this type of training would be dismounted movements supported by wheeled vehicles.
2) Small Arms Range Complex (SARC) – The ALARNG is proposing a new range complex that would centralize all small arms weapons live-fire training and qualification on a range that is constructed to meet Army standards. The complex would include the construction of five small arms weapons qualification ranges: a combat pistol range, an automated record fire range, a 10/25-meter zero range, a multipurpose machine gun range, and a sniper range. The preferred location for the SARC would be on TA B-75, with an alternative location on B-5, which is an inactive range that was previously used for small arms training.
3) Cantonment Area – Approximately 300 acres would be used for an intermediate staging area, consisting of fixed buildings that would include sufficient structures to support training site equipment and personnel, and an Army forward operating base in a combat theater, which would be a more rustic environment than the intermediate staging area. The cantonment would be located in the central portion of the MGTA.

The ALARNG prepared a Draft EA for public comment with a review period from 12 May to 26 June 2005. A Final EA was completed in August 2007, but a FONSI has not yet been signed (U.S. Air Force, 2007h). None of the potential impacts identified in the EA were significant. The impacts that will be addressed for potential cumulative impacts are summarized below:

Land Use and Recreation

- Use of TA B-75 or B-5 for small arms training would create new safety footprints in areas of Eglin AFB that are currently open to the public. These areas would have to be closed during range firing. This would require temporary closure of recreation management units 12 and 14 (TA B-75) or 2 and 16 (B-5) for up to 41 weekends and 40 weekdays per year.

Noise

- Operation of the SARC at TA B-75 and B-5 would expose land areas of up to 1,118 and 1,149 acres, respectively during training to Noise Zone II and III levels (sound levels above 70 C-weighted decibels).

Biological Resources

- Approximately 126 acres of RCW foraging habitat would be impacted by construction of the SARC on TA B-75.
- One active RCW cavity tree and 126 acres of RCW foraging habitat would be impacted by construction of the SARC on B-5.

Infrastructure and Transportation

- Hwy 87 would need to be closed a maximum of 41 weekends per year and 40 other weekdays per year for approximately 15 minutes per event, if tracked vehicles would be crossing the highway.
- Water wells, waste water systems, and energy infrastructure improvements would be necessary to construct the cantonment area west of Hwy 87.

Based on review of the Eglin AFB *Estuarine and Riverine Areas Programmatic Environmental Assessment* (U.S. Air Force, 2004a), increases in riverine and estuarine Special Operations, Navy EOD, Testing Support and Live Fire training have been approved and can be expected over the long term. These increases are on the order of more than 300 missions (greater than 10,000 people-days) and more than 2,000 boat landings per year. These increases represent a 100 percent increase in the amount of training activities that currently occur in these areas over the baseline (2005).

2.7.5 Munitions Use

Small Arms/Large Caliber – Under the No Action Alternative, approximately 5,500 explosive events would continue to occur in training areas located near or co-located with the proposed 7SFG(A) training ranges as part of explosives testing and explosives ordnance disposal activities. Increases beyond these areas' baseline annual 9,500 rounds of small-arms and large-caliber ammunition are expected over the long term through changes identified previously under the Ground Training activities above. The *Alabama Army National Guard Implementation of a Portion of the Master Plan for Cobb Training Site Final Environmental Assessment* for Eglin AFB, Florida, states that utilization of the SARC would involve approximately 80,000 5.56 mm blanks, 54,000 7.62 mm blanks, 40,000 0.50 caliber blanks, and 500 blast simulator canisters on an annual basis (U.S. Air Force, 2007c).

Based on review of the Eglin AFB *Estuarine and Riverine Areas Programmatic Environmental Assessment* (U.S. Air Force, 2004a), two new live fire ranges may be developed over the long term; munitions use in these areas as well as throughout the riverine-estuarine areas of Eglin AFB include an increase of about 33,000 rounds of 5.56 mm to 0.50 caliber munitions and 4,000 rounds of 5.56 to 40 mm practice rounds. These increases also represent a 100 percent increase in the amount of munitions used for these activities under the baseline (2005).

Air Delivered Weapons – With the realignment of AFSOC to Cannon AFB, it is anticipated that there would also be a decrease in the amount of air-delivered munitions utilized during AFSOC training activities. The decrease in the amount of air-delivered munitions as compared to the baseline (2005) would be directly proportional to the decrease in mission activities associated with that action. Reductions in munitions use resulting from disestablishment of the 33 FW would be minimal as the 33 FW has an air-to-air mission and does not typically use air-to-ground ranges.

2.8 REGULATORY COMPLIANCE

This EIS has been prepared to satisfy the NEPA requirements (42 USC 4321 et seq.) and its implementing regulations.

This analysis of environmental resources considered all applicable federal, state, and local regulations. Certain areas of federal legislation, such as the Endangered Species Act (ESA) and National Historic Preservation Act (NHPA), include direct contact with agencies. Other state and federal regulations used for guidance are identified in Chapter 3.

Implementing an alternative would involve coordination with several agencies. Compliance with the ESA involves consultation with the Department of the Interior (delegated to the USFWS) in cases where a federal action could affect listed threatened

or endangered species, species proposed for listing, or candidates for listing. The USFWS and Eglin AFB coordinate on a monthly basis concerning BRAC actions. The USFWS has been and is kept informed of the specifics of the BRAC recommendations. The USFWS responded to the Notice of Intent in a letter detailing its concerns. The letter was coordinated with the Florida Fish and Wildlife Commission. Eglin AFB prepared a Biological Assessment on potential impacts to threatened or endangered species associated with the BRAC actions.

The preservation of cultural resources associated with this EIS primarily relates to meeting provisions of the NHPA, as amended, and Section 106 of the act. Consultation with the State Historic Preservation Officer (SHPO), federally recognized tribes, and other parties including public participation, was part of the Section 106 planning process incorporated with the development of this EIS. Eglin AFB consulted the Alabama SHPO, the Florida SHPO and four federally recognized tribes: the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, the Poarch Band of Creek Indians, Alabama, and the Muskogee (Creek) Nation of Oklahoma. A project-specific programmatic agreement was developed as part of this EIS's Section 106 consultation effort, and an existing separate 2003 programmatic agreement for historic structures is pertinent to aspects of the EIS. Appendix F, *Cultural Resources,* fully describes how NHPA compliance was met for all alternatives.

2.8.1 Permit Requirements

This EIS has been prepared in compliance with NEPA; other federal statutes, such as the Clean Air Act and the Clean Water Act; Executive Orders; and applicable state statutes and regulations. A list of Eglin AFB permits and certifications was compiled and reviewed during the EIS process. Table 2-26 summarizes these applicable federal, state, and local permits and the potential for change to the permits due to implementing the proposed beddown or an alternative.

Table 2-26. Applicable Permits and Potential Permit Changes due to BRAC Decisions

Resource Area	Permits	Proposed Action
Airspace	No Permits Required	Not Applicable
Noise	No Permits Required	Not Applicable
Socioeconomics	No Permits Required	Not Applicable
Transportation	No Permits Required	Not Applicable
Utilities	New Consumptive Use Permit (CUP) and a Potable Water System (PWS) permit.	No potable water well is located at Test Area (TA) C-53. To address the lack of potable water at TA C-53, either a new potable water well would have to be established or the existing well at C-3 would need to be accessed to support the proposed ranges at and in the vicinity of TA C-53.
Air Quality	No Permits Required	Not Applicable
Safety	No Permits Required	Not Applicable

Continued on the next page…

Table 2-26. Applicable Permits and Potential Permit Changes due to BRAC Decisions, Cont'd

Resource Area	Permits	Proposed Action
Solid Waste	No Permits Required	Not Applicable
Hazardous Materials	No Permits Required	Not Applicable
Physical Resources	Construction activities would also require coverage under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities, where 1 or more acres of land are disturbed (FAC Rule 62 621).	All construction activities that have the potential to impact stormwater quality or disturb more than 1 acre of land must be permitted under NPDES regulation as administered by the FDEP. The Army would incorporate a comprehensive Stormwater, Erosion and Sedimentation Control Plan and an SWPPP into the final design plan.
	Stormwater Discharge Permits FAC Rule 62-346.	Stormwater Discharge Permits and any necessary utility extension permits would require coordination between the proponent and 96 CEG/CEVCE. The Army would obtain all appropriate permits prior to the commencement of any ground-disturbing activities.
	Stormwater Discharge Permits FAC Rule 62-346, cont'd	An Application for Stormwater Permit in Northwest Florida will be submitted by the Air Force prior to project initiation according to FAC Rule 62-346.
	Coastal Zone Consistency Determination	Actions taking place within the jurisdictional concerns of the FDEP require a consistency determination with respect to Florida's Coastal Zone Management Plan and the CZMA. Appendix I contains the CZMA Determination.
	Wastewater Permit (FAC Form 62-620.910(2) Application for a Domestic Wastewater Facility Permit - Form 2A)	If a wastewater treatment plant is constructed for the 7SFG(A) cantonment area, FDEP regulations require permits for wastewater treatment systems with a design capacity of more than 10,000 gallons per day of domestic wastewater and more than 5,000 gallons per day of commercial wastewater (see Chapter 3, Section 3.6.2, Region of Influence and Existing Conditions, Utilities). Depending on the presence of oil and grease or other toxic chemicals in the wastewater system, an industrial permit may also be required.
	FONPA: Per Executive Order (EO) 11988, *Floodplain Management*, and EO 11990, *Protection of Wetlands*, the Army is required to consider their actions in wetlands or floodplains	If there are no alternatives that would impact a wetland or floodplain; therefore there is no requirement for a Finding of No Practicable Alternative (FONPA). Additionally, the proponent and its contractor shall coordinate with 96 CEG/CEVCE for the following: ● Final stormwater design and permitting. ● Any potential discharges into surface waters from construction activities. ● Final backflow preventer design, if applicable.

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Table 2-26. Applicable Permits and Potential Permit Changes due to BRAC Decisions, Cont'd

Resource Area	Permits	Proposed Action
Physical Resources, cont'd	Design and Construction Permit	Any proposed stormwater retention or design features associated with cantonment areas would require an "Application for Stormwater Permit in Northwest Florida" to be submitted by the Air Force prior to project initiation according to FAC Rule 62-346 (new permit process promulgated 1 October 2007).
Biological Resources	No Permits Required. Endangered Species Act Section 7 Consultation with the USFWS will occur regarding all proposed activities.	Endangered Species Act Section 7 Consultation with the USFWS has occurred regarding the proposed activities (Appendix H, *Biological Resources*).
Cultural Resources	Because all planning and mitigative activities for cultural resources have been and would be performed by the Air Force, Archaeological Resources Protection Act permitting will not be necessary.	Excavation or removal of archaeological resources from Air Force fee title land.

96 CEG/CEVCE = Environmental Engineering Section; BMPs = best management practices; CZMA = Coastal Zone Management Act; FAC = Florida Administrative Code; FDEP = Florida Department of Environmental Protection; FONPA = Finding of No Practicable Alternative; NPDES = National Pollutant Discharge Elimination System; SHPO = State Historic Preservation Officer; SWPPP = Storm Water Pollution Prevention Plan; THPO = Tribal Historic Preservation Officer; USFWS = U.S. Fish and Wildlife Service

Note: EO 13423 is an overarching guideline with respect to each of these resource areas.

2.9 ENVIRONMENTAL COMPARISON OF ALTERNATIVES

The potential impacts related to each of the four requirements are presented in Table 2-27 through Table 2-31. These tables provide a summary of the environmental consequences, grouped by resource area, associated with each alternative. Table 2-32, following this narrative, provides an upper-level summary of the level of the impacts of the alternatives for each activity described in Table 2-27 through Table 2-31. It also shows the No Action condition for each resource. At the bottom of the table is the overall summary of impacts for all the activities that constitute the Proposed Action. The color coding in Table 2-32 reflects the degree of impact without consideration of any mitigations outside those required by law as a result of regulatory/permits that would be required as part of an alternative. Permit-related requirements (i.e., "permit mitigations") that would be part of the sub-alternative as required by law (e.g., stormwater permits) were included in the analyses of impacts

because these "permit mitigations" will be implemented regardless of the outcome of the analyses.

- Green – may include some beneficial or adverse environmental consequences, but the overall effect is one that can neither be termed beneficial nor adverse.
- Yellow – potential adverse environmental consequences or burdens on the resource, or issues with the resource have been identified.
- Red – unavoidable adverse environmental impact.
- Split boxes represent a designation between two categories above. Some of the impacts would fall into one category, with others in a different category. Therefore, it is not certain what the overall impact to the resource would be.

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Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Noise (Section 4.2)	Construction noise would be temporary and localized to the area immediately surrounding the construction site. While noise from construction activities would be audible at nearby workplaces and residences, overall noise impacts would be expected to be minor and would be temporary in nature.	Construction noise would be temporary and localized to the area immediately surrounding the construction site. Sites for Alternatives 2A, 2B, 2C, and 3 are remote from developed areas. Noise impacts would be minor and temporary in nature.			
Land Use (Section 4.3)	The 7SFG(A) Cantonment Alternatives 1A, 1B, and 1C would have direct land use impacts in each of the potentially affected areas. The impact would be a change in land use from open space to industrial, administrative, housing (unaccompanied), and outdoor recreation to support the construction of the new cantonment. 7SFG(A) Cantonment Alternatives 1A and 1C would not have any impact on surrounding land use, but 7SFG(A) Cantonment Alternative 1B could potentially encroach on the 33 FW area along the northern boundary of the West Gate site. There would be no land use impacts on any off-base areas. The change in land use would not be adverse, since it would be compatible with the existing land uses that surround the Triangle, West Gate, and North Poquito areas. The change would also not adverse reduce the amount of open space remaining within Eglin Main Base.	7SFG(A) Cantonment Alternatives 2A-2E would not have any direct land use impacts on surrounding community land use. Alternative 2A would permanently remove approximately 473 acres used for public access/recreation in Management Units 9 and 9A. Alternative 2B would eliminate public access/recreation on about 535 acres within Management Units 8A and 9A. Approximately 1,022 acres within Management Units 9 and 9A would be removed from public use by Alternative 2C. Alternative 2D would eliminate public access/recreation on approximately 1,281 acres within Management Unit 9. Alternative 2E would directly impact public access/recreation on about 716 acres within Management Unit 9. Alternative 2E would also impact a portion of the Florida Scenic Trail and the campground at Jr. Walton Pond. This would be an adverse impact if the trail and campground could not be relocated. The change in land use under Alternative 2 (all options) would not be adverse since it would be compatible with the surrounding land uses. The change would also not adversely reduce the amount of area open for public access/recreation within the affected management units and the remaining land portion of the Eglin Range.	Land Use impacts for Alternative 3 would be similar to those described for Alternative 2. Public access/recreation would be eliminated on approximately 500 acres of Management Unit 6N. Alternative 3 would not have any off-base land use impacts. The change in land use would not be adverse since it would be compatible with the surrounding land uses. The change would also not adversely reduce the amount of area open for public access/recreation within the affected management unit and the remaining land portion of the Eglin Range.	Land Use impacts for Alternative 4 would be similar to those described for Alternative 2. Public access/recreation would be eliminated on approximately 500 acres of Management Unit 10. Alternative 4 would not result in changes to off-base community land use. The change in land use on base would not be adverse since it would be compatible with the surrounding land uses. The change would also not adversely reduce the amount of area open for public access/recreation within the affected management unit and the remaining land portion of the Eglin Range.	Land Use impacts for Alternative 5 would be similar to those described for Alternative 2. Public access/recreation would be eliminated on approximately 500 acres of Management Unit 13. Alternative 5 would not result in changes to off-base community land use. The change in land use on base would not be adverse since it would be compatible with the surrounding land uses. The change would also not adversely reduce the amount of area open for public access/recreation within the affected management unit and the remaining land portion of the Eglin Range.

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Socioeconomics (Section 4.4)	Establishing the 7SFG(A) at Eglin AFB would bring additional people and create jobs in each county in the region of influence (ROI). These effects, in turn, would increase the demand for products and services in the ROI, including schools and public services. There would be a beneficial increase to the individual counties in terms of additional jobs and incomes. Locating the 7SFG(A) to the region would generate a net total of $8.2 million in annual spending and an increase of 105 jobs. The effect of the 7SFG(A) personnel combined with the drawdown of the 33 FW and the drawdown from the President's Budget for 2007 would be a net increase of 1,579 personnel, an increase of 0.41 percent as compared to the 2005 population. Of the additional people entering the area as a result of the 7SFG(A) realignment, there would be approximately 2,415 children. With an estimated 1,243 students leaving the region because of the 33 FW and President's 2007 Budget drawdowns, the net addition of students to the ROI would be 713, increasing the student population by 1.15 percent. The corresponding net change in total revenues received by the ROI's school districts would be an increase of nearly $1.6 million, an increase of 0.38 percent. The direct effects of the construction spending involved in establishing the 7SFG(A) at Eglin AFB would support approximately 1,304 jobs per year over the term of the construction, for a total of 5,217 jobs. Construction activities, as well as the personnel realignment, associated with 7SFG(A) Cantonment Alternatives 1 and 2 would not disproportionately impact minority or low-income communities of concern. Analyses discussed in Sections 4.2, Noise; 4.7, Air Quality; 4.8, Safety; and 4.10, Hazardous Materials, found that no adverse effects related to these environmental issues would occur under any of the alternatives. As a result, no disproportionate or adverse impacts to minority or low-income populations in the ROI are anticipated to occur.				The effects of locating the 7SFG(A) cantonment near DeFuniak Springs would be the same as the other alternatives except that it is likely that more military personnel would choose to live in Walton County, near the cantonment area. Therefore, Walton County would experience additional demand on public services, including schools, law enforcement, and medical services. Walton County would also receive additional tax revenues from the incoming population. However, due to the rural nature of Walton County and the availability of services on Eglin Main Base, it is likely that the majority of the military personnel would still relocate to Okaloosa County as in the other alternatives.
Transportation (Section 4.5)	The analyses identified seven roadways projected to be adversely impacted in both Alternatives 1A/1C and Alternative 1B. One of these, SR 397 from Museum Drive/Nomad Way to SR 189/West Gate, occurs on base. The main difference in the roadway segments projected to be adversely impacted is that in Alternative 1A/1C, SR 189 from SR 188 to SR 393 and SR 393 from SR 189 to SR 30 are adversely impacted and in Alternative 1B, SR 85 from Eglin Boulevard to 12th Avenue and SR 397 from Museum Drive to SR 189 adversely impacted. The total number of roadway segments projected to be deficient in Alternative 1A/1C is 23. The total number of roadway segments projected to be deficient in Alternative 1B is 24.	The analysis identified four roadways projected to be adversely impacted in Alternative 2. The total number of roadway segments projected to be deficient in Alternative 2 is 25.	The analysis identified four roadways projected to be adversely impacted in Alternative 3. The total number of roadway segments projected to be deficient in Alternative 3 is 25.	In terms of off-base impacts, Alternative 4 is very similar to Alternatives 1A, 1B, and 1C. The analysis identified eight roadway segments that are projected to be adversely impacted. When compared to Alternatives 1A, 1B, and 1C, the resulting number of roadway sections that are adversely impacted varies by four. The total number of roadway segments projected to be deficient in Alternative 4 is 23.	The analysis identified three roadways projected to be adversely impacted in Alternative 5. The total number of roadway segments projected to be deficient in Alternative 5 is 22.

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Utilities (Section 4.6)	An increase in potable water usage would occur, but usage would still be within permitted limits. Industrial use of potable water may require drawing water from the sand and gravel aquifer to reduce usage from the Floridan Aquifer. The Triangle and West Gate sub-alternatives would utilize the Plew Heights wastewater treatment plant (WWTP). The North Poquito sub-alternative would potentially use the Garnier WWTP until the new county facility is completed. Neither the Plew Heights WWTP nor the Garnier WWTP would have difficulty accommodating the additional flow from the 7SFG(A) cantonment areas. According to Gulf Power and Okaloosa Natural Gas, the estimated increase in electrical and natural gas supply to support the proposed 7SFG(A) cantonment area can be accommodated without adverse impact to the electrical or natural gas supply in Northwest Florida. New electrical and natural gas infrastructure would be required for the three sub-alternative sites. However, the close proximity to Eglin Main Base provides adequate existing infrastructure from which to branch off.	The increase in potable water usage would cause Duke Field water system to exceed permitted limits. An additional or expanded water system would need to be established for the 7SFG(A) cantonment area if any of the Duke Field sub-alternatives are selected. Duke Field WWTP annual average would increase to 86,000 gallons per day. This would result in 69 percent of the total permitted capacity being utilized. Since the additional wastewater would still be within permitted limits, the 7SFG(A) cantonment area would not have adverse impacts on the Duke Field WWTP. According to Gulf Power and Okaloosa Natural Gas, the estimated increase in electrical and natural gas supply to support the proposed 7SFG(A) cantonment area can be accommodated without adverse impact to the electrical or natural gas supply in Northwest Florida. New electrical and natural gas infrastructure would be required for the five sub-alternative sites. However, the close proximity to Duke Field provides adequate existing infrastructure from which to branch off.	Since the area along the northwestern boundary of the Eglin Range proposed for the 7SFG(A) cantonment contains no potable water wells, a potable water system would need to be established, which requires a new consumptive use permit (CUP) and a PWS permit. Since there currently is no wastewater treatment system in the area, the establishment of an approximately 100,000 gallon per day on-site wastewater treatment system and infrastructure would be required. The amount and type of wastewater expected to be produced would also require permitting from the FDEP. The environmental consequences for electrical and natural gas supply would be the same as those described in Alternative 1. Electrical and natural gas infrastructure would be required for the proposed site. An existing electrical distribution line along Range Road (RR) 211 provides a point at which to tap into the electrical supply. The west Range Substation would also be utilized. Okaloosa Natural Gas would tap into the pipeline existing within the Hwy 85 right-of-way to supply natural gas. This would require an easement, new substation, and early coordination, planning, and analysis by the Okaloosa Natural Gas engineers and Eglin AFB.	This alternative would utilize the Eglin Main Base water system. The increase in potable water usage would not cause the permit to be exceeded. The Main Base WWTP would be used for this alternative. With the additional wastewater, the WWTP would still remain within permitted limits. The environmental consequences for electrical and natural gas supply would be the same as those described in Alternative 1. Since Eglin Main Base is already piped and supplied with natural gas and electricity and this location is in close proximity to Eglin Main Base, this proposed location would be easily accommodated. The exact location of the cantonment will influence specifics for supplying natural gas and electricity, but overall it would be logistically feasible.	Since the area along the northeastern boundary of the Eglin Range proposed for the 7SFG(A) cantonment contains no potable water wells, a potable water system would need to be established, which requires a new CUP and a PWS permit. Since there currently is no wastewater treatment system in the area, the establishment of an approximately 100,00 gallon per day on-site wastewater treatment system and infrastructure would be required. The option of pumping the wastewater to an off-site facility is not considered valid since the extensive creeks and other waterways in this portion of the Eglin Range are difficult to traverse with pipes. The amount and type of wastewater expected to be produced would also require permitting from the FDEP. Choctawhatchee Electric Cooperative, Inc. (CHELCO) would supply the power to this site and anticipates being able to accommodate the increase in the electrical load. The electrical distribution lines located within 2 miles of the proposed cantonment area provide a point at which to tap into the electrical supply. Okaloosa Natural Gas anticipates being able to meet the additional natural gas demand. However, this alternative would be the most difficult of all the alternatives to provide natural gas infrastructure due to the location of the proposed site and the distance to existing natural gas pipelines.

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Air Quality (Section 4.7)	The accommodation of the 7SFG(A) would require construction a Special Operations Forces (SOF) Compound composed of 33 facilities totaling approximately 5,106,522 square feet. Carbon monoxide would be above the 250 tons per year (tpy) criteria (341.63 tpy), while only increasing the emissions 0.23 percent for the ROI, based on the United States (U.S.) Environmental Protection Agency (USEPA) 2002 NEI. The slight increase in local emissions from construction activities would be temporary, so there are no air quality issues anticipated with the Proposed Action at any of the sites being considered for the 7SFG(A) location. An increase of 2,240 personnel and 2,741 spouses and children are estimated with the realignment. This would mean a small increase in vehicular emissions from daily commutes and increase in public traffic, which is not expected to adversely affect the overall air quality.				
Safety (Section 4.8)	**Explosives Safety -** Facilities would be designed and fully licensed for the ordnance they store. Additionally, Eglin AFB would develop and implement appropriate Explosive Safety Quantity Distances (ESQDs) to mitigate potential hazards associated with the storage of munitions at these locations. **Ground Safety -** No unusual ground safety risks would be expected from C&D activities. Current operational processes, procedures, standard safety standards, and BMPs would be followed.				
	No existing ESQDs would be affected by the construction of the 7SFG(A) cantonment under any of the sub-alternatives of Alternative 1.	Construction of the cantonment for Alternative 2B would require coordination with Eglin AFB and EOD to ensure that required safety buffers are maintained.	**No existing ESQDs would be affected by the construction of the 7SFG(A) cantonment under Alternative 3, 4 or 5.**		
Solid Waste (Section 4.9)	The increase in population at Eglin AFB would result in an increase in the generation of municipal solid waste. Based on average per-person solid waste generation estimates, the additional solid waste generated would be approximately 4,983 tons, a net increase of about 2 percent. Development of the cantonment area will result in generation of wastes associated with the construction of new facilities and the demolition or renovation of existing structures. Based upon the planned construction, renovation and demolition activities that would be required, approximately 2,555 tons of debris waste would be generated annually during construction activities. The debris generated during 7SFG(A) construction would increase landfill use in Okaloosa County by approximately 3 percent, or by approximately 2 percent in Santa Rosa County. Based upon information from local landfill owners/operators, construction and demolition (C&D) landfills are not reaching full capacity and have a life expectancy ranging from 18 to 30 years. Therefore, the quantity of C&D debris and municipal solid waste generated for disposal is not expected to adversely impact available landfill resources.	The waste generated from additional personnel would be the same as that for Alternative 1. The quantity of debris associated with construction would be slightly less under Alternative 2 because demolition of buildings 1278, 1284, 1289, and gazebo J would not be required. Therefore, based upon proposed construction activities, a total of 9,931 tons of debris would be generated during construction activities. This would result in an anticipated annual generation rate of 2,483 tons per year. The overall increase of C&D wastes for disposal would be similar to that identified in Alternative 1. The debris generated would increase the use of Okaloosa County's landfill by approximately 3 percent and Santa Rosa County's landfills by approximately 2 percent. Based upon information from local landfill owners/operators, C&D landfills are not reaching full capacity and have a life expectancy ranging from 18 to 30 years. Therefore, the quantity of C&D debris and municipal solid waste generated for disposal is not expected to adversely impact available landfill resources.	The quantities of municipal solid waste from additional personnel and of C&D waste from construction activities would be the same as those presented in Alternative 2.	The waste generated from additional personnel will be the same as that for Alternative 1. The total mass of debris generated under this alternative includes 9,931 tons from construction activities and 287 tons from demolition activities required prior to construction of munitions storage areas (MSAs), for a total of 10,218 tons or approximately 2,555 tons per year. The debris generated during 7SFG(A) cantonment construction would increase the use of Okaloosa County's landfill by approximately 3 percent and Santa Rosa County's landfills by approximately 2 percent. Therefore, the quantity of C&D debris and municipal solid waste generated for disposal is not expected to adversely impact available landfill resources.	The quantities of municipal solid waste from additional personnel and of C&D waste from construction activities would be the same as those presented in Alternative 2.

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Hazardous Materials (Section 4.10)	**Hazardous Materials Management** - No adverse impacts related to hazardous materials are anticipated from implementation of the 7SFG(A) alternatives. **Hazardous Waste Management -** Renovation/demolition of some of buildings could result in the production of minor amounts of lead-based paint (LBP) or asbestos wastes. Hazardous and non-hazardous waste would be generated as a result of maintenance functions associated with new aircraft on the base. Eglin AFB would establish new initial accumulation points (IAPs) at generation locations, and personnel managing these locations would be properly trained in waste management. Management of hazardous wastes would be performed according to prescribed procedures already in place. Thus, no change to permits, hazardous waste generator status, or management procedures would be required and no adverse environmental impacts are anticipated. **ERP Sites -** Development on or near any ERP sites on Eglin AFB would be coordinated with the Eglin Environmental Office, the USEPA, the Florida Department of Environmental Protection (FDEP), and other relevant stakeholders, as required. No adverse impacts related to ERP issues are anticipated from implementation of the alternatives.	**Hazardous Materials Management** - Same as Alternative 1 **Hazardous Waste Management -** Same as Alternative 1 **Environmental Restoration Program (ERP) Sites –** No ERP Sites would be affected by these alternatives. Therefore, no adverse impacts related to ERP issues are anticipated from implementation of these alternatives.			

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Physical Resources (Section 4.11)	Construction would increase impervious surface area and stormwater. However, the potential for stormwater and sediment transport offsite into surface waters is low, given the permeable soil type and relatively flat terrain at the site. No adverse impacts to physical resources are anticipated. Construction permits may require the implementation of stormwater management practices. For construction activities, an Erosion, Sedimentation, and Pollution Control Plan would be required. This would serve to further ensure that erosion and the transport of sediment off the project site do not occur.	Sub-alternatives 2A through 2E would all result in the addition of impervious surfaces. Impervious surfaces would increase the quantity of stormwater runoff that would be generated from this area. All sub-alternatives have slight slopes and permeable soil characteristics which would limit the transport of stormwater offsite. Adverse impacts to physical resources are not anticipated. The Army would obtain construction and stormwater permits and as required by FDEP stormwater management practices.	Erosion risk at this area is low due to the flat terrain. Water resources within this area are associated with the headwaters of Turkey Hen Creek, which is located in the extreme southwest corner of the Alternative 3 area. There is a potential for increased rate and volume of stormwater runoff only in this area No adverse impacts to surface water, groundwater, floodplain, or wetland quality from 7SFG(A) Cantonment Alternative 3 would be expected. The Army would obtain permits and, as required by FDEP, implement site-specific management actions.	Water resources within the Alternative 4 area include two branches of Turkey Creek and wetlands associated with those two branches. Toms Creek flows just to the south of the proposed site. There is a potential for increased rate and volume of stormwater runoff in these areas. The majority of the site is characterized by flat terrain with a low potential for erosion. No adverse impacts to surface water or wetland quality from Alternative 4 are expected. As required by FDEP, the Army would obtain permits and implement site-specific management actions and BMPs.	Known water sources within this proposed location are Buck Branch, which runs along the western border of the proposed location area, and Bullhide Creek, which flows within the eastern boundary of the site area. There is potential for increased rate and volume of stormwater runoff near these creeks. However, modeling indicates that stormwater transport of sediments would not be adverse due to the permeable soil characteristics at the site and the generally flat terrain. No adverse impacts to surface water or wetland quality from Alternative 5 are expected. As required by FDEP, the Army would obtain permits and implement site-specific management actions and BMPs.
Biological Resources (Section 4.12)	Impacts to wildlife would not be adverse under any of the sub-alternatives. Potential impacts for the Florida black bear are associated with the potential for increased human-bear interaction and land clearing. While clearing would result in the loss of potential black bear habitat, the bear's avoidance of the area may serve to benefit the bear through decreased bear-traffic related incidents. Each of these areas is fire suppressed due to its location and is not optimal habitat for	**Common to all Alternative 2 sub-alternative locations –** Although not documented at any Alternative 2 sites, eastern indigo snakes, Florida pine snakes, and Florida black bears may occur at the sites due to the presence of appropriate habitat. Surveys for gopher tortoises and commensals (e.g., indigo snakes) would be conducted prior to construction, and these species would be relocated to avoid potential impacts to burrows and direct physical impacts from vehicles. While clearing would result in the loss of potential black bear	Surveys for gopher tortoises and commensals (e.g., indigo snakes) would be conducted prior to construction, and these species would be relocated to avoid potential impacts to burrows and direct physical impacts from vehicles. While clearing would result in the loss of potential black bear habitat, the bear's avoidance of the area may serve to benefit the bear through decreased bear traffic-related incidents. RCW foraging habitat would be	The headwater portions of two Okaloosa darter streams occur in the northern portion of the Alternative 4 site and the headwaters of two other Okaloosa darter streams begin within 0.25 mile of the site. These darter streams would potentially be affected by sedimentation and runoff from construction and daily cantonment activities. Utilization of erosion control measures such as silt fencing would reduce impacts during construction, and vegetative	Although not documented at the site, eastern indigo snakes, Florida pine snakes, and Florida black bears may occur at the Alternative 5 sites due to the presence of appropriate habitat. Surveys for gopher tortoises and commensals (e.g., indigo snakes) would be conducted prior to construction, and these species would be relocated to avoid potential impacts to burrows and direct physical impacts from vehicles. While clearing would result in the loss of potential black bear habitat,

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Biological Resources (Section 4.12), Cont'd	gopher tortoises (and subsequently the indigo snake and Florida pine snake). However, potential impacts to any gopher tortoises present may result due to burrow collapse during construction activities. A survey of the alternative areas to evaluate the presence of any gopher tortoise burrows and the subsequent relocation of tortoises and/or commensal species identified during the survey are required just prior to any land-disturbing activities. Inactive RCW trees are located at the Alternative 1B and MSA sites, and are adjacent to the 1C site. The Eglin Natural Resources Section (NRS) indicates there is extremely low potential for these clusters to become active. Alternative 1 activities are not likely to adversely affect the RCW. An Okaloosa darter stream is located near the proposed MSA expansion area. The darter is susceptible to effects from eroding sediments from the construction site. However, the potential for sediment transport is very low, given the permeable soil characteristics at the site. The Okaloosa darter is not likely to be adversely affected. There will likely be a construction permit requirement to institute erosion control measures at the site. Overall impacts to biological resources would not be adverse for any of the Alternative 1 sub-alternatives.	habitat, the bear's avoidance of the area may serve to benefit the bear through decreased bear traffic-related incidents. No sensitive species or habitats are present within the proposed MSA, thus no impacts to biological resources would occur at the MSA. **2A –** Two HQNCs are located to the south of this site, and would likely experience a reduced frequency of prescribed burning due to proximity to structures. The southeast corner of the Alternative 2A location may potentially affect foraging habitat for the active cluster to the southeast (located over 400 meters from the area). Alternative 2A would limit prescribed fire in the area, and adjacent clusters may see an increase in hardwood midstory component which may decrease the habitat quality over time. Eglin Natural Resources biologists do not believe this to be significant; the RCW is not likely to be adversely affected. **2B –** The Alternative 2B area is not considered to be an area for future growth for RCWs due to poor habitat quality; therefore, the NRS believes there would be No Effect to RCWs for the 7SFG(A) Alternative 2B location. **2C –** There is one small HQNC on a steephead area in the center of the Alternative 2C site. Due to steep slopes and wet conditions, it is not a good location for construction, thus this area would likely be avoided. Although no direct impacts to RCWs or RCW foraging habitat would occur, future growth of RCW habitat may be affected. The NRS believes impacts would	removed and fire suppression may lead to the degradation of the surrounding foraging habitat. A direct physical impact to a bird would be considered remote; however, indirect impacts to RCWs could occur from the physical presence of personnel or equipment within foraging habitat. Indirect impacts could include changes in nesting behavior, changes in feeding, and long-term alterations to the habitat. Even though much of the habitat proposed to be removed from cluster 103L is optimal habitat (47 acres), the proposed 7SFG cantonment area would still leave 255 acres of foraging habitat, which is above the managed stability standard and the recovery standard. All criteria would be above the recovery standards set for the Eglin RCW population. Alternative 3 is not likely to adversely affect the RCW. Due to overall potential for impacts to federally listed species, an Endangered Species Act (ESA) Section 7 consultation has been conducted with the U.S. Fish and Wildlife Service (USFWS) (Appendix H, *Biological Resources*).	buffers would reduce impacts from runoff associated with daily cantonment activities. The Okaloosa darter is not likely to be adversely affected. The indigo snake, Florida pine snake, and Florida black bear may pass through the project area; however, the habitat in the area is degraded due to fire suppression, with a dense understory and sand pine encroachment. Potential impacts to the indigo snake and Florida pine snake would be the same as those for Alternative 1. As with Alternative 1, Florida black bears have been killed by cars near the proposed project site. Preventing bears from entering the area may result in an ancillary benefit to the bear, in that bears would be less likely to cross Highway (Hwy) 123 and Hwy 85, thus reducing the potential for bear-automobile incidents. Habitat loss to the bear would be minimal, as the site represents less than 1 percent of the total area of undeveloped lands on Eglin AFB, which provides black bear habitat throughout the Eglin Range. Overall impacts to biological resources would not be adverse.	the bear's avoidance of the area may serve to benefit the bear through decreased bear traffic-related incidents. The two sensitive plant species are associated with a stream-side area. It is likely that construction permits would require buffers around streams and erosion control measures to lessen potential runoff, thus protecting the sensitive plants. Overall impacts to biological resources would not be adverse.

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Biological Resources (Section 4.12), Cont'd		not be significant and the RCW is not likely to be adversely affected. Gopher tortoises are present and would be relocated prior to construction to avoid impacts to burrows and direct physical impacts. **2D –** A portion of this site overlaps with an ONA/SBS, which would likely be affected due to fire suppression. All of the HQNCs at the Alternative 2D site are associated with wetland/riparian areas. Impacts would not be adverse since there are many more acres of similar high quality wetland/riparian areas maintained on other areas of Eglin. Additionally, it is likely that construction permits would require buffers around streams/wetlands and erosion control measures to lessen potential runoff. Potential salamander habitat and Alternative 2D overlap by 126 acres. The NRS believes that Alternative 2D is a poor site for salamanders, and is not likely to adversely affect the flatwoods salamander. **2E –** An ONA/SBS is adjacent to this site on the east; this site would likely be affected due to fire suppression. HQNCs are located to the north, south, and east; these are associated with wetland/riparian areas. Impacts would not be adverse since there are many more acres of similar high quality wetland/riparian areas maintained on other areas of Eglin. Additionally, it is likely that construction permits would require buffers around streams/wetlands and erosion control measures to lessen potential runoff. The Florida bog frog has been documented in the northeast corner of the site. Bog frogs are typically associated with boggy areas adjacent to streams, so this portion of the site is not a good area for construction and impacts to the bog frog are unlikely. A small area to the east of alternative 2E overlaps			

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Biological Resources (Section 4.12), Cont'd		with potential flatwoods salamander habitat; however, the area is minimal and impacts would not be significant; the flatwoods salamander is not likely to be adversely affected. Overall impacts to biological resources would not be adverse for any of the Alternative 2 sub-alternatives.			
Cultural Resources (Section 4.13)	**1A –** No cultural resources would be impacted by the selection of Alternative 1A. **1B –** The southern tip of Area 2 of the SAC Alert Historic District is located in the northeastern portion of this area; no impacts are expected. **1C –** No standing historic structures, historic districts, or historic cemeteries are located within the Alternative 1C area. Two NRHP-eligible archaeological sites, 8OK1835 and 8OK1836, exist within the northern portion of this area. Any construction plans or other project activities for this area will take into account these two archaeological sites. Any potential adverse effects will be considered under provisions of the project specific programmatic agreement (Appendix F), including subsequent appropriate planning and implementation of mitigation.	**2A –** No known cultural resources have been identified to date within the Alternative 2A area. As a result, no additional work is recommended within the Alternative 2A area. **2B –** No known cultural resources have been identified to date within the Alternative 2B area. As a result, no additional work is recommended within the Alternative 2B area. **2C –** Two prehistoric archaeological sites in the project area are considered ineligible for the NRHP, and no other significant historic structures, historic districts, or historic cemeteries are located within the Alternative 2C area. **2D –** Two prehistoric archaeological sites in the project area are considered ineligible for the NRHP, and no other significant historic structures, historic districts, or historic cemeteries are located within the Alternative 2D area. **2E –** One archeological site has been identified that is considered potentially	No resources within this location were identified as eligible for listing on the NRHP, and no historic structures, historic districts, or historic cemeteries are located within this alternative area. Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.	No resources within this location were identified as eligible for listing on the NRHP, and no historic structures, historic districts, or historic cemeteries are located within this alternative area. Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.	No resources within this location were identified as eligible for listing on the NRHP, and no historic structures, historic districts, or historic cemeteries are located within this alternative area. Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.

Table 2-27. Potential Impacts from the Implementation of the 7SFG(A) Cantonment, Cont'd

Resource	7SFG(A) Cantonment Alternative 1 1A – The Triangle 1B – Eglin West Gate 1C – North Poquito	7SFG(A) Cantonment Alternative 2 2A – Southeast of Duke Field 2B – Northwest of Duke Field 2C – Northeast of Duke Field 2D – East of Duke Field 2E – Eglin North Near Duke Field	7SFG(A) Cantonment Alternative 3 West of Duke Field	7SFG(A) Cantonment Alternative 4 North of Eglin Main	7SFG(A) Cantonment Alternative 5 DeFuniak Springs
Cultural Resources (Section 4.13), Cont'd		eligible for the NRHP. Under provisions of the project-specific programmatic agreement, this site will be further evaluated and, if determined significant, considered for potential adverse effects. Three additional sites are ineligible to the NRHP. No additional consideration is required for these sites.			

Table 2-28. Potential Impacts from the Implementation of the 7SFG(A) Range Configuration

Resource	7SFG(A) Range Alternative 1 – East Side and North of Eglin Main Base Training	7SFG(A) Range Alternative 2 – East Side and North-South Corridor Training	7SFG(A) Range Alternative 3 – East and West Side Training	7SFG(A) Range Alternative 4 – East Side and Near DeFuniak Springs Training	7SFG(A) Range Alternative 5 – East Side Training
Noise (Section 5.2)	7SFG(A) weapons training would cause increases in small-arms and high-explosive munitions noise at and near Eglin Range. Off-range areas would not be exposed to small arms noise at greater than 65 dB DNL. 7SFG(A) high-explosives munitions training noise would result in 43 acres of off-range property being affected by noise at greater than 62 C-weighted Decibel Day-Night Average Sound Level (CDNL) whereas 0 off-range acres were impacted by this noise level under baseline conditions. Small arms peak noise levels of greater than 87 PK(15)met would not extend beyond range boundaries and peak noise levels generated by high-explosives would be much less intense than the peak noise levels currently generated by ongoing training. Construction noise would be limited to relatively undeveloped areas with no known sensitive receptors. Vehicular operations would be similar in nature to existing range noise sources and would be dispersed over very large areas. Vehicular noise would not occur at a frequency and intensity expected to cause impacts that would be perceived as adverse.	7SFG(A) weapons training would cause increases in small-arms and high-explosive munitions noise near range locations. Off-range areas would not be exposed to noise at greater than 65 dB DNL. 7SFG(A) high-explosives munitions training noise would impact the same amount of off-range acreage at greater than 62 dB CDNL that was impacted under Alternative 1. Construction noise would be limited to relatively undeveloped areas with no known sensitive receptors. Vehicular operations would be similar in nature to existing range noise sources and would be dispersed over very large areas. Vehicular noise would not occur at a frequency and intensity expected to cause impacts that would be perceived as adverse.	7SFG(A) weapons training would cause increases in small-arms and high-explosive munitions noise near range locations. Off-range areas would not be exposed to noise at greater than 65 dB DNL. 7SFG(A) high-explosives munitions training noise would impact the same amount of off-range acreage at greater than 62 dB CDNL that was impacted under Alternative 1. Construction noise would be limited to relatively undeveloped areas with no known sensitive receptors. Vehicular operations would be similar in nature to existing range noise sources and would be dispersed over very large areas. Vehicular noise would not occur at a frequency and intensity that would be perceived as adverse.	7SFG(A) weapons training would cause increases in small-arms and high-explosive munitions noise near range locations. Off-range areas would not be exposed to noise at greater than 65 dB DNL. 7SFG(A) high-explosives munitions training noise would impact the same amount of off-range acreage at greater than 62 dB CDNL that was impacted under Alternative 1. Peak small-arms noise levels of greater than 87 PK_{15}(met) would affect 39 off-range acres. However, the affected area would be entirely within the highway I-10 corridor and no negative effects affects are expected. Construction noise would be limited to relatively undeveloped areas with no known sensitive receptors. Vehicular operations would be similar in nature to existing range noise sources and would be dispersed over very large areas. Vehicular noise would not occur at a frequency and intensity that would be perceived as adverse.	7SFG(A) weapons training would cause increases in small-arms and high-explosive munitions noise near range locations. Off-range areas would not be exposed to noise at greater than 65 dB DNL. 7SFG(A) high-explosives munitions training noise would result in 201 acres of off-range property being affected by noise at greater than 62 dB CDNL, whereas 0 off-range acres were impacted by this noise level under baseline conditions. Construction noise would be limited to relatively undeveloped areas with no known sensitive receptors. Vehicular operations would be similar in nature to existing range noise sources and would be dispersed over very large areas. Vehicular noise would not occur at a frequency and intensity that would be perceived as adverse.
Land Use (Section 5.3)	No adverse impact to military land use would occur from the new firing ranges and SDZs because the primary land use would continue to be for military training, testing, and evaluation. Since the proposed infiltration/exfiltration areas would only be used periodically and they are all located on Eglin AFB property, water operations associated with training activities would not result in a permanent change in land use. Impacts from the Group 2 Maneuver Area, Ranges, and SDZs would be the same across all alternatives since they would be located in the same area. The Group 2 Maneuver Area, Ranges, and SDZs would result in the conditional closure for public access/recreation of approximately 44,020 acres in Management Units 7, 8A, 9, 9A, 9B, 11, 13, and 14. Approximately 9,570 acres in Management Units 11 and 13 would be permanently closed to public access/recreation. Depending on which alternative is selected, the size of the conditionally closed area could change and as much area as possible would be reopened for recreational use. The change in land use would not be adverse, since it would be compatible with the existing land uses that surround the area. However, the change may be perceived by the public as an adverse reduction in the total amount of area open for public access and outdoor recreation within the interstitial area of the Eglin Range. The alternatives would not have any direct impact on any surrounding community land use outside the Eglin Range. As a displaced action, the Navy EOD activities that presently occur on Test Area (TA) C-52W would be relocated to the proposed Special Operations Forces (SOF) 12 location.				

Table 2-28. Potential Impacts from the Implementation of the 7SFG(A) Range Configuration, Cont'd

Resource	7SFG(A) Range Alternative 1 – East Side and North of Eglin Main Base Training	7SFG(A) Range Alternative 2 – East Side and North-South Corridor Training	7SFG(A) Range Alternative 3 – East and West Side Training	7SFG(A) Range Alternative 4 – East Side and Near DeFuniak Springs Training	7SFG(A) Range Alternative 5 – East Side Training
Land Use (Section 5.3), Cont'd	Group 1 Ranges and SDZs would result in the permanent closure of approximately 430 acres of Management Unit 6N (1 percent decrease) and 5,190 acres of Management Unit 6S (40 percent decrease).	Group 1 Ranges and SDZs would result in the permanent closure of approximately 1,570 acres of Management Unit 7 (8 percent decrease), 29 acres of Management Unit 8A (6 percent decrease), 314 acres of Management Unit 9 (3 percent decrease), and 1,206 acres of Management Unit 9B (61 percent decrease).	Group 1 Ranges and SDZs would result in the permanent closure of approximately 8,630 acres of Management Unit 6N (21 percent decrease). The proposed location of the Group 1 Ranges and SDZs would require the 6th Ranger Training Battalion to modify their current maneuver areas to the west of Camp Rudder. Additionally, the public may perceive the loss of use of Duck Pond and the associated campground as adverse.	Group 1 Ranges and SDZs would result in the permanent closure of approximately 5,697 acres of Management Unit 13 (8 percent decrease) and 1,885 acres of Management Unit 13A (99 percent decrease).	The Group 1 Firing Ranges and SDZs would be located within the conditionally closed area associated with all of the alternatives. The permanently closed area associated with the Firing Ranges and SDZs would impact approximately 351 acres in Management Area 11 (6 percent decrease) and 10,755 acres in Management Area 13 (14 percent decrease).
Socioeconomics (Section 5.4)	Socioeconomic effects on the population, employment, schools, and public services are primarily determined by where the incoming personnel will reside. The location of the ranges would not be a significant factor in military members' choice of residence. Additional employment would be generated as a result of the construction activities associated with establishing the ranges in each of the locations. However, the additional construction employment would be temporary, lasting only until construction is completed. Also, the construction workers hired to complete the range construction would most likely be hired from the local region, minimizing any additional effects on schools and public services. Additional jobs and incomes may also be created from the long-term operations and maintenance involved in sustaining the ranges, which could have a beneficial effect on the region. Effects on environmental justice and special risks to children would be minimal, as factors such as noise and safety would not disproportionately affect minorities, impoverished individuals, or children. Construction noise would be intermittent and temporary. Time-averaged small-arms noise levels greater than 65 dB DNL would not occur beyond Eglin Range boundaries as a result of 7SFG(A) training. High-explosive munitions noise would exceed 62 dB CDNL in off-range locations comprising 43 acres in the vicinity of Big Hammock Point and Sharon Lake, of which 31 acres are zoned for residential use. Residents of areas affected by increased high-explosive noise levels may experience annoyance and/or activity interruption from the noise.				
Utilities (Section 5.5)	The Eglin Main Base water system and Main Base wastewater treatment plant (WWTP) would accommodate the potable water and wastewater needs of the 7SFG(A) Group 1 Ranges. Infrastructure would be required at the ranges for both water and wastewater. Since Eglin Main Base is already piped and supplied with natural gas and electricity and this location is in close proximity to Eglin Main Base, this proposed location would be easily accommodated.	Group 1 Ranges would be sited around TA C-2, which lacks utilities and would require potable water wells, a consumptive use permit (CUP), septic tanks, and new infrastructure to support all utilities, including electricity and natural gas. Establishing a new WWTP on-site may be preferable to adding septic tanks.	Group 1 Ranges would be sited in the area along the northwestern portion of installation boundary. This area contains no existing utilities. Potable water wells, CUPs, septic tanks, and infrastructure would be required to support all utilities.	Group 1 Ranges would be sited in the northeastern portion of the installation, which lacks any utilities with the exception of electrical distribution lines more than 2 miles away. This area would require potable water wells with a CUP, septic tanks, and new infrastructure to support all utilities, including electricity and natural gas. As under 7SFG(A) Cantonment Alternative 5, the establishment of an approximately 100,000 gallon per day on-site wastewater treatment system and infrastructure would be required. This would require permitting from FDEP. As in Cantonment Alternative 5, Choctawhatchee Electric Cooperative, Inc. (CHELCO) would provide electricity and Okaloosa Natural Gas would supply gas. Both anticipate the ability to handle the increased load.	Group 1 Ranges would be located near TA C-53. Since there are no potable water wells in the area, a new potable water system would have to be established, or the existing well at TA C-3 would have to be expanded. Either option would require a CUP and PWS permit. Since there is no wastewater system in place in the area, new septic tanks would be required or a new wastewater treatment system could be established, as adding smaller septic tanks becomes inefficient at a point. New infrastructure would be required to support electricity and natural gas. Neither would require quantities that would adversely impact the supply in Norwest Florida. Electrical lines at TA C-53 could be tapped and natural gas lines at TA D-51 could be tapped.

Table 2-28. Potential Impacts from the Implementation of the 7SFG(A) Range Configuration, Cont'd

Resource	7SFG(A) Range Alternative 1 – East Side and North of Eglin Main Base Training	7SFG(A) Range Alternative 2 – East Side and North-South Corridor Training	7SFG(A) Range Alternative 3 – East and West Side Training	7SFG(A) Range Alternative 4 – East Side and Near DeFuniak Springs Training	7SFG(A) Range Alternative 5 – East Side Training
Utilities (Section 5.5), Cont'd	Group 2 Ranges would be the same under all alternatives. Of the areas proposed for the Group 2 Ranges, TAs C-52 and C-72 currently have utilities and supporting infrastructure, with the exception of natural gas. None of the TAs proposed have natural gas. Some of the electrical distribution lines on C-52 and C-53 may require relocation, depending on the final layout of the proposed ranges. TA C-53 does not have potable water wells or septic tanks and would therefore require both. A new or amended CUP would also be required. Electrical distribution lines are available near and within TA C-53.				
Air Quality (Section 5.6)	Construction activities and use of munitions, wheeled vehicles, aircraft, and watercraft for training operations would result in carbon monoxide and particulate matter with a diameter of less than or equal to 10 microns (PM_{10}) emissions above the criterion of 250 tons per year (tpy), which equates to an increase of 0.3 and 1.4 percent of the Region of Influence (ROI), respectively. However, this would still be well below the 10 percent criteria established for conformity analysis for the ROI. Adverse impacts to regional air quality are not expected.				
Safety (Section 5.7)	**Explosives Safety -** Since the types of munitions to be used are the same or similar to the types currently used at Eglin AFB, implementation of the 7SFG(A) Range would not be expected to prevent or significantly limit the ability of range managers to conduct explosive ordnance disposal (EOD) and range maintenance activities. Safety footprints or surface danger zones (SDZs) would be employed for land-based training where live ordnance is used. In the case of the proposed live-fire ranges, personnel exclusion zones and appropriate safety buffers would be developed and implemented. Standard safety procedures, such as closing range gates and blocking all passable trails, would be implemented in all cases to ensure limited public access to affected areas during training activities. **Ground Safety -** Eglin AFB has implemented specific procedures for minimizing the risk of fire from range operations; therefore, implementation of the 7SFG(A) Range would not result in heightened ground safety concerns. **Unexploded Ordnance -** Most areas on the Eglin Range have the potential for unexploded ordnance (UXO) contamination. Consultation and coordination with 96 CES/CED would be required prior to commencement of any activity associated with the development on, or use of, these areas to mitigate any potential adverse impacts from UXO.				
Solid Waste (Section 5.8)	The potential impacts of the 7SFG(A) range configuration include the generation of solid waste from additional personnel, as well as debris from construction and land clearing associated with the development of the various ranges and support facilities necessary to fulfill the training requirements of the 7SFG(A). Since the construction footprint and operation of the various ranges remain constant across each alternative, the quantity of solid waste requiring disposal would be the same for Alternatives 1 through 5. Construction activities would generate an estimated total of 13,348 tons of debris for each evaluated alternative. In addition, it is anticipated that 330,392 tons of land clearing debris would be generated during construction, and 136 tons per year of metallic debris from range operations. The debris associated with land clearing and range operations is not expected to require disposal. This is due to the assumptions that land clearing wastes will be recycled or burned in place and range debris will either be collected (in the case of large debris or casing) or remain on the range (in the case of projectiles on small caliber ranges). Therefore, an estimated 3,337 tons per year of debris from construction activities would require disposal in a construction and demolition (C&D) landfill. For the landfills evaluated, the debris generated during 7SFG(A) Range construction would increase use in Okaloosa County by approximately 4 percent, or by approximately 3 percent in Santa Rosa County. This is not expected to cause landfills to reach capacity or be otherwise adversely affected.				
Hazardous Materials (Section 5.9)	**Environmental Restoration Program (ERP) Sites** Group 1 Ranges **–** There are no ERP sites located in the area surrounding any of the proposed Group 1 Range locations. Therefore, no impacts are anticipated based on construction or activities associated with the 7SFG(A) Group 1 Ranges. Group 2 Ranges - To the extent practicable, all ERP sites would be avoided during construction and ground-disturbing activities. Construction would avoid sites DP-09 and SS-25, since LUCs are in place at these two sites. All other sites in the vicinity are classified as NFA and thus would not be adversely impacted by construction of Group 2 Ranges. Regardless, Environmental Management Restoration (EMR) would be consulted prior to beginning construction. **Ground Maneuvering –** Although ground maneuvering operations would take place throughout the range, only Area of Concern (AOC)-97 is located within the potential designated ground maneuvering area. This site has been designated "No Further Action" (NFA). Due to the lack of ERP sites in the designated areas and the non-invasive nature of ground maneuvering activities, no impacts are expected. **Munitions Related Wastes -** Munition fragments and residues would be generated as a result of training missions. Releases to the environment from munitions utilized in proficiency and qualification training require reporting to the United States (U.S.) Environmental Protection Agency (USEPA) under the Emergency Planning and Community Right-to-Know Act (EPCRA) Toxic Release Inventory (TRI) program. Eglin AFB has developed procedures to comply with TRI reporting requirements and would track ordnance use associated with the proposed alternatives. Metallic releases to the environment from training would increase over current quantities, especially in the case of antimony, copper, and lead. This increase would be primarily associated with the 7SFG(A) Range Alternatives. Compared to baseline levels, the public may perceive the increase in the quantity of chemicals released as an adverse impact from hazardous materials.				

Table 2-28. Potential Impacts from the Implementation of the 7SFG(A) Range Configuration, Cont'd

Resource	7SFG(A) Range Alternative 1 – East Side and North of Eglin Main Base Training	7SFG(A) Range Alternative 2 – East Side and North-South Corridor Training	7SFG(A) Range Alternative 3 – East and West Side Training	7SFG(A) Range Alternative 4 – East Side and Near DeFuniak Springs Training	7SFG(A) Range Alternative 5 – East Side Training
Physical Resources (Section 5.10)	**Soils -** Under Alternatives 1 and 2, land clearing associated with construction of firing ranges would potentially impact soil. Exposed soil would be susceptible to erosion from wind, water, and military maneuvering. Modeling (see Water analysis below) indicates the likelihood of waterborne erosion and transport of soil is low due to its permeable characteristics. Impacts would not be adverse. Additionally, this construction action requires the development of a Storm Water Pollution Prevention Plan (SWPPP). The plan would identify best management practices (BMPs) to ensure minimal adverse impacts from soil erosion. Over time Alternatives 1 and 2 7SFG(A) range soils would contain high levels of copper and lead from small arms projectiles. The lead and copper levels expected in range soils would pose a potential ecological risk based on exceedance of USEPA ecological soil benchmarks. Alternative 1 small arms ranges are located within 0.25 mile from creeks and streams. Thus, there is a risk that Alternative 1 small arms ranges would leach into groundwater and eventually reach surface waters. The potential for surface water impacts from Alternative 2 is low, as there are no surface waters within 0.25 mile of the proposed small arms range sites.		**Soils -** The public may perceive adverse soil erosion impacts from Alternative 3. Soil characteristics at this site are not as permeable as those at Alternative 1 and 2 and the terrain is more steeply sloped. Erosion control measures would have limited effectiveness at the steeply sloped areas. The amount of lead and copper expended at small arms ranges would likely exceed USEPA ecological soil benchmarks. Range sites SOF 1 and SOF 1a are located within 0.25 mile of a surface water. The risk of lead and copper transport is highest for these locations. Other Alternative 3 small arms ranges would be located further than 0.25 mile from surface waters and pose minimal risk of lead or copper contamination.	**Soils -** Potential impacts to soils under Alternative 4 are expected to be the same as those discussed under Alternatives 1 and 2. Alternative 4 small arms range expenditures would result in elevated levels of lead and copper in range soils. These levels would likely exceed USEPA criteria for soil. Lead in soils would potential leach into groundwater, eventually posing a risk to surface waters.	**Soils -** Potential impacts to soils under Alternative 5 are expected to be the same as those discussed under Alternatives 1 and 2. There is a potential for Alternative 5 to cause elevated levels of lead and copper in range soils. These metals would be available for downward vertical transport into groundwater. Small arms ranges SOF 1, SOF 1a and SOF 4 are located within 0.25 mile of a surface water and therefore pose a risk of lead contamination. Remaining small arms ranges for this alternative have little potential to affect surface waters.
	Water – Stormwater model results indicated a low potential for sediment and soil transport into surface waters from areas disturbed by construction. Potential impacts would result from training operations and/or equipment movement off of paved roads. Implementation would include efforts to avoid wetlands, prevent erosion and subsequent sedimentation in streams, and clean up range debris (i.e. shell casings, etc.), obtaining all applicable permits, and developing a mandatory comprehensive stormwater, erosion, and sedimentation control plan. Consequently, adverse impacts to water resources are not expected.				
Biological Resources (Section 5.11)	No SOF land clearing or construction would occur in SBSs, ONAs, or RCW foraging habitat. Clearing in an ONA/SBS may occur for the south drop zone (DZ)/LZ. Clearing may occur near Okaloosa darter streams, potentially resulting in increased sedimentation. Water operations and air operations would not result in any major increase in shoreline small boat landings or air traffic over what currently occurs as part of normal Eglin operations. Direct impacts to sensitive species as the result of munitions/pyrotechnics use are unlikely; however, some increased	Impacts for Alternative 2 are the same as those described for Alternative 1, with the exception of the location of the Group 1 Ranges, two of which would be located in an ONA/SBS. Land clearing and wildfires may degrade these habitats. Otherwise, impacts are the same, just at different locations in some instances.	Impacts for Alternative 3 are the same as those described for Alternative 1, with the exception of increased impacts to RCWs due to the location of the Group 1 SOF ranges and SOF8 near Camp Rudder. Otherwise, impacts are the same, just at different locations in some instances. RCW foraging habitat would be removed and fire suppression may lead to the degradation of the surrounding foraging habitat. A direct impact to a bird is unlikely; however, indirect impacts to RCWs could occur from the physical presence of personnel and firing within foraging habitat. Indirect impacts could include changes in nesting behavior,	Because no sensitive species have been documented in the Alternative 4 area, the location of the Group 1 SOF in the northwest portion of Eglin would reduce potential impacts to all sensitive species compared to the other alternatives. Impacts for Alternative 4 with Group 2 Ranges, interstitial areas, and boat landing areas are the same as those described for Alternative 1.	The types of potential impacts from 7SFG(A) Range Alternative 5 activities would be the same as those for Alternative 1, but would occur in the Test Area (TA) C-53 area. Alternative 5 Group 1 Range activities would increase the potential for impacts from land clearing/construction and munitions/pyrotechnics use (i.e., sedimentation, chemical impacts) to the Okaloosa darter and potential flatwoods salamander habitat in the TA C-53 area. However, in locations where construction appears to impact streams, the final surveys

Table 2-28. Potential Impacts from the Implementation of the 7SFG(A) Range Configuration, Cont'd

Resource	7SFG(A) Range Alternative 1 – East Side and North of Eglin Main Base Training	7SFG(A) Range Alternative 2 – East Side and North-South Corridor Training	7SFG(A) Range Alternative 3 – East and West Side Training	7SFG(A) Range Alternative 4 – East Side and Near DeFuniak Springs Training	7SFG(A) Range Alternative 5 – East Side Training
Biological Resources (Section 5.11), Cont'd	risk of wildfire and chemical impacts would result. Impacts to sensitive habitats from dispersed ground maneuvering would not be adverse; however, ground maneuvers may affect sensitive species such as sea turtles, RCWs, flatwoods salamanders, indigo snakes, and Okaloosa darters from noise, direct impacts, and habitat alteration. Jeopardy to the populations of these species would not occur. Therefore, the impacts would not be adverse. 7SFG(A) ranges were sited to minimize the potential that projectiles would be deposited in riparian zones, streams, and other sensitive areas.		changes in feeding, and long-term alterations to the habitat. Even with 11.2 acres removed from both clusters, only a small fraction (2.9 acres from cluster 102F and 1 acre from cluster 101B) are optimal habitat. The remaining 581 acres of foraging habitat would be above the managed stability standard and the recovery standard. Alternative 3 is not likely to adversely affect the RCW. Due to overall potential for impacts to federally listed species, an Endangered Species Act (ESA) Section 7 consultation has been conducted with the U.S. Fish and Wildlife Service (USFWS) (Appendix H, *Biological Resources*).		and design layouts would be implemented so that riparian areas would not be impacted. The areas potentially impacted have a very low likelihood of actually supporting flatwoods salamander populations. Thus, Alternative 5 Group 1 Ranges are not likely to adversely affect the Okaloosa darter or flatwoods salamander, and impacts would not be adverse.
Cultural Resources (Section 5.12)	NRHP eligibility testing of 13 sites or avoidance would be required as a result of this alternative. Historic Cold War structures (8WL1523) identified within SOF 10 would require protection or mitigation in consultation with the State Historic Preservation Officer (SHPO) as per Eglin's project-specific programmatic agreement regarding historic properties, if impacts cannot be avoided (see Appendix F, *Cultural Resources*, for details on project specific programmatic agreement). Coordination with the SHPO would be required to comply with Section 106 of the National Historic Preservation Act of 1966 (NHPA) and to identify measures that must be taken to avoid impacting sites of cultural and archaeological significance.	Impacts for Alternative 2 cultural resources are the same as those described for Alternative 1.	Impacts for Alternative 3 cultural resources are the same as those described for Alternative 1.	Impacts for Alternative 4 cultural resources are the same as those described for Alternative 1.	Impacts for Alternative 5 cultural resources are the same as those described for Alternative 1.

Table 2-29. Potential Impacts From the Implementation of the JSF IJTS Cantonment

Resource	JSF IJTS Alternative 1 – 33rd Fighter Wing (33 FW) Area	JSF IJTS Alternative 2 – East Side of Eglin Runway
Noise (Section 6.2)	**Construction Noise** - Implementation of either alternative would result in temporary increases in noise levels in the vicinity of the project area during construction, demolition, and renovation. The areas in which the projects are proposed to occur are frequently subjected to high levels of aircraft noise. Furthermore, construction projects are common at Eglin AFB. Noise would last only for the duration of the projects and is expected to be limited to normal working hours (7 AM – 5 PM). Overall, noise impacts are expected to be minor and temporary in nature.	
Land Use (Section 6.3)	Under Alternatives 1 and 2, only a few minor changes to current land use may occur from the construction of new facilities and modification of existing facilities. There would be no change to the existing land use for the munitions storage area. The proposed activities would be compatible with the existing land use patterns in the surrounding area and no off-base land use impacts would occur.	
Socioeconomics (Section 6.4)	The establishment of the JSF IJTS would involve the addition of 2,326 personnel to Eglin AFB, including pilot instructors, maintainer instructors, civil service personnel, government contractors, and students. The total number of people, including military dependents entering the area as a result of the JSF IJTS would be 4,885. However, the drawdown of the 33 FW and the drawdown from President's 2007 Budget would result in a decrease of 7,004 personnel in the ROI. Therefore, the total net change in population in the ROI from actions related to the JSF and the 33 FW would be an increase of only 468 personnel, an increase of approximately 0.12 percent. The net increase in the number of students in the ROI school districts would be 346 students, an increase in the ROI student population of 0.56 percent. The combination of the JSF and the personnel drawdowns would result in a net decrease in school district revenues of approximately $2.5 million as well as a corresponding decrease in school district expenditures. The JSF IJTS realignment would inject approximately $286 million in annual permanent spending into the ROI, as well as generate approximately $212.4 million in income. A total of 3,648 permanent jobs would be created, including the incoming military personnel and civilian personnel, as well as other full-time, part-time, and seasonal employment. By combining the net effect of the 33 FW drawdown and the drawdown from President's 2007 Budget, the net increase in permanent annual spending would be $15.9 million and the creation of 226 permanent jobs. It is not expected that the demand for services such as law enforcement, fire protection, and medical services would vary widely from the current level of service being provided. The direct effects of the construction spending involved in establishing the JSF IJTS at Eglin AFB would support approximately 551 jobs per year over the term of the construction, for a total of 3,859 jobs. Construction activities, as well as the personnel realignment associated with the actions involving the location of the JSF IJTS, would not disproportionately impact minority or low-income communities of concern. Analysis for JSF IJTS Alternatives 1 and 2, discussed in Sections 6.2.1.2 and 6.2.2.2 (Noise), 6.8.1.2 and 6.8.2.2 (Safety), and 6.10.1.2 and 6.10.2.2 (Hazardous Materials), found that no adverse impacts related to these environmental issues would occur under any of the alternatives.	
Transportation (Section 6.5)	The results of the analysis indicate that Alternative 1 is projected to adversely impact six roadway segments, including portions of SR 85, SR 123, and SR 189. The total number of roadway segments projected to be deficient in Alternative 1 is 17.	The results of the analysis indicate that Alternative 2 is projected to adversely impact eight roadway segments, including portions of Barrancas Avenue, SR 20, SR 30 (US 98), SR 85, SR 123, SR 189, SR 393 (Mary Esther Boulevard), and SR 397. On-base impacts resulting from JSF IJTS Alternative 2 (located east of the Eglin Runway) would likely require some improvement to Barrancas Avenue, Choctawhatchee Road, and Daytona Road if the JSF IJTS has access from these facilities as conceptualized. The total number of roadway segments projected to be deficient in Alternative 2 is 18.
Utilities (Section 6.6)	An increase in potable water usage would occur, but usage would still be within permitted limits for the Housing Area Water System. Although the wastewater flow would increase, the input to the Plew Heights wastewater treatment plant (WWTP) would still be well below permitted levels. Industrial water usage would increase as well, with the construction of two freshwater rinses and an aircraft wash rack. Eglin AFB may be required to draw from the Sand and Gravel Aquifer to reduce strain on the Floridan Aquifer. According to Gulf Power and Okaloosa Natural Gas, the estimated increase in electrical and natural gas supply to support the proposed JSF IJTS for Alternative 1 can be accommodated without adverse impact to the electrical or natural gas supply in Northwest Florida. Overall, the existing electrical and natural gas infrastructure on Eglin Main Base would support Alternative 1 for the JSF IJTS. Additional infrastructure may need to be added or existing infrastructure slightly modified to accommodate certain aspects of the JSF IJTS.	An increase in potable water usage would occur, but usage would still be within permitted limits for the Eglin Main Base Water System. Wastewater flow would increase, but the additional input to the Main Base WWTP would be well within permitted levels. Industrial water usage would increase as well, with the construction of two freshwater rinses and an aircraft wash rack, and Eglin AFB may be required to draw from the Sand and Gravel Aquifer to reduce strain on the Floridan Aquifer. According to Gulf Power and Okaloosa Natural Gas, the estimated increase in electrical and natural gas supply to support the proposed JSF IJTS for Alternative 2 can be accommodated without adverse impact to the electrical or natural gas supply in Northwest Florida. Analysis and discussion of the electrical and natural gas infrastructure is the same for this alternative as that discussed in Alternative 1. The two connected actions associated with this alternative would not impact utilities on Eglin Main Base since the overall number of personnel would not change. Slight changes to utilities infrastructure might have to be made to accommodate the relocations, but it would not be adverse.

Table 2-29. Potential Impacts From the Implementation of the JSF IJTS Cantonment, Cont'd

Resource	JSF IJTS Alternative 1 – 33rd Fighter Wing (33 FW) Area	JSF IJTS Alternative 2 – East Side of Eglin Runway
Air Quality (Section 6.7)	Individual pollutant emissions from construction and personnel activities associated with the project would not exceed 10 percent of the total ROI emissions for each corresponding pollutant, despite a temporary increase in particulate matter with a diameter of less than or equal to 10 microns (PM_{10}) emissions above the 250 tons per year (tpy) criteria (418.47 tpy and 1.36 percent of the ROI). The slight increase in local air quality emissions would be temporary. Small increases in vehicular emissions from daily commutes and increases in public traffic are not expected to adversely impact overall air quality.	
Safety (Section 6.8)	**Explosives Safety -** Facilities for ordnance storage would be constructed at the existing munitions storage area (MSA) and designed and fully licensed for the ordnance they store. Additionally, Eglin AFB would develop and implement appropriate Explosive Safety Quantity Distances (ESQDs) to mitigate potential hazards associated with the storage of munitions at these locations. No adverse impacts to explosive safety from implementation of the JTF IJTS are anticipated. **Ground Safety -** No unusual ground safety risks would be expected from ground operations or demolition/construction activities as current operational processes and procedures, as well as standard industrial safety standards would be followed.	
Solid Waste (Section 6.9)	The increase in population at Eglin AFB (4,885 persons) would result in an increase in the generation of municipal solid waste. Based on average per-person solid waste generation estimates, the additional solid waste generated would be approximately 4,012 tons, a net increase of about 2 percent in Okaloosa County. This is not considered an adverse impact to the waste generation rate within the ROI or to the existing disposal capacity at area landfills.	The solid waste generated from the population increase under Alternative 2 is the same as discussed under Alternative 1.
	In addition to municipal solid waste, metallic debris would be generated from routine aircraft maintenance operations. It is estimated that approximately 18 tons of metallic debris would be generated from aircraft servicing on an annual basis. This material is anticipated to be recycled and would not impact available landfill capacity within the ROI. The development of the cantonment area would result in the generation of wastes associated with the construction of new facilities and the demolition or renovation of existing structures at a rate of approximately 79,106 tons per year during construction. For the landfills evaluated, the debris generated during JSF IJTS construction would increase landfill use in Okaloosa County by approximately 100 percent or by approximately 76 percent in Santa Rosa County over the three-year period. By utilizing the available landfills for disposal, it is anticipated that the overall impact to any single landfill could result in an annual increase in debris to be disposed by approximately 20 percent to 30 percent during the years construction was ongoing. Further, current analysis indicates that landfills within the area have a life expectancy of 18 to 30 years. Because of the existing capacity, the rise in debris for disposal during the three-year construction phase is not anticipated to have an adverse impact on available landfill capacity within the ROI.	Aircraft maintenance activities under Alternative 2 would be the same as discussed under Alternative 1. The development of the cantonment area under Alternative 2 would require the demolition or renovation of an additional 1,000,000 square feet of existing structures. This additional activity substantially increases the quantity of construction and demolition (C&D) waste generated during the construction of cantonment facilities. The estimated quantities of wastes associated with the construction of new facilities and the demolition or renovation of existing structures is approximately 106,919 tons per year during construction. For the landfills evaluated, the debris generated during JSF IJTS construction would increase landfill use in Okaloosa County by approximately 135 percent or by approximately 103 percent in Santa Rosa County over the 3-year period. By utilizing the available landfills for disposal, it is anticipated that the overall impact to any single landfill could result in an annual increase in debris to be disposed by approximately 30 to 50 percent during the years construction was ongoing. Existing landfills available for use currently have a life expectancy of between 18 and 30 years (remaining capacity). Because of this existing capacity, the rise in debris for disposal during the three-year construction phase is not anticipated to have an adverse impact on available landfill capacity over the long term.

Table 2-29. Potential Impacts From the Implementation of the JSF IJTS Cantonment, Cont'd

Resource	JSF IJTS Alternative 1 – 33rd Fighter Wing (33 FW) Area	JSF IJTS Alternative 2 – East Side of Eglin Runway
Hazardous Materials (Section 6.10)	**Hazardous Materials Management -** No adverse impacts related to hazardous materials are anticipated from implementation of the JSF IJTS alternatives. **Hazardous Waste Management -** Hazardous and non-hazardous wastes would be generated as a result of maintenance functions associated with new aircraft on the base. Eglin AFB would establish new initial accumulation points (IAPs) at generation locations, and personnel managing these locations would be properly trained in waste management. Management of hazardous wastes would be performed according to prescribed procedures already in place. Thus, no change to permits, hazardous waste generator status, or management procedures would be required and no adverse environmental impacts are anticipated. **Environmental Restoration Program (ERP) Sites -** Development on or near any ERP sites on Eglin AFB resulting from implementation of the JSF IJTS would be coordinated with the Eglin Environmental Office, the U.S. Environmental Protection Agency (USEPA), the Florida Department of Environmental Protection (FDEP), and other relevant stakeholders, as required. No adverse impacts related to ERP issues are anticipated from implementation of the alternatives. Specific sites with ongoing remediation activities would be avoided in construction (ST-75/ST-67, SS-274, LF-03, OT-35, ST-54). **Asbestos -** Asbestos debris may be generated as a result of proposed building renovation/demolition activities. Proper disposal of asbestos wastes would be conducted as directed by the National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 Code of Federal Regulations [CFR] 61.40 through 157). Implementation of management requirements including training and certification of contractors and transport and disposal documentation records would mitigate any adverse impacts resulting from asbestos-containing materials (ACM). **Lead-Based Paint (LBP) -** LBP debris may be generated as a result of proposed building renovation/demolition activities. Demolition/renovation of structures known to contain LBP would be conducted in accordance with applicable regulations. Proper disposal of lead-containing wastes would also be conducted in accordance with state and federal regulations, including the Toxic Substances Control Act (TSCA) and the Occupational Safety and Health Administration (OSHA). Further, these wastes would be accompanied by a waste manifest and disposed at a state-approved facility. The appropriate management of LBP is not expected to create adverse impacts.	
Physical Resources (Section 6.11	Although 100 acres and 89 acres of ground disturbance would result from Alternative 1 and Alternative 2 activities, neither would have an adverse impact on soils. Construction, demolition, and renovation would have little potential to affect soils and create conditions that could result in serious erosion episodes. Most of the area in the JSF IJTS Alternative 1 and Alternative 2 sites are Urban Land and covered with pavement, cement, or existing buildings. The soils within the Alternative 1 and Alternative 2 area that are not currently developed have relatively limited erodibility, and the natural terrain is generally flat. Additionally, a stormwater management system (i.e., pond, swale) to provide on-site treatment of stormwater would likely be a permit requirement. On-site storage of stormwater would prevent direct discharge of stormwater runoff to any surface waters, thereby reducing potentially adverse impacts to water quality. Implementation of a Stormwater, Erosion, and Sedimentation Control Plan, a Storm Water Pollution Prevention Plan (SWPPP), and construction BMPs, as required by FDEP regulations, would serve to alleviate stormwater sedimentation runoff.	
Biological Resources (Section 6.12)	The project areas for Alternatives 1 and 2 are predominately urban/landscaped and located adjacent to the flight line, with little wildlife value or sensitive habitats. Therefore, no adverse impacts would occur to flora, fauna, sensitive habitats, or sensitive species from either alternative. The Okaloosa darter stream north of the proposed JSF MSA expansion area (Toms Creek) may be affected by sedimentation and runoff from the construction activities at the MSA. It is approximately 700 feet from the proposed MSA expansion area to Toms Creek, with at least a portion of this being vegetated. To reduce potential runoff issues, erosion control measures such as silt fencing would be used near Toms Creek. Eglin Natural Resources biologists indicate there is extremely low potential for a cluster of 16 inactive red-cockaded woodpecker (RCW) trees located within the area to become active, and a letter from the U.S. Fish and Wildlife Service (USFWS) indicates that any future developments impacting RCW inactive trees on Eglin AFB Main Base are not likely to adversely affect the RCW. The JSF IJTS is not likely to adversely affect the RCW or Okaloosa darter, and overall impacts to biological resources would not be adverse.	

Table 2-29. Potential Impacts From the Implementation of the JSF IJTS Cantonment, Cont'd

Resource	JSF IJTS Alternative 1 – 33rd Fighter Wing (33 FW) Area	JSF IJTS Alternative 2 – East Side of Eglin Runway
Cultural Resources (Section 6.13)	No NRHP-eligible archaeological sites are located within the Alternative 1 area. Eglin's Cultural Resources Branch, in consultation with the State Historic Preservation Officer (SHPO), determined that no additional archaeological survey is required for this area. Potential adverse effects to cultural resources would include the planned demolition of five structures (buildings 1339, 1343, 1345, 1352, and 1353), and the potential renovation of seven other structures within the Strategic Air Command (SAC) Alert Historic District (buildings 1285, 1315, 1318, 1321, 1326, 1328, and 1344). The SAC Alert Historic District was previously evaluated as eligible for the NRHP. After consultation with the SHPO as per Eglin's project-specific programmatic agreement regarding historic properties, if impacts cannot be avoided (see Appendix F for details on project specific programmatic agreement), a mitigation of these resources would need to be performed for all affected facilities.	No NRHP-eligible archaeological sites are located within the Alternative 2 area. Eglin's Cultural Resources Branch, in consultation with the SHPO, determined that no additional archaeological survey is required for this alternative area. Adverse effects to cultural resources may include the planned demolition or renovation of contributing resources within the Eglin Field National Historic District and SAC Alert Historic District. Potential adverse effects to cultural resources would include the planned demolition of two structures within the Eglin Field Historic District (buildings 238 and 246), and the potential renovation of one other structure within the SAC Alert District (building 1285). Because these buildings are part of districts evaluated as eligible for nomination to the NRHP, or are already listed, a mitigation of these resources would be performed for all affected facilities after consultation with the SHPO, as per Eglin's existing programmatic agreement regarding Historic and Archeological Resources.

Table 2-30. Potential Impacts from the Implementation of the JSF Flight Training

Resource	JSF Training Alternative 1	JSF Training Alternative 2
Airspace (Section 7.2)	There would be an estimated annual increase in operations of approximately 85 percent for all of the alternatives, which would increase the workload of air traffic controllers. Flight safety impacts associated with operational activity of the aircraft are not anticipated. All alternatives would impact aircraft ground delays at Duke Field, Eglin Main Base, and Choctaw Field to varying degrees. None of these delays would be adverse.	
Noise (Section 7.3)	**Eglin/Duke –** Eglin AFB and Duke Field are considered as a single noise environment because noise contours are continuous between the two installations under certain alternatives. Estimated off-base population exposed to aircraft noise levels of 65 dB DNL or greater would increase from 2,113 to 6,757 (increase of 4,644). The estimated off-installation population affected by greater than 75 dB DNL would increase from 142 to 2,174 (increase of 2,032). Two hospitals would be impacted at greater than 65 dB DNL, whereas no hospitals and two schools were impacted at this noise level under baseline conditions. A potential for hearing damage exists for the most highly exposed individuals within Eglin's on-base population and off-base population. **Choctaw Field** - Estimated off-base population exposed to aircraft noise levels of 65 dB DNL or greater would increase from 0 to 114. No off-base residents would be affected at greater than 75 dB DNL under baseline or proposed conditions. No hospitals would be affected by noise at greater than 65 dB DNL under proposed or baseline conditions. **Special Use Airspace (SUA) –** Average noise levels under SUA and MTRs proposed to be used by the JSF would change <45 - 65 dB DNL_{mr} to 41 – 75 dB DNL_{mr}. Several small towns and many rural residents would be affected by increased noise as a result of training on MTRs and SUAs. Training on MTRs would yield an increase from < 45 dB DNL_{mr} to 76 dB DNL_{mr}. Sonic booms experienced beneath W-151 would increase in frequency but typical boom overpressure would remain similar to those experienced under baseline conditions. **Munitions Use –** JSF munitions use would increase average noise levels near targets, but would not cause any increase in off-range areas impacted by noise levels of greater than 62 dB C-weighted Decibel Day-Night Average Sound Level (CDNL).	**Eglin/Duke –** Estimated off-base population exposed to aircraft noise levels of 65 dB DNL or greater would increase from 2,113 to 11,156, an increase of 9,043. The estimated population affected by greater than 75 dB DNL would increase from 142 to 2,721 (increase of 2,579). Two hospitals would be impacted at greater than 65 dB DNL, whereas no hospitals and two schools were impacted at this noise level under baseline conditions. A potential for hearing damage exists for the most highly exposed individuals within Eglin's on-base population and off-base population. **Choctaw Field** - Estimated off-base population exposed to aircraft noise levels of 65 dB DNL or greater would increase from zero to six. No off-base residents would be affected at greater than 75 dB DNL under baseline or proposed conditions. No hospitals would be affected by noise at greater than 65 dB DNL under proposed or baseline conditions. **SUA –** JSF training in SUA and resulting noise impacts would be the same under Alternative 2 as they would be under Alternative 1. **Munitions Use –** JSF air-to-ground high-explosives munitions training would be the same under Alternative 2 as they would be under Alternative 1. Impacts would be the same as under Alternative 1.
Land Use (Section 7.4)	JSF flight training would produce noise levels above the current baseline, which could have adverse compatibility impacts for certain land uses at Eglin Main, Duke Field, and affected off-base areas. Approximately 43,213 acres on Eglin Main Base and the Eglin interstitial areas would be exposed to noise levels greater than 65 dB DNL. The entire developed area of Duke Field would experience increased noise exposure of greater than 75 dB DNL, and the unaccompanied housing area at Duke Field would potentially be exposed to noise levels of 85 dB DNL. Approximately 3,405 acres of community land near Eglin Main Base would be exposed to noise levels greater than 65 dB DNL. Noise impacts on the surrounding communities would be greatest northeast of Eglin Main Base in Valparaiso and Niceville. Other impacted areas include unincorporated areas of Okaloosa County, part of Shalimar, the eastern end of Okaloosa Island, a portion of Destin, property located just east of Destin near the Mid-Bay Bridge, and the area southeast of Crestview around the Shoal River. Perceived adverse land use compatibility impacts from noise exposures above 75 dB DNL would be greatest for land uses that include sensitive noise receptors (e.g., residences, public buildings, schools, churches, and certain recreational uses). Noise exposures above 75 dB DNL could adversely impact most uses in the	Approximately 46,345 acres Eglin Main Base and the Eglin interstitial areas would be exposed to noise levels greater than 65 dB DNL. The affected areas and impacts would be similar to those described for Alternative 1. Impacts at Duke Field would also be similar to those described for Alternative 1 Noise exposures at Choctaw Field would also be similar to those described for Alternative 1 and would not have any adverse impacts on existing on-base land use compatibility. Approximately 5,008 acres of off-base land near Eglin Main Base would be exposed to noise levels greater than 65 dB DNL. No off-base land north of Duke Field would be exposed to noise levels greater than 75 dB DNL. Of the total off-base area exposed in the vicinity of Eglin Main Base, approximately 931 acres would be exposed to noise levels greater than 75 dB DNL. Using Choctaw Field for JSF flight training would expose a total of approximately 2,296 acres of off-base property to noise levels greater than 65 dB DNL. Approximately 592 acres of off-base property would be exposed to noise levels greater than 75 dB DNL. All the affected property is categorized as open/agricultural/low-density land use. No adverse impacts on the existing land use compatibility would occur.

Table 2-30. Potential Impacts from the Implementation of the JSF Flight Training, Cont'd

Resource	JSF Training Alternative 1	JSF Training Alternative 2
Land Use (Section 7.4), Cont'd	public/quasi-public category and some uses within the commercial category unless noise level reduction measures are included in the design and construction of buildings. Most uses in the industrial and open/agricultural/low density categories are compatible without restrictions. Impacts from noise exposures above 75 dB DNL would be greatest for land uses that include sensitive noise receptors (e.g., residences, public buildings, schools, churches, and certain recreational uses). Noise exposures above 75 dB DNL could adversely impact most uses in the public/quasi-public category and some uses within the commercial category unless noise level reduction measures are included in the design and construction of buildings. Most uses in the industrial and open/agricultural/low density categories are compatible without restrictions. Of the total off-base area exposed in the vicinity of Eglin Main Base and Duke Field, approximately 782 acres would be exposed to noise levels greater than 75 dB DNL. No adverse land use compatibility impacts would occur off-base in the vicinity of Duke Field and Choctaw Field because of the type of land use that would be affected. Average noise levels under Special Use Airspace (SUA) and MTRs proposed to be used by the JSF would increase over baseline levels. Perceived adverse land use compatibility impacts could occur especially for affected residential areas.	JSF training in SUA and potential land use compatibility impacts resulting from increased noise would be the same under Alternative 2 as they would be under Alternative 1.
Socioeconomics (Section 7.5)	Demographic analysis of census data indicates that of the areas impacted by noise levels of greater than 65 dB DNL in the vicinity of the airfields minority and/or low-income populations do not represent a disproportionately high percentage of the affected population as compared to the community of comparison established in Section 3.4 There are two MTRs proposed for use in JSF flight training, VR-1082 and VR-1085, where JSF training would increase noise levels. The MTRs overfly 10 counties in Florida and Alabama. Of the 10 counties, the population under the MTRs by census tracts in three of the counties have minority and/or low income populations that are disproportionate to the respective populations in the county overall. All three counties (Clarke, Monroe, and Wilcox) are located in Alabama. In total, beneath the MTRs, 21,323 persons could potentially be affected by noise levels of between 57 and 76 dB DNL. Of the total population to be affected, over 18,000 would be minority and/or low income persons and over 5,000 would be persons under the age of 18. Aircraft sortie-operations on the MTRs would continue to be relatively infrequent (less than two per day). However, individual overflights could be alarming to people overflown and would be expected to cause significant annoyance to between 6 and 40 percent of the population affected (Section 7.3, Noise). The area underneath the Eglin MOA is also a fairly rural area. However, homes would be overflown, potentially alarming people and animals. An estimated 8,776 people could be affected by the increased noise levels. Approximately 7 percent of the affected population would be minorities, and 16 percent would be low-income populations. In Santa Rosa County, the area that underlies Eglin MOA A East has a low-income population that is disproportionate to the low-income population in the county. The noise levels in the MOA would increase under the proposed JSF flight training from a current noise level of less than 45 dB DNL to noise levels between 49 and 61 dB DNL. This increase in the level of noise would be expected to cause significant annoyance to residents, as well as recreational users, such as hunters. Of the population affected by operations in the Eglin MOA, it is expected that 1 to 7 percent would be highly annoyed (Section 7.3,	Training activities under JSF Flight Training Alternative 2 would increase the number of people potentially affected by aircraft noise levels of 65 dB DNL and greater by 428 percent. This increased area would result in approximately 9,048 additional people within the high noise level area as compared to the existing conditions for a total of 11,161 affected persons. Of the affected population, 1,458 persons (13 percent) would be minority, and 1,032 persons (9 percent) would be low-income. The minority populations identified under the noise level contours in the vicinity of the airfields are not disproportionate to the overall communities of comparison as discussed in Chapter 3 (Section 3.4, Socioeconomics and Environmental Justice). Low-income populations under the noise contours are disproportionate to the overall communities and are subject to an adverse impact from the aircraft noise levels. Aircraft noise impacts in areas underlying the special use airspace is the same as those impacts described under JSF Flight Training Alternative 1, as the training operations conducted in those airspace segments would be the same in both alternatives. Addie R. Lewis Middle School would be subject to 70 dB DNL noise levels, while Cherokee and Valparaiso Elementary Schools would be subject to 75 dB DNL noise levels. Oak Hill Elementary School could be affected by noise levels of 80 dB DNL and greater. The Child Care Network, Inc. daycare and Miss Karen's Home Daycare would be subject to noise levels of 75 dB DNL. Under the existing conditions, Valparaiso Elementary School, Oak Hill Elementary School, the Child Care Network, Inc., and Miss Karen's Home Daycare previously have been subject to noise levels of 65 dB DNL. The potential for impacts associated with noise levels in the MTRs, Eglin MOA, and restricted airspace are analyzed in JSF Flight Training Alternative 1.

Table 2-30. Potential Impacts from the Implementation of the JSF Flight Training, Cont'd

Resource	JSF Training Alternative 1	JSF Training Alternative 2
Socioeconomics (Section 7.5), Cont'd	Noise). Noise levels in the Tyndall MOA would increase from JSF operations from less than 45 dB DNL to 64 dB DNL. Approximately 46,300 people could be affected by the increased noise levels, of which 18 percent (8,300) would be minorities and 19 percent (8,700) would be low-income persons. Tyndall MOA C, D, F, and H overlie portions of Bay, Calhoun, Franklin, and Gulf Counties that have minority and/or low-income populations that are disproportionate to the respective overall populations for each county. The increase in the noise levels and the disproportionate effect on minorities and low-income persons would be expected to cause annoyance to residents such that approximately 11 percent of the affected population would be annoyed. There is also restricted airspace over the Eglin Reservation and the beachside communities in Okaloosa, Santa Rosa, and Walton Counties as well as portions of Washington and Bay Counties. These areas are designated as R-2914, R-2915, and R-2919. As many of the larger communities in these counties are located on the beaches underlying the restricted airspace, the estimated population affected would be nearly 60,750, of which 17 percent would be minority populations and 10 percent would be low-income populations. Under R-2914A, a portion of Washington County has low-income populations disproportionate to the county overall, and in Okaloosa and Santa Rosa counties, R-2915A and R2915B overlie areas that have disproportionate minority and/or low-income populations. Underneath these restricted airspaces, noise levels are expected to increase from less than 45 dB DNL up to a maximum of 71 dB DNL. Between 1 and 33 percent of the affected population is expected to be highly annoyed, with noise levels in R-2915A expected to cause the highest level of annoyance. Special risks to children are anticipated in the form of increased difficulty in learning at several schools impacted by high noise levels. Addie R. Lewis Middle School and Lula J. Edge Elementary School would be subject to 65 dB DNL noise levels, Cherokee and Valparaiso Elementary Schools would be subject to 75 dB DNL noise levels, and Oak Hill Elementary School would be subject to noise levels of 80 dB DNL and greater. First Valparaiso Child Care, Angels Are Us Learning Center, and Miss Karen's Home Daycare would be subject to noise levels of 70 dB DNL. The Child Care Network, Inc. daycare and preschool would be subject to noise levels of 80 dB DNL and above.	
Utilities (Section 7.6)	Potable water, wastewater, and electrical infrastructure are currently in place at each of the proposed auxiliary fields. Eglin Main Base is supplied by two water systems that collectively have enough excess capacity to handle the additional air traffic controllers and fire and crash protection crews. It is likely that the potable water system at Duke Field would have enough capacity to accommodate the additional JSF mission. However, the current Duke Field water system would not have the capacity to support both the JSF mission and the 7SFG(A) cantonment. An additional water system would be needed at Duke Field to support the new missions. Wastewater treatment, electricity, and natural gas infrastructures are already in place at each of the auxiliary fields. Increases in usage from the JSF missions would not be sufficient to exceed acceptable levels, so no impacts are expected to these utilities. The effects for Alternative 2 would include only those associated with Eglin Main Base and Choctaw, and the effects for Alternative 3 would include only Eglin Main Base and Duke.	
Air Quality (Section 7.7)	Currently, TA C-62 is used for the types of munitions proposed; the rest of the test areas have not been previously used for the type of activity proposed or type of munition. The use of GBU-12 bombs on TA C-52E and B-82, an increase in particulate matter is expected to occur from the expenditure of bombs. The use of various bombs for air-to-surface training is not expected to cause any adverse effects to regional air quality based on the established impact criteria. The use of live 25-mm rounds on TA C-62 and B-75 for strafing runs will increase the air quality emissions minimally in the ROI. Flares would contribute to minor increases in particulate matter emissions in the ROI. Adverse affects to the regional air quality is not expected from the addition of these training activities. Overall the use of munitions would have minimal impact on regional air quality.	
Safety (Section 7.8)	**Explosives Safety -** Implementation of the JSF Flight Training would not be expected to prevent or significantly limit the ability of range managers to conduct explosive ordnance disposal (EOD) and range maintenance activities. All ordnance would be handled by trained and qualified personnel in accordance with all explosive safety standards and detailed published technical data. Aircraft-delivered ordnance (e.g., GBUs) would require generation/implementation of weapon safety footprints to define personnel evacuation areas during training activities. Implementation of the JSF Flight Training would not result in heightened explosive safety concerns. **Ground Safety –** Any unique training associated with F-35 crash response would also have to be extended to personnel from local fire departments. Specific procedures are implemented for minimizing the risk of fire from range operations; therefore, implementation of the JSF Flight Training would not result in heightened ground safety concerns. **Aircraft Mishaps –** Current safety policies and procedures at Eglin are designed to ensure that the potential for aircraft mishaps is reduced to the lowest possible level. These safety policies and procedures would continue under the JSF Flight Training. **Bird/Wildlife Aircraft Strike Hazards -** Under the JSF Flight Training, the number of total annual sorties for all aircraft at the base would increase, thus it is expected that the number of bird strikes per year would similarly increase. However, the overall risk associated with bird-aircraft strikes is expected to remain low.	

Table 2-30. Potential Impacts from the Implementation of the JSF Flight Training, Cont'd

Resource	JSF Training Alternative 1	JSF Training Alternative 2
Solid Waste (Section 7.9)	It is estimated that GBU and JDAM debris would generate approximately 257 tons of solid waste per year. The expenditure of live 25-mm ammunition would generate a total weight of approximately 61 tons of projectile and casings on an annual basis during training activities. It is anticipated that the bulk of the debris generated would be in the form of scrap metal which will either be reclaimed or remain on the range. The quantity of waste generated during range training operations would result in an increase of approximately 2 percent. Therefore, based upon projected training needs, it is not anticipated that training activities would result in the generation of waste quantities sufficient to affect current waste forecasts at Eglin AFB.	
Hazardous Materials (Section 7.10)	**Munition-Related Wastes -** The JSF Program estimates an approximate annual usage of 635 live and 219 inert ordnance units. It is not anticipated this proposed usage would adversely affect estimated waste-generation quantities, and proposed training activities would not result in thresholds being exceeded for any new chemicals.	
Physical Resources (Section 7.11)	Approximately 219 inert GBU-12 bombs and 635 live GBU-12 bombs would be dropped on TA B-82 and TA C-52E each year by JSF students and instructors. Neither B-82 nor C-52E is frequently used for bombing. Metals from munitions casings and other components would be periodically retrieved through existing range cleanup procedures. Soil and water impacts from increased JSF training on TA B-82 and C-52E would not be considered adverse. Targets would not be established in slope or wetland areas. Soil erosion from current vegetation management practices is the primary environmental concern at TA C-62. The increase in JSF flight training would not result in a change in vegetation management practices. The practice of keeping the area clear of vegetation would remain the same regardless of the number of munitions expended. Thus, the conditions that led to the erosion at TA C-62 would not change as a result of increased JFS flight training. Debris retrieval would likely increase, but the equipment currently used does not result in more than minor surface soil disturbance. Since debris retrieval is an established practice, adverse impacts to physical resources are not anticipated from JSF training. Erosion is already occurring as a result of target area maintenance. Current maintenance practices would not change, and the erosion is not expected to worsen as a result of JSF training.	
Biological Resources (Section 7.12)	**Air Operations -** Ground movements by aircraft would only occur on established air fields; therefore, no impacts from air operations would occur to sensitive habitats. Since aircraft are already a major component of the existing noise environment at Eglin, aircraft noise from the alternatives would not pose a novel or new threat to birds and wildlife that would cause adverse reactions other than temporary flight. Thus noise from the air operations would not adversely affect protected species. **Munitions Use -** Direct impacts to sensitive habitats and species as the result of munitions are unlikely; however, some increased risk of wildfire would result from munitions use. For JSF training, wildfire operational plans would be developed with Eglin's Natural Resources Section to identify high wildfire risk conditions and notification procedures that units would follow to engage fire response personnel when needed. Munitions use would follow Eglin's Wildfire Specific Action Guide Restrictions. Noise impacts to the red-cockaded woodpecker (RCW) and bald eagle would be possible; however, RCWs and eagles continue to thrive near noisy test areas, indicating that habitat quality seems to be more influential in determining productivity, survival, and population stability than noise. The RCW is not likely to be adversely affected. Impacts to sensitive habitats and species from munitions use would not be adverse. Eglin is conducting an Endangered Species Act (ESA) Section 7 consultation with the United States (U.S.) Fish and Wildlife Service (USFWS)	**Air Operations -** Impacts from JSF air operations would be the same as those described for the JSF Flight Training Alternative 1, except noise impacts at Duke Field would be less, and noise impacts at Eglin Main Base would be greater. However, the increase does not adversely impact any sensitive species. Impacts to biological resources from JSF air operations would not be adverse. **Munitions Use -** Impacts from JSF munitions use would be the same as those described for the JSF Flight Training Alternative 1. Eglin is conducting an Endangered Species Act (ESA) Section 7 consultation with the United States (U.S.) Fish and Wildlife Service (USFWS).
Cultural Resources (Section 7.13)	No adverse effects to historic properties would result from normal aircraft operations at Eglin AFB, Duke Field, or Choctaw Field. The project-specific programmatic agreement and consultation timeline (Appendix F, *Cultural Resources*) provide additional detail regarding historic properties and flight operations.	

Table 2-31. Potential Impacts from the No Action Alternative

Resource Area	No Action Alternative
Airspace (Section 7.2.3)	Drawdown of the 33rd Fighter Wing (33 FW) and potential loss of the C-130 would be expected to improve the Eglin AFB airspace environment through reduction in scheduling issues, ground delays, and overall use. These reductions in use would serve to open airspace for other uses.
Noise (Sections 4.2.6, 5.2.6, 6.2.3, and 7.3.3)	As compared to the other alternatives, positive changes in the noise environmental across the Eglin Reservation would occur under this alternative. The 33 FW would draw down, and all operations associated with the 33 FW mission would cease; this 70 percent reduction in annual sorties would decrease average noise levels in the vicinity of all areas where 33 FW aircraft operate, including the areas proposed for the 7SFG(A) and JSF IJTS cantonment areas as well as ranges across Eglin. In addition, under the No Action Alternative, C-130 aircraft belonging to the Air Force Reserve's 919th Special Operations Wing (919 SOW) would cease operations at Duke Field, decreasing noise levels in that area.
Land Use (Sections 4.3.6, 5.3.6, 6.3.3, and 7.4.3)	There would be no adverse land use compatibility issues for any areas beyond those that currently exist under baseline conditions. There would be positive land use impacts under the No Action Alternative, as the potential loss of C-130 aircraft belonging to the Air Force Reserve's 919 SOW located at Duke Field and the drawdown of the 33 FW would reduce the level of use at Duke Field and Eglin Main Base; greater than 65 dB DNL noise exposures on- and off-base would be less than the baseline noise contours and the overall affected area would decrease. The listed actions, if implemented, would occur in areas where the existing land use is already compatible with the actions. Under the No Action Alternative, the test areas would continue to support existing and planned test and evaluation activities and military training. Public access and recreation would also be unchanged from the existing conditions. Noise exposures for Choctaw Field would remain the same as the baseline.
Socioeconomics (Sections 4.4.6, 5.4.6, 6.4.3, and 7.5.3)	The combined effect of the predictable actions at Eglin AFB would be a loss of 2,172 military personnel. The decrease in personnel would affect the surrounding region through a decrease in population, employment, and revenues and expenditures for the counties and the school districts. The direct effects of the predictable actions at Eglin AFB without the BRAC actions would be a population loss of 4,561 (1.2 percent) including military personnel, civilians, and dependents. The induced effects on population would be a loss of 2,443 people (0.6 percent). The direct effects of the predictable actions on the number of students in the region then would be a decrease of 1,243 students (2.0 percent). The direct effects of the outgoing personnel would be a decrease in total spending of over $169 million and the number of jobs lost would be the same as the net number of personnel leaving the region, or 2,172 personnel. The induced effects would be a decrease in total spending of nearly $100.9 million, and the number of jobs lost would be approximately 1,250. While the effects of the personnel drawdown may not directly result in a decrease of the personnel providing public services, the population loss would decrease the tax base of the counties and decrease the amount of revenues the counties could collect to fund the provision of these public services Construction activities as well as the personnel realignment under the No Action Alternative would not disproportionately impact minority or low-income communities of concern.
Transportation (Sections 4.5.6 and 6.5.3)	The results analysis show that under the No Action Alternative, 23 roadway segments are projected to operate deficiently including portions of SR 10 (US 90), SR 20, SR 30 (US 98), SR 83 (US 331), SR 85, SR 123, SR 188 (Racetrack Road), SR 189, SR 285, and SR 393 (Mary Esther Boulevard). Of these 23 roadways, 14 are deficient today.
Utilities (Sections 4.6.6, 5.5.6, 6.6.3, and 7.6.3)	The Florida Army National Guard's (FLARNG's) Company C, 3rd Battalion, 124th Infantry's request to relocate to Eglin would potentially increase utilities on the Eglin Range. However, reduction of personnel at Duke, Field, Eglin Main Base, and Hurlburt Field would result in an overall reduction in local utility use at all these locations. Amounts of potable water, electricity, and natural gas consumed and wastewater produced would be reduced and would have an overall positive impact on utilities.
Air Quality (Sections 4.7.6, 5.6.6, 6.7.3, and 7.7.3)	Short-term and minor increases in emissions are expected associated with new construction. However, there would be a long-term net decrease in air emissions due to the drawdown of the 33 FW and potential loss of C-130s. This would result in an overall long-term positive impact on air quality in the region.
Safety (Sections 4.8.6, 5.7.6, 6.8.3, and 7.8.3)	Drawdown of the 33 FW and the 919 SOW would result in the elimination of current MSAs associated with these units, and no construction of new MSAs would be required. As a result, there would be positive impacts to the safety environment of Eglin AFB associated with the No Action Alternative.
Solid Waste (Sections 4.9.6, 5.8.6, 6.9.3, and 7.9.3)	The quantity of C&D waste for identified construction activities is negligible. It is anticipated that there will be an overall reduction of municipal solid waste generated at Eglin AFB due to reduction of personnel; this would have an overall positive impact associated with solid waste.
Hazardous Materials (Sections 4.10.6, 5.9.6, 6.10.3, and 7.10.3)	The overall quantity of hazardous materials used or hazardous waste generated at the installation would be expected to decrease based on any drawdown in 33 FW operations or loss of C-130s.
Physical Resources (Sections 4.11.6, 5.10.6, 6.11.3, and 7.11.3)	Soil and water resources have the potential to be impacted from construction activities under the No Action Alternative. However, it was determined in project-specific environmental analysis that no impacts to soils, water resources, or water quality were expected from the proposed activities given the attainment of the required permits and the implementation of BMPs defined in associated SWPPPs.

Table 2-30. Potential Impacts from No Action Alternative, Cont'd

Resource Area	No Action Alternative
Biological Resources (Sections 4.12.6, 5.11.6, 6.12.3, and 7.12.3)	Almost all of the predictable actions that are to occur at Eglin through the year 2015 are to be located either on or near Eglin Main Base, Duke Field, Camp Rudder, Choctaw Field, or at established test areas, where wildlife habitat quality is poor. These areas are either already developed, are open grasslands/shrublands, or are degraded (i.e., overgrown with sand pine). The only areas with any natural habitats are the ALARNG cantonment area, portions of Camp Rudder, and the proposed SARC location, which are flatwoods and sandhills. Development of the ALARNG cantonment area and Camp Rudder expansion would result in the loss of small areas of sandhills, but thousands of acres of similar habitat would still be managed for wildlife. Clearing for the ALARNG SARC would result in a loss of RCW foraging habitat, but many acres of suitable habitat would remain for the affected cluster. Use of the interstitial areas and waters adjacent to Eglin would increase, but impacts have been analyzed and approved through NEPA, consultations, and other regulatory channels. Drawdown of the 33 FW from Main Base ,the realignment of the 919 SOW located at Duke Field, and the realignment of AFSOC, which utilizes TAs A-77 and A-78, would reduce noise and activity levels in the these areas, reducing disturbance to wildlife. Overall impacts to biological resources from the No Action Alternative would not be adverse, and may be beneficial in certain aspects.
Cultural Resources (Sections 4.13.6, 5.12.6, 6.13.3, and 7.13.3)	Given the scope of projects identified under the No Action Alternative no adverse or beneficial effects to cultural resources would be expected.

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Table 2-32. Summary Alternative Impact Comparison

Alternative		Airspace Management	Noise	Land Use	Socioeconomics and Environmental Justice	Transportation	Utilities	Air Quality	Safety	Solid Waste	Hazardous Materials and Hazardous Waste	Physical Resources	Biological Resources	Cultural Resources
Baseline		n/a												
7SFG(A) Cantonment	*1A*	n/a												
	1B	n/a												
	1C	n/a												
	2A	n/a												
	2B	n/a												
	2C	n/a												
	2D	n/a												
	2E	n/a												
	3	n/a												
	4	n/a												
	5	n/a												
Baseline					n/a	n/a								
7SFG(A) Ranges	*1*				n/a	n/a								
	2				n/a	n/a								
	3				n/a	n/a								
	4				n/a	n/a								
	5				n/a	n/a								
Baseline		n/a												
JSF Cantonment	*1*	n/a												
	2	n/a												
Baseline						n/a								
JSF Flight Training	*1*					n/a								
	2					n/a								
Four Components														
No Action														
Combined Impacts														

7SFG(A) = 7th Special Forces Group (Airborne); IJTS = Initial Joint Training Site; JSF = Joint Strike Fighter
n/a = not analyzed
Green – May include some beneficial or adverse environmental consequences, but the overall effect is one that can neither be termed beneficial nor adverse.
Yellow – potential adverse environmental consequences or burdens on the resource, or issues with the resource have been identified.
Red – unavoidable adverse environmental impact.
Split boxes represent a designation between two categories above. Some of the impacts would fall into one category, with others in a different category. Therefore, it is not certain what the overall impact to the resource would be.

As shown in the summary table above, the greatest potential for impacts from the individual alternatives is related to:

- **Transportation –** under the 7SFG(A) and JSF IJTS cantonment alternatives the Air Force anticipates significant impacts (consuming 5 percent or more of the roadway's capacity) to transportation routes outside of Main Base due to the increase in traffic on local roadways. Impacts are defined as being significant and adverse when the roadway is projected to operate deficiently. Any impacts to existing and projected deficient transportation routes, regardless of significance, could be perceived by the public to be adverse.
- **Socioeconomics –** under the JSF Flight Training alternatives the Air Force anticipates disproportionate, adverse impacts to minority and/or low income populations due to the noise levels generated by flight operations in areas overflown by the MTRs and other special use airspaces. Under the implementation of any of the flight training alternatives, noise levels would increase under several military airspace units and these anticipated noise levels have the potential to result in annoyance in underlying areas. Also, noise levels currently experienced by local schools and day care facilities would increase. Several schools and daycare facilities would potentially be subject to noise levels of 75 dB DNL or greater as compared to the current noise levels of 65 dB DNL. This increase in noise levels has the potential to disrupt speech and hinder learning, resulting in special risks to children. These actions may be perceived by the public as an adverse impact.
- **Utilities –** under 7SFG(A) Cantonment Alternatives 3 and 5 the Air Force anticipates adverse impacts due to the lack of utility infrastructure at the proposed locations; as a result, extensive utility infrastructure would need to be established, including a wastewater treatment facility. This may be perceived by the Army as a significant cost.
- **Land Use –** under 7SFG(A) Range Alternative 3 the Air Force anticipates adverse impacts associated with the closure of Duck Pond and the associated campground, which are heavily utilized by the public. These closures may be perceived by the public as adverse impacts. Under the JSF Flight Training alternatives the Air Force anticipates adverse impacts to land use associated with noise from the JSF – sensitive noise receptors (e.g., residential areas, public buildings, schools, churches, and hospitals) underlying departure and approach lanes for the JSF at Eglin Main, Duke Field, and Choctaw Field would experience an increase in noise levels that are generally incompatible with those types of land uses. The increase in noise levels may be perceived by the public as an adverse impact. Average noise levels under SUA and MTRs proposed to be used

by the JSF would also increase over baseline levels. Perceived adverse land use compatibility impacts could occur especially for affected residential areas.

- **Noise –** under the JSF Flight Training alternatives the Air Force anticipates adverse impacts associated with increased noise levels from the JSF. Increased noise levels are associated with departure and approach lanes for the JSF at Eglin Main, Duke Field, and Choctaw Field as well as under several special use airspace units; anticipated noise levels have the potential to result annoyance and health issues in underlying noise-sensitive areas. Of particular concern are increases in noise levels in noise sensitive areas near Eglin Main and beneath certain special use airspace units to greater than 75 dB DNL. In areas of noise greater than 75 dB DNL the potential for hearing damage increases. The degree of hearing damage risk is related to the amount of time exposed to the anticipated high noise levels, based on long-term exposure and assuming daily exposure for five days a week for a period of 20 to 40 years.
- **Solid Waste** – under the combined components, the generation rates associated with C&D waste would result in adverse impacts associated with disposal capacity at individual landfills within the ROI. Although sufficient capacity appears to exist based upon the life expectancy of landfills within the area, the increase in debris requiring disposal during the relatively short construction timeframe(s) (e.g., 3 to 4 years) may be perceived by the public as an adverse impact in the event a single landfill was utilized for disposal of all wastes associated with the combined actions.

2.10 MITIGATION AND MANAGEMENT MEASURES

Specified mitigation measures have been identified and will be carried forward in implementing the selected actions as defined in the ROD. Some impacts have been mitigated by attempting to avoid them by incorporating impact avoidance measures into the design of the alternatives carried forward. These impact avoidance measures are primarily discussed in Chapter 2. Chapters 4, 5, 6, and 7 include mitigative type measures required by regulation or agency guidance for each relevant resource.

For those resource areas where potential impacts are not mitigated by avoidance (i.e., through project design), proposed mitigation measures are summarized in this section.

2.10.1 Defining a Mitigation Measure

The mitigation measures discussed in an EIS cover a range of issues generally addressing mitigation measures applied in the design of reasonable alternatives (i.e., mitigation by avoidance) or address mitigations not included in the design, but applied after the impact analysis. Mitigation measures are considered even for impacts that, by

themselves, would not be considered "adverse." The Eglin AFB BRAC 2005 proposal is considered as a whole to address specific effects on the environment (regardless of the level of the impacts), and mitigation measures are developed where it is feasible to do so. Mitigations already in place for water and ground training are described in Chapter 4 (Section 4.11.1.2, Environmental Consequences for 7SFG(A) Cantonment Alternative 1 in the Water Resources' *Permits/Plans* and *Potential Mitigations* subsections).

CEQ regulations (at 40 CFR 1508.20) define mitigation in the following five ways:

1. **Avoiding** the impact altogether by not taking a certain action or parts of an action.
2. **Minimizing** impacts by limiting the degree or magnitude of the action, and its implementation.
3. **Rectifying** the impact by repairing, rehabilitating, or restoring the affected environment.
4. **Reducing or eliminating** the impact over time by preservation and maintenance operations during the life of the action.
5. **Compensating** for the impact by replacing or providing substitute resources or environments.

During the initial development of this project, mitigation and management measures were included in the design parameters. This meant that avoiding, minimizing, or reducing potential impacts was a priority guiding the development of alternatives. These mitigation and management measures, which are incorporated into the overall design of the alternatives, include BMPs.

A mitigation plan will be developed in accordance with 32 CFR 989.22(d). The mitigation plan will be developed to address specific mitigations that the proponents of various actions will be required to implement. The mitigation plan, for example, will also include a Storm Water Pollution Prevention Plan (SWPPP) and a Spill Prevention, Control, and Countermeasures Plan. These plans are in addition to and complement any permits that may be issued to implement BRAC actions at Eglin AFB.

2.10.2 Resource-Specific Measures Proposed to Reduce the Potential for Environmental Impacts

Table 2-33 identifies proposed measures to reduce the potential for environmental impacts. The table presents the measures by resource area and alternative.

Table 2-33. Potential Mitigation or Management Measures

Resource Area/Alternative	Mitigations or Management Measures
Airspace	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5 JSF IJTS Alternative 1 JSF IJTS Alternative 2	No Mitigations
JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	Enhanced scheduling procedures, improved command and control, enhanced airport traffic control procedures, expanded operational hours would reduce congestion and would reduce delays and provide other beneficial effects. A regional airspace study would evaluate all military and civilian requirements, would concentrate primarily on SUA, and would determine the most efficient way to utilize airspace within 150 nautical miles of Eglin. Implementation of the results of the study would alleviate congestion.
Noise	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5 JSF IJTS Alternative 1 JSF IJTS Alternative 2	No Mitigations

Table 2-33. Potential Mitigation or Management Measures, Cont'd

Resource Area/Alternative	Mitigations or Management Measures
JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	Mitigations and management measures that have been adopted and incorporated into the flight operations include: • Restricting the number of night flights. • Use of flight simulators for some training. • No afterburner takeoffs on Runway 01. • Termination of afterburner use on takeoff as soon as possible. • Minimize operations on Runway 01/19 and maximize operations on Runway 12/30 by modifying the taxi flow with a new taxiway to Runway 30. Potential operational mitigations that are not currently applied to Alternatives 1 and 2, but that could be adopted over time as the JSF training program at Eglin matures, include: • Review arrival and departure procedures. • Review flight patterns. As more flight characteristics become known for the F-35, perform a complete review of airfield flight operations and procedures to identify additional mitigation measures for the F-35. • Periodically monitor and evaluate the JSF syllabus with more mature data to ensure that aircraft numbers and use rates would remain at the timing and frequency currently described in the EIS. • Monitor and evaluate use of all low-level routes to decrease airspace noise by modifying lowest altitudes to be flown and flight airspeed and avoiding noise sensitive areas. • Use of an aircraft other than the JSF as an adversary or chase aircraft for air-to-air training would reduce average noise levels and noise impacts near airfields and in special use airspace/military training routes. The degree to which noise levels would be reduced depends on the adversary or chase aircraft used. • Impacts to persons while they are indoors could be mitigated somewhat by addition of noise attenuation measures to homes and other structures. Eglin AFB could provide generalized information and limited technical guidance to homeowners or business owners that are interested in adding such measures to their existing or proposed structure. Noise attenuation measures can be incorporated during construction or added to existing structures. Special noise attenuation measures can provide up to 35 dB of noise level reduction. • Individual land uses could be relocated on a case-by-case basis if they cannot be adequately attenuated.

Table 2-33. Potential Mitigation or Management Measures, Cont'd

Resource Area/Alternative	Mitigations or Management Measures
Socioeconomics	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5 JSF IJTS Alternative 1 JSF IJTS Alternative 2 JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	No Mitigations
Transportation	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5	• Improvements for deficient roadways could include roadway widening or the construction/improvement of parallel roadways; CMS (congestion management system) and TSM (transportation system management) projects, which are typically smaller intersection and operational improvements that would preserve or act as minor capacity improvements; access or corridor management plans (a corridor management plan could look at access changes along the corridor); and/or transit improvements. • Several roadways could need six or more lanes. However, an improvement for six lanes or more may not be feasible for many reasons, including right-of-way availability, safety concerns, cost, environmental constraints, etc.
7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5	No Mitigations
JSF IJTS Alternative 1 JSF IJTS Alternative 2	The demand on several roadways equates to the need for six lanes or more. However, an improvement for six lanes or more may not be feasible for many reasons, including right-of-way availability, safety concerns, cost, etc. Other improvements that should be considered include CMS and TSM projects, a corridor management plan that looks at access along the corridor, and transit improvements.

Table 2-33. Potential Mitigation or Management Measures, Cont'd

Resource Area/Alternative	Mitigations or Management Measures
JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	No Mitigations
Utilities	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5	During Eglin's CUP renewal process, the Northwest Florida Water Management District (NWFWMD) required the identification of industrial uses of the Floridan Aquifer in the attempt to gradually reduce industrial uses of potable water (Jordan, 2006). As part of this process, the vehicle wash platform may be required to draw water from the Sand and Gravel Aquifer rather than the Floridan Aquifer. One issue related to drawing water from the Sand and Gravel Aquifer is the potentially high level of metals in the water and the unknown corrosive effect it would have on vehicles.
7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5 JSF IJTS Alternative 1 JSF IJTS Alternative 2 JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	No Mitigations
Air Quality	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5 JSF IJTS Alternative 1 JSF IJTS Alternative 2	Construction activities would employ standard management measures for construction such as watering of graded areas, covering of soil stockpiles, and contour grading (if necessary), to minimize temporary generation of dust and particulate matter. This would serve to minimize air emissions associated with the elements of the Proposed Action.

Table 2-33. Potential Mitigation or Management Measures, Cont'd

Resource Area/Alternative	Mitigations or Management Measures
JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	No Mitigations
Safety	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5	As part of the construction of new munitions storage facilities, Explosive Site Plan (ESP) packages would be submitted in accordance with Air Force Manual 91-201, *Explosives Safety Standards*. Implementing procedures to ensure that guards, housekeeping, and personal protective equipment are in place; establishing programs and procedures for lockout, right-to know, confined space, hearing conservation, forklift operations, and so on; conducting employee safety orientations and performing regular safety inspections; and developing a plan of action for the correction of any identified hazards would minimize potential impacts.
7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5	No Mitigations
JSF IJTS Alternative 1 JSF IJTS Alternative 2	Safety precautions to protect the public in areas surrounding the work sites would include adequate measures to restrict access, minimization of hazards associated with the construction sites/activities, and proper handling and disposal of hazardous materials. Such mitigation measures would offset the potential for construction-related impacts to any age group, including children.
JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	No Mitigations
Solid Waste	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3	No Mitigations

Table 2-33. Potential Mitigation or Management Measures, Cont'd

Resource Area/Alternative	Mitigations or Management Measures
7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5 JSF IJTS Alternative 1 JSF IJTS Alternative 2 JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	
Hazardous Materials	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5 JSF IJTS Alternative 1 JSF IJTS Alternative 2 JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	No Mitigations
Physical Resources	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5	To minimize the potential for impacts to groundwater, wetlands floodplains, and other surface water resources in interstitial areas, the following management requirements would be employed: • Do not extract over 500 gallons of water per day from the streams for any reason. • Do not alter natural flow patterns of streams by diverting water, causing siltation, or damming any portion of the stream or its tributaries. • Wheeled vehicles must keep to existing trails/roads, except for missions that have been approved for off-road vehicle use. • Vehicles and equipment must stay a minimum of 50 meters (164 feet) from the edge of slopes leading down to streams. • For permitted off-road vehicle use: Do not drive vehicles in or across streams except at designated

Table 2-33. Potential Mitigation or Management Measures, Cont'd

Resource Area/Alternative	Mitigations or Management Measures
JSF IJTS Alternative 1 JSF IJTS Alternative 2 JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	crossing points. • All trenches must be filled immediately after use. • Tree clearing of any species is not permitted. • Install and maintain entrenched silt fencing and hay bales along the perimeter of the construction site prior to any ground-disturbing activities and maintain them in effective, operating condition prior to, during, and throughout the entire construction process to prevent fill material, pollutants and runoff from entering wetlands or other surface waters. • Incorporate a monitoring plan, especially after rain events, to observe the effectiveness of silt fencing, hay bales, and/or other erosion and sedimentation control devices and address modification as needed. Any failures would be carefully examined and corrected to prevent reoccurrence. • Sequence construction activities to limit the soil exposure for long periods of time. • Vegetate cleared/disturbed areas with native vegetation and grasses or mulch when the final grade is established to reduce/prevent erosion. • Where applicable, reduce erosion using rough grade slopes or terrace slopes. • Identify areas of existing vegetation that the proponent would retain and not disturb by construction activities. • Chemicals, cements, solvents, paints, or other potential water pollutants would be stored in locations where they cannot cause runoff pollution. • Any repairs, maintenance, and use of construction equipment (i.e., cement mixers) would take place in designated "staging areas" designed to contain any chemicals, solvents, or toxins from entering surface waters. • Stabilize construction site entrance using Florida Department of Transportation (FDOT)-approved stone and geotextile (fiber fabric). • Incorporate 10-year storm events into the design of facilities. • Do not utilize septic tanks. • Equip all work sites with adequate waste disposal receptacles for liquid, solid, and hazardous wastes to prevent construction and demolition debris from leaving the work site. • Utilize proper site planning, low-impact design principles, and adequately engineered stormwater retention ponds (or swales) to manage stormwater (on site) and prevent discharges into nearby surface waters. The design would take into consideration the landscape of the area and physical features to determine whether a retention pond or series of swales would be used to contain runoff. In accordance with FDEP regulations, a Florida-registered Professional Engineer would design the proposed retention feature. • Incorporate into the design and construction of paved surface areas a slope sufficient enough to direct potential runoff away from wetland areas. Design and construct all drainage improvements and

Table 2-33. Potential Mitigation or Management Measures, Cont'd

Resource Area/Alternative	Mitigations or Management Measures
	related infrastructure in such a manner that the natural hydrologic conditions would not be severely altered. • Do not use wetlands and other water bodies as sediment traps. • Design open channels and outfall ditches to include plans so that they do not overflow their banks. • Where flow velocities exceed 2 cubic feet per second, provide ditch pavement or other permanent protection against scouring. Revegetate all ditches not protected with a permanent material to provide an erosion resistant embankment. • Treat runoff from parking lots to remove oil and sediment before it enters receiving waters. • Provide all construction personnel with proper training regarding all management techniques.
Biological Resources	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5 JSF IJTS Alternative 1 JSF IJTS Alternative 2	There are existing operating constraints based on current agreements with the USFWS for threatened and endangered (T&E) species protection. Additionally, all Terms and Conditions resulting from the current BRAC Section 7 consultation with the USFWS will be implemented. • Immediately prior to clearing, conduct surveys for gopher tortoises and indigo snakes. If any animals are found, apply to the FWC for a relocation permit, and relocate these animals to another area on Eglin according to FWC guidelines. • Provide project personnel with a description of the eastern indigo snake, including information on its behaviors, its protection under federal law, and instructions not to injure, harm, or kill this species. • Direct personnel to cease any activities if a black bear, indigo snake, or gopher tortoise is sighted and allow the animal sufficient time to move away from the site on its own before resuming any activities. Immediately contact Eglin's Natural Resources Section. • Restrict vehicles within the MSA to established roads and paved areas. • Maintain at least a 100-foot vegetated buffer along the Okaloosa darter stream at the MSA. • Utilize erosion control measures such as silt fencing near the Okaloosa darter stream at the MSA. • To reduce potential seed sources, treat areas with known invasive nonnative species problems. • To avoid spreading invasive nonnative species, do not drive vehicles in areas with known invasive nonnative species problems. If a vehicle is driven in such an infested area, clean the vehicle before it is driven to a noninfested area. • Use only native plants for landscaping.

Table 2-33. Potential Mitigation or Management Measures, Cont'd

Resource Area/Alternative	Mitigations or Management Measures
JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	● Restrict low-level aircraft flights within 1,000 feet (vertically) of the eagle nest on Eglin Main Base during the breeding season (1 October to 15 May). ● Develop wildfire operational plans with Eglin's Natural Resources Section to identify high wildfire risk conditions and notification procedures that units would follow to engage fire response personnel when needed. ● Follow Eglin's Wildfire Specific Action Guide Restrictions (U.S. Air Force, 2006n).
Cultural Resources	
7SFG(A) Cantonment Alternative 1 7SFG(A) Cantonment Alternative 2 7SFG(A) Cantonment Alternative 3 7SFG(A) Cantonment Alternative 4 7SFG(A) Cantonment Alternative 5 7SFG(A) Range Alternative 1 7SFG(A) Range Alternative 2 7SFG(A) Range Alternative 3 7SFG(A) Range Alternative 4 7SFG(A) Range Alternative 5	The Air Force would incorporate protection or mitigation measures provided through a NHPA Section 106 project-specific programmatic agreement (refer to Appendix F); which generally includes the following: • Use highly visible avoidance measures, such as flags, signage, or removable barriers, around the recorded limits of cultural sites. • Map the location of all archaeological sites and historic buildings and describe avoidance measures for each. • Coordinate with user groups to communicate the importance of protecting cultural resources and how to identify and avoid impacting them. • Data recovery, architectural treatment, or alternative mitigation methods conducted by a qualified individual and coordinated with the SHPO.
JSF IJTS Alternative 1 JSF IJTS Alternative 2 JSF Flight Training Alternative 1 JSF Flight Training Alternative 2	The Air Force would incorporate protection or mitigation measures provided through a NHPA Section 106 project-specific programmatic agreement (refer to Appendix F); which generally includes the following: • Address anticipated adverse effects of demolition by updating appropriate forms, compiling electronic photos and blueprints, and communicating with the public. • Accomplish all demolition using qualified individuals and coordinate directly with the SHPO. • Avoid and preserve in-place, whenever possible, all archaeological sites that are either determined to be or potentially NHRP-eligible, or follow the appropriate stipulations and procedures to resolve adverse effects. • If, as a result of aircraft noise, Eglin proposes to change the use of buildings that contribute to or are eligible NHRP structures, determine whether the structure serves its historic purpose and whether the use is important to its significance. If both criteria are met, consult with SHPO and possibly enter into a Memorandum of Agreement regarding treatment of adverse effect.

2.10.3 Unavoidable Impacts

Some of the BRAC 2005 activities are projected to result in disturbance and/or noise within areas not previously or recently subject to these effects. To the extent possible, mitigation measures, such as those identified in Section 2.10.2, would be applied to reduce potential effects to acceptable levels. However, some impacts that cannot be mitigated would occur. Some of these impacts could be considered adverse or annoying to individuals potentially affected.

Potential impacts that could occur and cannot be mitigated include the following:

- Receptors (people, animals, and structures) beneath SUA would experience louder overflights than they have in the past. Overflights would also be more frequent. This increase in frequency and intensity of noise is expected to lead to increased annoyance.
- A number of noise-sensitive receptors near Eglin Main and Duke would be exposed to time-averaged noise levels (DNL) higher than are recommended per DoD compatible land use guidelines. Mitigation of interior noise at certain DoD facilities is possible, but it would be expensive and/or impossible to mitigate certain other facilities. The DoD is only currently authorized to fund on-base facility noise attenuation. Impacts would include annoyance and activity interruption.
- Noise from flight training operations in the MTRs, MOAs, and Eglin Main, Duke Field, and Choctaw Field would have the potential to have a disproportionate adverse impact on affected minority and low-income populations. These flight operations would also have the potential to present a special risk to children as there are several schools and daycares that would be affected by these noise levels. Outdoor noise from overflights can typically only be mitigated through operational changes. All land uses have some outdoor component. The increased noise levels will result in a large increase in the numbers of highly annoyed persons and an impact on children's learning.
- The number of high-explosives munitions noise events would increase. Some off-range areas would experience higher noise levels associated with munitions use.
- The existing capacity of regional landfills would be reduced due to the solid waste generated.
- JSF flight training would result in increased airspace congestion resulting in delays in commercial and military departures and arrivals.
- Hazardous and nonhazardous waste would be generated as a result of maintenance functions associated with new training units on the base.

- Munitions fragments and metallic residues would be generated and deposited on the Range as a result of training missions.
- Interstitial areas (including those on SRI) would receive some impacts from ground training to biological resources.
- Noise from low-level training overflights and munitions would increase and be heard by wildlife and sensitive species.
- The ability to conduct prescribed burns would decrease, resulting in habitat degradation.
- Land clearing would result in a reduction in forested areas.
- Individual species would be affected by land clearing, construction, daily cantonment operations, ground operations, air operations, water operations, munitions use, and pyrotechnics use.
- Stormwater runoff and associated erosion would increase due to construction.
- Public access to portions of the Eglin Range for outdoor recreation would be eliminated.
- A number of roadway segments would deteriorate further.
- Air quality emissions would increase temporarily during construction.
- There is potential for an increase in the number of bird-aircraft strikes and aircraft mishaps resulting from the increase number of annual sorties for all aircraft at the base.

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3. DEFINITION OF AFFECTED RESOURCES

Chapter 3 provides information regarding the environmental resources identified during the scoping process as important and, therefore, analyzed in this Environmental Impact Statement (EIS). Each resource is defined, the potentially affected Region of Influence (ROI) is discussed, the methodology for analysis is described, and relevant regulatory requirements are noted. The methodology addresses both the context of the environmental resource and the intensity of potential consequence to the resource resulting from the Proposed Action.

In some cases, the affected resource has existing conditions that remain constant across all four components of the Proposed Action. In those cases, the resource's ROI is described here in Chapter 3. In other cases, potentially affected resources vary among the components of the Proposed Action and alternatives. In those cases, the applicable existing conditions are described within the resource sections in Chapters 4 through 7. The appendices included in this EIS provide more technical methodology data and explanation for relevant environmental resources, as needed.

3.1 AIRSPACE

3.1.1 Definition

There are two categories of airspace or airspace areas, regulatory (which are designated through rulemaking) and nonregulatory (nonrulemaking). Regulatory airspace contains Class A, B, C, D, and E airspace areas, restricted and prohibited areas while nonregulatory airspace contains military operating areas (MOAs), warning areas, alert areas, and controlled firing areas. Within these two categories (regulatory and nonregulatory), there are four types of airspace: Controlled, Special Use, Other, and Uncontrolled airspace. The categories and types of airspace are dictated by: (1) the complexity or density of aircraft movements; (2) the nature of the operations conducted within the airspace; (3) the level of safety required; and (4) the national and public interest (Federal Aviation Administration [FAA], 2006b).

Special Use Airspace identified for military and other governmental activities is charted and published by the National Aeronautical Charting Office in accordance with FAA Order 7400.2 and other applicable regulations and orders.

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the United States and its territories. "Navigable airspace" is airspace above the minimum altitudes of flight prescribed by regulations under USC Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the takeoff and landing of aircraft (49 USC 40102). Congress has charged the FAA with responsibility for developing plans and

policy for the use of the navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircrafts and their efficient use (49 USC 40103(b); FAA Order 7400.2 2000).

Terminology associated with the description and assessment of this resource is defined in Table 3-1.

Table 3-1. Airspace Terminology

Term	Definition
Visual Flight Rules (VFR)	A standard set of rules that all pilots, both civilian and military, must follow when not operating under instrument flight rules and in visual meteorological conditions. These rules require that pilots remain clear of clouds and avoid other aircraft.
Instrument Flight Rules (IFR)	A standard set of rules that all pilots, civilian and military, must follow when operating under flight conditions that are more stringent than visual flight rules. These conditions include operating an aircraft in clouds, operating above certain altitudes prescribed by Federal Aviation Administration (FAA) regulations, and operating in some locations like major civilian airports. Air traffic control agencies ensure separation of all aircraft operating under IFR.
Above Ground Level (AGL)	Altitude expressed in feet measured above the ground surface.
Mean Sea Level (MSL)	Altitude expressed in feet measured above average sea level.
Flight Level (FL)	Airspace altitude, measured by a standard altimeter setting, designating altitudes above 18,000 feet above MSL.
Air Traffic Control (ATC)	The system used to safely direct aircraft in flight, using radar and controllers from both the FAA and the military.
Air Route Traffic Control Center	FAA-designated air traffic control centers that provide air traffic service to aircraft operating on IFR flight plans within controlled airspace, principally during the en route phase of flight.
Ceiling	The distance between the ground and the lowest cloud layer that covers more than half the sky.

3.1.2 Region of Influence and Existing Conditions

The regional airspace is a national treasure, which has no shared strategic plan that integrates all of the military and civilian requirements. Several independent studies reveal the challenges presented by the regional airspace utilization and congestion are growing due to changes and interactions among both military and civilian requirements (Committee on the Sustainable Emerald Coast, 2008). The airspace in Northwest Florida Region is heavily used by a number of military, commercial, and general aviation interests.

Restricted areas (R-2914/15/18/19) are primarily used by the 46th Test Wing (46 TW), 16th Special Operations Wing (16 SOW), 33 FW, and 53rd Wing (53 WG) for extensive multi-use air-to-surface, surface-to-air, ground detonations, and test and evaluation activities.

Warning Area W-151 is principally used by the 33 FW, 16 SOW, and 46 TW for broad multi-use air-to-air, air-to-surface, and surface-to-air training activities, aircraft flying activities, and test and evaluation activities.

Warning Area W-470 is used mainly by the 325 FW located at Tyndall AFB for training jet pilots in the F-15 and F-22 aircraft. The 53 WG also uses W-470 for multi-use air-to-air, air-to-surface, and surface-to-air training activities, aircraft flying activities, and test and evaluation activities. The Air Combat Maneuvering Instrumentation (ACMI) utilized in scoring pilot efficiency is located in this area. W-155 is managed by NASP and is used primarily by the Navy for pilot training and is used on occasion by training and test missions out of Eglin AFB. W-453 is managed by MS ANG and is used predominantly for ANG training. The area is also used on occasion by the Navy at Pensacola and units from Eglin AFB.

The Tyndall MOAs are predominantly used by the 325 FW. These MOAs are scheduled by Tyndall AFB. Each affected airspace unit is depicted in Chapter 1 (Figure 1-3, Department of Defense Airspace). Table 3-2 provides details regarding the existing airspace for the Eglin Range.

Approximately 107,000 air operations are conducted annually in the airspace environment currently. The 33 FW uses the W-151 airspace for more than 80 percent of current sortie operations.

Table 3-2. Eglin AFB Existing Airspace

Airspace Type	Name	Airspace Floor	Airspace Ceiling	Type of Exercise	Baseline (2005)	
					F-15s from 33 FW	Other Aircraft
Restricted Area	R-2914A	Surface	Unlimited	Air-to-Ground	1,552	6,772
	R-2914B	8,500 feet AGL	Unlimited	Air-to-Ground	11	302
	R-2915A	Surface	Unlimited	Air-to-Ground	770	24,439
	R-2915B	Surface	Unlimited	Air-to-Ground	66	1,929
	R-2915C	8,500 feet AGL	Unlimited	Air-to-Ground	66	1,135
	R-2919A	Surface	Unlimited	Air-to-Ground	66	704
	R-2919B	8,500 feet AGL	Unlimited	Air-to-Ground	66	428

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Table 3-2. Eglin AFB Existing Airspace, Cont'd

Airspace Type	Name	Airspace Floor	Airspace Ceiling	Type of Exercise	Baseline (2005)	
					F-15s from 33 FW	Other Aircraft
Military Operating Area	Eglin A	1,000 feet AGL	18,000 feet above MSL (1)	Air-to-Air, Air-to-Ground	0	629
	Eglin C	1,000 feet AGL	18,000 feet above MSL (1)	Air-to-Air, Air-to-Ground	0	264
	Tyndall C/D/E/F	300 feet AGL	6,000 feet AGL	Air-to-Air, Air-to-Ground	30	4,094
Warning Area	W-151A	Surface	Unlimited	Air-to-Air	8,267	3,543
	W-151B	Surface	Unlimited	Air-to-Air	7,619	3,265
	W-151C	Surface	Unlimited	Air-to-Air	8,523	3,653
	W-151D	Surface	Unlimited	Air-to-Air	7,525	3,225
	W-151E	Surface	Unlimited	Air-to-Air	5,898	2,528
	W-151F	Surface	Unlimited	Air-to-Air	5,710	2,447
Military Training Route	VR-1082	Surface (2)	1,500 feet AGL	Low Altitude Training	0	173
	VR-1085	Surface (2)	1,500 feet AGL	Low Altitude Training	0	73

3.1.3 Analysis Methodology

The potential effects of the alternatives on the airspace environment were assessed by considering the changes in airspace utilization that would result from the implementation of the alternatives. This assessment considered compliance with Air Force Instruction (AFI) 13-201 (*Air Force Airspace Management*) and supplements thereto, as well as measures that could minimize potential impacts on other regional air traffic and the Air Traffic Control (ATC) system.

For airspace impacts associated with the various proposed base realignment and closure (BRAC) actions, significance is determined based on the extent, context, and intensity of the impact in relation to the relevant regulations, guidelines, and scientific documentation. This EIS identifies the existing airspace used and quantifies the change in use associated with the F-35 beddown. Numbers of aircraft and potential congestion impact airspace management in the form of flight safety, inefficient movement of aircraft, increased restrictions, and additional controller workloads.

3.1.4 Laws and Regulations

The U.S. Air Force manages airspace in accordance with processes and procedures detailed in AFI 13-201, *Air Force Airspace Management*. AFI 13-201 implements Air Force Planning Document 13-2, Air Traffic Control, Airspace, Airfield, and Range Management, and Department of Defense (DoD) Directive 5030.19, *DoD Responsibilities*

on Federal Aviation and National Airspace System Matters. The AFI 13-201 addresses the development and processing of Special Use Airspace and covers aeronautical matters governing the efficient planning, acquisition, use, and management of airspace required to support Air Force flight operations. In addition to the above-referenced AFIs, the Air Force utilizes FAA Order 7110.65R, *Air Traffic Control*, and FAA Order 7610.4, *Memorandum of Agreement between Department of the Air Force and Federal Aviation Administration on Safety for Space Transportation and Range Activities*.

3.2 NOISE

This EIS analyzes the impacts of noise resulting from aircraft operations, construction activities, high-explosive munitions use, and the firing of small arms.

3.2.1 Definition

Noise is defined as any unwanted sound. Defining characteristics of noise include sound level (amplitude), frequency (pitch), and duration. Each of these characteristics plays a role in determining the intrusiveness and level of impact of the noise on a noise receptor. The term *noise receptor* is used in this document to mean any person, animal, or object that hears or is affected by noise.

Sound levels are measured on a logarithmic decibel (dB) scale, reflecting the relative way in which differences in sound energy levels are perceived. A sound level that is 10 dB higher than another would normally be perceived as twice as loud while a sound level that is 20 dB higher than another would be perceived as four times as loud. Under laboratory conditions, a person with normal hearing can detect a change in sound level as small as 1 dB. Under most nonlaboratory conditions, the people will notice changes in sound level of approximately 3 dB.

Sound measurement may be further refined through the use of frequency "weighting." A typical healthy human can detect sounds that range in frequency from about 20 hertz (Hz) to 20,000 Hz (Federal Interagency Committee on Noise [FICON], 1992). However, all sounds throughout this range are not heard equally well. In "A-weighted" measurements, the frequencies in the 1,000 to 4,000 Hz range are emphasized because these are the frequencies to which human hearing is most sensitive. Sound level measurements weighted in this way are termed *A-weighted decibels* (dBA). In the case of sonic booms, blast noise, and other impulsive "booming" noises, sound is felt as well as heard. With these types of noise, overpressure may be considered more annoying than the sound itself. For this reason, impulsive sounds are measured using "C-weighting," which does not attenuate the lower frequencies to the extent that A-weighting does. Sound level measurements weighted in this way are termed *C-weighted decibels* (dBC). Unless otherwise noted, all sound levels referenced in this EIS can be assumed to be A-weighted.

Typically, the sound level at any given location changes constantly. For example, the sound level changes continuously when an aircraft flies by, starting at the ambient (background) level, increasing to a maximum when the aircraft passes closest to the receptor, and then decreasing to ambient levels when the aircraft flies into the distance. The term *Maximum Sound Level*, or "L_{max}" represents the sound level at its greatest level during an aircraft overflight when sound is at its maximum.

Because munitions noise levels are so strongly influenced by meteorological conditions (e.g., winds), the peak noise level reaching a particular location after a particular noise event may vary significantly. The metric "Peak Noise Exceeded by 15 Percent of Firing Events" (PK 15[met]) accounts for weather-influenced statistical variation in received single-event peak noise levels. PK 15(met) is the peak noise level, without frequency weighting, expected to be exceeded by 15 percent of all firing events. Because this value is based on probability and actual noise levels would vary higher and lower, it cannot be directly measured in the field. If multiple weapon types are fired from one location, or from multiple firing locations, the reported PK_{15}(met) level would be based on the loudest weapon type at the closest location. The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) recommends this metric as a supplement to time-averaged noise levels when discussing impulsive noise (USACHPPM, 2005).

Because both the duration and frequency of noise events also play a role in determining overall noise impact, several metrics are used that account for these factors. Each metric discussed below is used in the assessment of noise impacts in this EIS. A more thorough discussion of these metrics can be found in Appendix E, *Noise*:

- Sound Exposure Level (SEL) accounts for both the maximum sound level and the length of time a sound lasts. SEL does not directly represent the sound level heard at any given time. Rather, it provides a measure of the total sound exposure for an entire event compressed into one second. This metric is useful for comparing fast-moving and slow-moving aircraft and is a good predictor of several noise impacts including sleep disturbance and speech interference.
- Day-Night Average Sound Level (DNL) represents aircraft noise level averaged over a 24-hour period with a 10 dB penalty to flights occurring between 10:00 PM and 7:00 AM to account for the added intrusiveness of noise during these hours. It is important to recognize that the DNL metric does not represent the noise heard at any single point in time, but rather a weighted average level of noise events that occur over the course of a day. The DNL metric has been endorsed by several federal agencies as being the best descriptor of general noise conditions in the vicinity of airfields (U.S. Environmental Protection Agency [USEPA], 1974; FICUN, 1980).

- C-Weighted Decibel Day-Night Sound Level (CDNL) is the 24-hour day-night averaged C-weighted sound level computed for areas subjected to sonic booms and blasts from high explosives. Use of the C-weighted scale accounts for the dominance of low-frequency components of these types of sounds.
- Onset-Rate Adjusted Monthly Day-Night Average Sound Level (DNL_{mr}) is the measure used for subsonic aircraft noise in military airspace (ranges, military training routes (MTRs), MOAs, or warning areas). This metric accounts for the fact that when military aircraft fly low and fast, the sound can rise from the ambient level to its maximum very quickly. Known as an onset-rate, this effect can make noise seem louder due to added "startle" effects. Penalties of up to 11 dB are added to account for this onset-rate.

Effects of Noise

Annoyance, speech interference, sleep interference, human health impacts, structural damage, and wildlife impacts have all been associated with noise. In this document, the "Noise" section of each chapter addresses general noise impacts on humans and structures, while subsequent sections discuss the impacts of noise on land use, environmental justice, biological resources, and cultural resources. Appendix E, *Noise*, provides additional detail regarding noise metrics, analysis methodology, and impacts.

Annoyance is the most common effect of aircraft noise on humans. Aircraft noise often interferes with activities such as conversation, watching television, using a telephone, listening to the radio, and sleeping. This interference often contributes to individuals becoming annoyed. Whether or not an individual becomes annoyed by a particular noise is highly dependent on emotional and situational variables of the listener as well as the physical properties of the noise (FAA, 1985). However, when assessed over long periods of time and with large groups of people, a strong correlation exists between the percentage of people highly annoyed by noise and the time-averaged noise exposure level in an area (Schultz, 1978; Finegold et al., 1994). This finding is based on surveys of groups of people exposed to various intensities of transportation noise. A generalized categorization of noise-induced annoyance can be found in Table 3-3. As discussed earlier in this section, DNL (A-weighted) is used to assess noise for which audible sound is the major concern (e.g., subsonic aircraft noise, small-arms fire). CDNL (C-weighted) is used to assess noise in which vibration and low-frequency components are a major concern (e.g., sonic booms, high-explosive munitions noise).

Table 3-3. Relationship Between Noise Level and Percent of Population Highly Annoyed

Criteria	Noise Level		
A-Weighted Average Noise Levels (Continuous Noise)	< 65 dB	65–75 dB	> 75 dB
C-Weighted Average Noise Levels (Impulsive Noise)	< 62 dBC	62–70 dBC	>70 dBC
Unweighted Peak Noise Levels (Small Arms Noise)	≤87 dBP	87-104 dBP	>104 dBP
Percent of Population Highly Annoyed	< 15%	15%–39%	>39%

Source: USACHPPM, 2005; U.S. Army, 1997
< = less than; > = greater than; dB = decibels; dBC = C-weighted decibels
Note: The primary noise metric used by the U.S. Army to describe small-arms noise is PK_{15}(met)

The USEPA has recommended that noise level in sleeping areas be less than 45 dB DNL (USEPA, 1974). As modern homes typically provide an exterior-interior noise level reduction of greater than 20 dB (U.S. Navy, 2005), residential areas in areas where noise is higher than 65 dB DNL are assumed to not meet this recommendation. Studies indicate a tendency for humans to habituate to regularly occurring nighttime noise over time, eventually reducing susceptibility to noise-induced sleep disturbance (Fidell et al., 1995; Pearsons et al., 1995; Kryter, 1984).

The USEPA recommends that, to protect public health with an adequate margin of safety, exterior noise levels should not exceed 55 dB DNL and interior noise levels should not exceed 45 dB DNL in noise-sensitive locations (USEPA, 1974). The Federal Interagency Committee on Urban Noise (FICUN) took these recommendations into consideration when developing its recommendations on compatibility of land uses with noise (FICUN, 1980). These recommendations have been adopted, with minor modifications, by the Department of Defense (DoDI 4165.57).

Noise is generally viewed as being one of a number of general biological stressors. Some studies have indicated that excessive exposure to intense noise might contribute to the development and aggravation of stress-related conditions such as high blood pressure, coronary disease, ulcers, colitis, and migraine headaches. Other studies have found no correlation between noise and various health conditions. Non-auditory health effects of noise are not well established at this time, but are likely only experienced at extremely high noise levels (USEPA, 1981).

A considerable amount of data on noise-related hearing loss have been collected and analyzed. For example, it has been established that eight hours of continuous exposure to 85 dB increases the risk for potential permanent hearing loss over a 40-year period (USEPA, 1974). The National Academy of Sciences Committee on Hearing, Bioacoustics, and Biomechanics (CHABA) identified 75 dB DNL as the minimum level

at which hearing loss may occur (CHABA, 1977). However, it is important to note that CHABA assumed long-term exposure (40 years) before hearing loss would occur. The U.S. Army has established a peak noise level of 140 dB as the threshold above which a temporary threshold shift (measured as increase in lowest level at which a sound is audible) may occur (USACHPPM, 2005).

The DoD, U.S. Air Force, and the National Institute of Occupational Safety and Health (NIOSH) all have established occupational noise exposure damage risk criteria (or "standard") for hearing loss based upon not exceeding 85 dB as an 8-hour time weighted average, with a 3 dB exchange rate in a work environment. (The exchange rate is an increment of decibels that requires the halving of exposure time, or a decrement of decibels that requires the doubling of exposure time. For example, a 3 dB exchange rate requires that noise exposure time be halved for each 3 dB increase in noise level. Therefore, an individual would achieve the limit for risk criteria at 88 dB, for a time period of 4 hours, and at 91 dB, for a time period of 2 hours.) The standard assumes "quiet" (where an individual remains in an environment with noise levels less than 72 dB) for the balance of the 24-hour period. Also, Air Force and Occupational Safety and Health Administration (OSHA) occupational standards prohibit any unprotected worker exposure to continuous (i.e., of a duration greater than one second) noise exceeding a 115 dB sound level . OSHA established this additional standard to reduce the risk of workers developing noise-induced hearing loss.

Sonic booms and other impulsive noises have the potential to damage structures in addition to causing annoyance. The probability of damage has been linked to the peak overpressure of the boom. At a peak, unweighted noise level of 128 dB, the probability of a window in good condition breaking ranges from 1 in 100,000 to 1 in 100 million, depending on the type of glass and other situation-specific factors (Haber and Nakaki, 1989). The probability of breakage increases dramatically if the window is cracked before the impulsive noise occurs. The probability of damage to plaster at this same overpressure ranges between 1 in 1,000 to 1 in 10 million depending on the strength of the wall, as quantified by static failure pressure in psf. Plaster failure may also occur as a result of sonic booms. Both glass and plaster failure probabilities are highly dependent on the condition of the structure at the time of the overpressure event.

3.2.2 Region of Influence and Existing Conditions

The extent of the ROI is specific to the action being discussed and would vary from one alternative to another. The ROI for Joint Strike Fighter (JSF) aircraft noise includes all areas beneath special use airspace proposed to be used by the JSF including Ranges, warning areas, MOAs, and MTRs. JSF munitions noise would impact areas near proposed targets located at or near Test Areas (TAs) B-82 and C-52. Noise associated with the 7th Special Forces Group (Airborne), or 7SFG(A), would affect areas

surrounding proposed firing ranges and, to a lesser extent, areas used for troop/vehicle maneuvers training. Areas near proposed construction, renovation, and demolition would be temporarily impacted while those proposed projects were underway.

Because the region of influence would be different depending on the action and the alternative being discussed, existing noise conditions in the regions of influence will be discussed for each action and alternative.

3.2.3 Analysis Methodology

This section briefly describes the methods used to assess noise impacts associated with the noise generated during the proposed training. Information needed for modeling aircraft noise was gathered from pilots, air traffic controllers, aircraft maintainers, and other sources in accordance with standard data collection procedures. Data required munitions noise modeling was gathered from range operators and users. For all analyses, best available information was used as required by NEPA.

For all types of noise impacts associated with the various proposed BRAC actions, significance is determined based on the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation.

Subsonic Aircraft Noise

DoD noise modeling software was used to predict noise levels associated with the Proposed Action. NOISEMAP (Version 7.0) software was used to predict noise levels in the vicinity of runways. NOISEMAP applies air operations to flight tracks and flight profiles that are representative of flying operations at the installation. NOISEMAP also accounts for ground operations by aircraft, including maintenance engine power runups. MR_NMAP software was used to predict noise beneath military airspace units. MR_NMAP allows modeling of air operations that are dispersed through a volume of airspace (Lucas and Calamia, 1996). Both programs were used in accordance with standard procedures for this type of assessment. NOISEMAP was run incorporating effects of topography. These effects include different sound propagation over acoustically “hard” surfaces, such as water, and acoustically “soft” surfaces, such as the majority of land areas.

Aircraft noise impacts were quantified based on the number of acres of land and estimated population exposed to noise levels of 65–70, 70–75, 75–80, 80–85, and greater than 85 dB DNL. Population numbers exposed to noise levels are estimated based on 2000 U.S. Census Bureau data. The analysis includes sensitive receptors including schools, hospitals, and places of worship. The context for noise consequences is existing noise levels in the appropriate ROI.

Supersonic Aircraft Noise

The computer program BOOMAP was used to model sonic booms associated with the proposed F-35 training. BOOMAP predicts CDNL beneath military airspace units based on variables such as aircraft altitude distribution, maneuver characteristics, variation in operations numbers, and atmospheric effects. The current version of BOOMAP was developed based on extensive field measurements of sonic booms (Frampton et al., 1993; Plotkin, 1996). The existing and projected change in sonic booms is included in the noise analysis.

Construction Noise

Construction noise was evaluated using Roadway Construction Noise Model (RCNM) version 1.00, the Federal Highway Administration's standard model for the prediction of construction noise (U.S. Department of Transportation [USDOT], 2006). RCNM has the capability to model types of construction equipment that would be expected to be the dominant construction-related noise sources associated with this action. All construction noise analyses were assumed to make use of a standard set of construction equipment. Construction noise is expected be limited to normal working hours (7:00 AM to 5:00 PM). Construction noise impacts are quantified using the DNL noise metric as calculated on an average busy working day during construction.

Munitions Noise

Noise from explosive ordnance delivery is impulsive in nature. Impulsive sounds are very short, loud events. Examples of this type of noise are sonic booms, thunder, piledriving, gunfire, and explosions. Munitions-generated noise of 62 dB CDNL consists of sound at different frequencies and, in terms of human annoyance, is equivalent to aircraft noise at 65 dB DNL. The EIS quantifies the extent of area and sensitive receptors affected by munitions noise.

Munitions noise was calculated using the DoD's BNoise2 computer program. This program estimates CDNL based on the type of weapon and ammunition, the number of rounds fired, the time of day at which rounds are fired, range attributes, and the weather. The software also accounts for spectrum and directivity of both muzzle blast and projectile sonic boom (ballistic wave). Source noise levels are based on field measurements of weapons noise. Air-to-ground gunnery noise was not specifically modeled because it is much less intense than high-explosives noise, and its effects are assumed to be eclipsed by the effects of high-explosive munitions noise that occurs regularly in the same general areas.

Small-Arms Noise

Noise near proposed small arms ranges was assessed using the Army's Small Arms Noise Assessment Model (SARNAM). This model accepts firing point locations, the number of rounds fired, the types of weapons used, the type of munitions used, and the times of day at which the weapons are to be fired. Because small-arms noise is not generally associated with low-frequency-specific impacts, DNL rather than CDNL is typically used to describe it. Small-arms noise is also described using the PK 15(met) metric. As with other environmental noise discussed in this EIS, the existing condition is compared with the extent of area and sensitive receptors potentially affected by changes in small arms use.

3.2.4 Laws and Regulations

There are no specific legal limits that apply to military noise. In 1972, Congress passed the Noise Control Act, which imposed limitations on source noise levels of several types of equipment. However, because noise controls could, in some cases, reduce the combat effectiveness of military equipment, military equipment was exempted from these requirements. For the same reason, FAA limitations on civilian aircraft noise do not apply to military aircraft. The Air Force participated in the FICUN development of noise levels and land use compatibility associated with airfields. Noise impacts are defined based on published guidelines on the compatibility of various land uses with noise and published scientific documents on noise effects.

3.3 LAND USE

3.3.1 Definition

Land use generally refers to the management and use of land by people. The attributes of land use include general land use patterns, land ownership, land management plans, and special use areas. General land use patterns characterize the types of uses within a particular area. Specific uses of land typically include residential, commercial, industrial, agricultural, military, and recreational. Land use also includes areas set aside for preservation or protection of natural resources, wildlife habitat, vegetation, or unique features. Management plans, policies, ordinances, and regulations determine the types of uses that are allowable, or the types of uses that protect specially designated or environmentally sensitive uses.

3.3.2 Region of Influence and Existing Conditions

The ROI for land use includes land areas proposed for 7SFG(A) and JSF Initial Joint Training Site (IJTS) use as well as adjacent properties and land areas. This includes the

majority of Eglin AFB (Eglin Main Base and the Eglin Range) and off-base areas in Okaloosa, Santa Rosa, and Walton Counties.

The existing conditions for land use are specific to each component of the Proposed Action and associated alternatives and are described in the respective analysis chapters. The Eglin AFB General Plan (U.S. Air Force, 2001a) was used to characterize the existing land use on Eglin Main Base and at Duke Field. The Eglin Range General Plan (U.S. Air Force, 1996a) and other applicable environmental studies and reports provided information on the existing land use and management of the Eglin Range. Appendix J, *Land Use*, provides a description of the on-base land use categories potentially impacted by the components of the Proposed Action. Appendix J, *Land Use*, also identifies off-base land use categories and possible noise exposure and accident potential combinations for Eglin AFB aircraft operations. Comprehensive plans prepared by local jurisdictions provided general information and a regulatory framework for existing and future land use and development within the base vicinity. Digitized geographic information system (GIS) maps and databases were also used to determine existing land use both on and off base.

3.3.3 Analysis Methodology

A *qualitative* method was used to assess potential land use impacts. On-base impacts are based on whether the Proposed Action would result in a change to the existing land use, the degree to which the existing land use would be affected by the change, and if the change would be compatible with adjacent land uses and development. Off-base land use impacts are based primarily on the analysis of the effects of JSF flight operations and if the change in noise exposure would have an adverse impact on land use compatibility. Incompatible land use impacts that would result from noise generated from JSF IJTS operations were evaluated using the Air Installation Compatible Use Zone (AICUZ) guidelines presented in the Eglin AFB AICUZ Study (U.S. Air Force, 2006d) and Accident Potential Zone (APZ) guidelines.

The AICUZ Program is used to promote compatible land development in areas subject to aircraft noise and accident potential. The AICUZ compatible use zones include the Clear Zone (CZ), APZ I, APZ II, and four noise zones. The CZ, APZ I, and APZ II are the zones classified by the military that are located immediately off the end of the runways. These zones delineate the areas with the highest accident potential based on historical accident data. The AICUZ noise zones are defined as 65–69 dB DNL, 70–74 dB DNL, 75–79 dB DNL, and greater than 80 dB DNL.

In addition to aircraft noise considerations, ordnance usage can have land use affects because of noise or Explosive Safety Quantity Distance (ESQD) considerations. ESQD clearance zones provide safe setback areas around explosive-handling facilities and

must be considered when evaluating land use impacts. Air Force Manual 91-201, *Explosives Safety Standards*, governs the majority of explosive activities and facilities on Air Force bases. This regulation defines safe clearances for similar activities, inhabited buildings, roadways, and personal contact with explosive activities.

3.3.4 Laws and Regulations

There are no specific regulations associated with land use activities other than Air Force standards. Guidelines were generally adopted from publications such as FICUN's *Guidelines for Considering Noise in Land-Use Planning and Control* and the USDOT publication, *Standard Land Use Coding Manual*. Air Force Manual 91-201, *Explosives Safety Standards*, provides guidelines for ESQD clearance zones.

3.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.4.1 Definition of Socioeconomics

Socioeconomic resources are defined as the basic attributes associated with human activities. Of particular interest are the population characteristics; economic factors including employment and income; and public services including schools, law enforcement, and emergency services. Actions that impact these socioeconomic indicators may have effects on other socioeconomic factors such as housing availability and budgetary requirements for local governments. The context and intensity for each BRAC action are used to quantify potential consequences in this EIS.

3.4.2 Region of Influence and Existing Conditions – Socioeconomics

The ROI for the socioeconomic and environmental justice resources for all BRAC-related actions is defined as Okaloosa County, Santa Rosa County, and Walton County. Potential impacts from the BRAC actions would be concentrated within these three counties. The existing conditions for the ROI are the same for each BRAC action and associated alternatives and are consolidated into the following subsections.

Population

In 2005, the population of the ROI totaled 388,466, accounting for 2.2 percent of the total population of Florida (Table 3-4) (Office of Economic and Demographic Research, The Florida Legislature, 2005). Okaloosa County accounts for 49 percent of the total ROI population, Santa Rosa County accounts for 35 percent, and Walton County accounts for 13 percent.

Table 3-4. Population Growth by County, 2000–2030

Location	Census 2000	Estimated 2005	Projected 2030	Average Annual Change 2000–2005	Average Annual Change 2005–2030
Okaloosa County	170,498	192,665	264,260	2.5%	1.3%
Santa Rosa County	117,743	141,481	226,057	3.7%	1.9%
Walton County	40,601	54,320	98,242	6.0%	2.4%
Total ROI	328,842	388,466	588,559	3.4%	1.7%
Florida	15,982,824	17,872,296	25,898,476	2.3%	1.5%

Source: Office of Economic and Demographic Research, The Florida Legislature, 2005
ROI = Region of Influence

Housing

At the time of the 2000 Census, there were 156,795 housing units in the ROI. Between 1990 and 2000, housing in the ROI grew by 37,667 units, a growth of 2.8 percent annually. Of the total housing units in the ROI, 112,717 housing units were occupied in 2000 representing over 72 percent of the total housing supply (U.S. Census Bureau, 2000a, 2000b, 2000c).

Between 2000 and 2005, housing growth in the ROI has been primarily in single family housing units. Most of the housing development was concentrated in Okaloosa County and Santa Rosa County. The number of multi-family housing units permitted during the same time period varied widely with most of the multi-family permits being issued in Okaloosa County and Walton County. Santa Rosa County issued very few multi-family building permits.

Future housing development in Okaloosa County is likely to be concentrated in the northern portion of the county, including the city of Crestview. The southern portion of Okaloosa County is occupied by Eglin AFB, and undeveloped land is limited. The northern portion of the county is relatively rural with land available for the development of new subdivisions.

Recently, the strength of the housing market has been a concern for the U.S. as well as the state of Florida. Demand for housing increased corresponding to the decrease in interest rates and the availability of new mortgages, including adjustable rate mortgages, that allowed more people to own homes. Housing prices also increased across the country. In the state of Florida, several hurricanes between 2000 and 2006 also increased the costs of homeowners' insurance, further increasing housing prices. According to the Emerald Coast Association of Realtors Multiple Listing Service (MLS), in July 2002, a total of 563 housing units were sold, including condos and townhomes, with an average price of $212,333 and an average of 116 days on the market. In the

same month, in 2007, only 345 housing units were sold, with an average price of $338,441 with an average of 116 days on the market (Emerald Coast Association of Realtors, 2008, Multiple Listing Service Statistics 2002-2007). Another, more reliable measurement of the housing market is the median price. In 2004, the median price of a housing unit in Okaloosa County was $169,833 as compared to the median price in the U.S. of $170,800. In 2007, the median price increased to $215,900 in Okaloosa County surpassing the median price in the U.S. of $212,300 (Economic Development Council (EDC) of Okaloosa County, FL, "Okaloosa County Real Estate"). Santa Rosa County experienced a similar increase in the median price where between 2004 and 2005 the median sales price increased over 23 percent (Florida Legislature Office of Economic and Demographic Research, 2007, "Santa Rosa County Profile"). Information on the median sales price for Walton County was not available.

The rate of price increases began to slow between 2005 and 2007 when higher interest rates, increased property taxes, and increased homeowner's insurance contributed to the weakening of the housing market. While housing prices in Florida continue to increase, the increase is more gradual than that experienced at the height of the housing market. According to the Bureau of Economic and Business Research at the University of Florida, statewide the sales price of single family homes increased 9 percent between 2005 and 2006 while the price of condominiums increased only 1 percent (University of Florida Bureau of Economic and Business Research, 2007, "Florida Focus: The Housing Boom"). Sales of existing homes and condominiums also declined with sales decreasing as much as 33 percent between 2005 and 2006. Many of these changes were concentrated in the coastal areas of southeast Florida. However, in Okaloosa County, the sales of existing homes fell nearly 27 percent between 2005 and 2006.

Schools

During the 2003-2004 school year, there were 61,955 students in the ROI. Okaloosa County School District had the largest number of students with 31,006 students. Santa Rosa County School District had 24,427 students, and Walton County had 6,522 students (Table 3-5) (Florida Department of Education, 2005a).

Table 3-5. Number of Students, 2003–2004 School Year

Location	Pre-kindergarten through Grade 3	Grades 4 – 8	Grades 9 – 12	Total
Okaloosa County School District	9,211	11,942	9,853	31,006
Santa Rosa County School District	7,264	9,540	7,623	24,427
Walton County School District	2,077	2,640	1,805	6,522
Three-County ROI	18,552	24,122	19,281	61,955

Source: Florida Department of Education, 2005a
ROI = Region of Influence

Capacity is determined based on individual schools. The Florida State Constitution limits the maximum average class sizes in Florida schools to an average 18 students for classes in pre-kindergarten to third grade, 22 students for classes in fourth grade through eighth grade, and 25 students for classes in ninth grade through twelfth grade. The school districts are required to comply with this mandate by 2010. As of the 2004-2005 school year, Santa Rosa County School District and Walton County School District were not in compliance under each of the three criteria. Okaloosa County School District was in compliance with the maximum average class sizes for all grade levels.

School Finances

Schools are funded by a combination of federal, state, and local revenues. Okaloosa County School District collects approximately $206 million in revenues and has $210 million in expenditures. Santa Rosa County School District has $155 million in revenues and $156 million in expenditures, while Walton County School District has $51 million in revenues and $50 million in expenditures. The total amount of revenues collected in the ROI for the school districts is approximately $413 million, and the expenditures are approximately $416 million.

Economic Activity

Total Employment

Total employment in the ROI in 2004 was 189,469 jobs. Between 2001 and 2004, employment grew at an average annual rate of 5.0 percent. Most of the employment in the ROI is based in Okaloosa County with a total employment of 122,762, followed by Santa Rosa County with 45,277, and Walton County with 21,430 (U.S. Bureau of Economic Analysis, 2006). Okaloosa County and Santa Rosa County experienced average annual growth rates of 4.7 percent and 4.9 percent, respectively. Employment in Walton County grew at an average annual rate of 6.7 percent during the same time period.

Public Services

Public services are provided by the county and city governments in the ROI as well as other government agencies. Expenditures and revenues define the level of services that may be provided as well as specific service metrics. Changes in population would affect the demand for these services as well as the ability to fund them.

Law Enforcement

There were a total of 670 law enforcement officers in the ROI in 2005, including officers employed by police departments and sheriff departments. The number of law enforcement officers per 1,000 persons is used as an estimated indicator of the level of

service. In Okaloosa County, the local police departments and the sheriff departments have 2.3 officers per 1,000 people and 1.9 officers per 1,000 people, respectively. Santa Rosa County local police departments had 3.1 officers per 1,000 persons and sheriff departments had 1.2 officers per 1,000 persons (Florida Department of Law Enforcement, 2005). Walton County had 2.6 officers per 1,000 people for the police departments and 2.5 officers per 1,000 people for the sheriff departments (Florida Department of Law Enforcement, 2005).

Fire Protection

In 2006, the ROI had a total of 657 firefighters, including career and volunteer firefighters in the various local communities. Okaloosa County had a total of 187 career firefighters and 95 volunteer firefighters (Department of Homeland Security, U.S. Fire Administration, 2006). Santa Rosa County had 19 career firefighters and 163 volunteer firefighters (Department of Homeland Security, U.S. Fire Administration, 2006). In Walton County, there were 101 career firefighters and 92 volunteer firefighters.

Medical Services

There are 5,431 licensed medical professionals in Okaloosa County with varying specializations including primary care, pediatrics, surgery, pharmacy, and nursing (Orcutt, 2006). In Santa Rosa County, there are 4,803 licensed medical professionals, and Walton County has 1,212 licensed medical professionals (Orcutt, 2006).

3.4.3 Analysis Methodology – Socioeconomics

The socioeconomic analysis focuses on the effects resulting from the incoming personnel, which includes all JSF IJTS personnel (permanent personnel and students) and all 7SFG(A) personnel, as well as construction programs that support the Proposed Action. The incoming personnel and construction activities bring with them income and new demands for products and services into the local economy that would lead to additional population growth, more jobs, greater earnings, and increased requirements for public services. These effects are evaluated by comparing the economic effects of the proposed BRAC actions in combination with the designated No Action Alternative which includes the drawdown of the 33 FW, the President's budget drawdown, and other related actions. The net change for each socioeconomic indicator is then compared to the existing conditions in the ROI to identify the intensity of the effects.

The magnitude of these effects is estimated through economic impact analysis, which models the relationship between industrial sectors and household expenditures. The economic impact analysis was conducted by the University of West Florida's Haas Center for Business Research and Economic Development using the Impact Analysis for Planning (IMPLAN) economic forecasting model. The IMPLAN model uses spending patterns established by the U.S. Bureau of Economic Analysis and the U.S. Bureau of

Labor Statistics to establish the multiplier effect of additional spending within a specified region. In this analysis, the IMPLAN model estimates the economic effects of the incoming personnel on spending and employment in the established ROI.

The economic impact analysis separates effects into three components: direct, indirect, and induced. *Direct* effects are the additional employment and income generated directly by the expenditures of the incoming personnel. To produce the goods and services demanded by the incoming personnel, businesses, in turn, may need to purchase additional goods and services from other businesses. The employment and incomes generated by these secondary purchases would result in the *indirect* effects. *Induced* effects are the increased household spending generated from the direct and indirect effects. The total effect from the economic impact analysis is the total number of jobs created throughout the region by the direct, indirect, and induced effects. This information is used to estimate the change that would be required to maintain the current level of services in socioeconomic indicators such as local budgetary requirements and public services.

The effects of each BRAC action may be categorized into permanent and temporary effects. Permanent effects are those that would occur for every year that the incoming personnel are present in the region. Temporary effects include the effects of construction spending that would occur only until the construction is completed.

Demographic data in terms of dependents per household were obtained from Air Force and Army bases. The direct effects on population were estimated based on the demographics of incoming 7SFG(A) and JSF IJTS personnel. For the 7SFG(A), 66 percent of the 2,200 incoming personnel are assumed to be married and 52 percent have one or more children for a total of 4,981 people entering the region. For the JSF IJTS personnel it is assumed that 50 percent of the 2,326 incoming personnel are married and 30 percent have no more than two children for a total of 4,885 people entering the region.

The induced effects on population were estimated based on the number of induced jobs resulting from the incoming personnel as estimated by the economic impact analysis and the number of workers per family and the average family size for each county in the ROI from the 2000 Census. It is assumed that all of the induced population would migrate to the region from outside of the ROI.

Eglin AFB population distribution data were obtained and evaluated for choices of residence location. The population growth associated with the BRAC actions are distributed through the ROI based on the residence location of the personnel currently stationed at Eglin AFB for the 7SFG(A) actions, Alternatives 1 through 4, and the JSF IJTS, Alternatives 1 and 2, as well as the No Action Alternative. It is assumed that of the additional population, 92 percent would be located in Okaloosa County, 6 percent in

Santa Rosa County, and 2 percent in Walton County. For the 7SFG(A) action, Alternative 5, population impacts were analyzed by assuming that 80 percent of the additional population would reside in Okaloosa County and 20 percent would reside in Walton County. This assumption was made based on the proposed cantonment area being located in Walton County and the distance of the proposed cantonment area from Eglin Main Base.

Effects on schools are based on the increase in students resulting from the incoming personnel and the induced population effects. The analysis assumed that 63 percent of the children accompanying the incoming personnel are school-aged from kindergarten through twelfth grade. The children of the incoming personnel who are school-aged (kindergarten through twelfth grade) would constitute an increase in the student population. The grade level of the students was estimated based on the 2000 Census age distribution and applied to the maximum average class sizes dictated by the State of Florida to determine the number of additional classes that could be created from the additional students. The number of students in the induced population is assumed compatible to the average number of school-aged children per household in each county in the ROI from the 2000 Census. These students are distributed to Okaloosa County School District, Santa Rosa County School District, and Walton County School District based on the same distribution as the current Eglin AFB population. The direct and induced effects on the expenditures and revenues collected by the school districts were estimated using the per student expenditures and per student revenues and applying those rates to the increased number of students.

The direct and induced population effects were used to estimate changes in the revenues and expenditures collected by each county in the ROI. Using the per capita revenues and per capita expenditures for the current year, total changes were estimated by applying those rates to the population increases.

The effect of the population increases on the requirements for law enforcement, fire fighters and medical personnel were estimated in a similar manner. The ratio of current levels of personnel to population was used to provide an estimate of the number of additional personnel required to maintain the current level of services. For example, the effects of the increased population on the number of law enforcement officers were estimated using the current number of law enforcement officers per 1,000 population and applying the ratio to the additional population. To estimate the effects of the incoming personnel on the number of firefighters and medical personnel, the number of firefighters and medical personnel per capita were compared to the additional population to estimate the number of fire fighters and medical personnel required to maintain the current level of services.

Potential socioeconomic impacts have been determined by comparing the effects of the BRAC actions to the baseline conditions for each socioeconomic indicator and evaluating whether the effects would be greater than the growth typically observed in the ROI.

Effects of the proposed construction spending were estimated using the economic impact analysis to determine the direct, indirect, and induced effects. However, the required construction projects for each of the alternatives would not result in long-term impacts on the ROI but would only occur over the life of the construction projects. Construction spending generates indirect effects as a result of business-to-business interactions increasing effects on incomes and jobs. Given the nature of the construction industry and the short time frame of the construction, it is assumed that local workers would be hired from within the ROI rather than migrate to the area. Thus the construction is not projected to generally have a long-term effect on population or other population-related effects such as law enforcement or emergency services.

3.4.4 Laws and Regulations – Socioeconomics

There are no specific regulations that govern socioeconomic aspects such as employment, population, or public services.

3.4.5 Definition of Environmental Justice and Special Risks to Children

Concern that certain disadvantaged communities may bear a disproportionate share of adverse health and environmental effects compared to the general population led to the Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This EO directs federal agencies to identify and address, as appropriate, disproportionately high and adverse environmental and human health effects in minority and low-income communities, and 32 Code of Federal Regulations (CFR) 989, Environmental Impact Analysis Process, addresses the need for consideration of environmental justice issues in compliance with the National Environmental Protection Act (NEPA). EO 12898 applies to federal agencies that conduct activities that could substantially affect human health or the environment.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, directs federal agencies to identify and assess environmental health and safety risks to children, coordinating research priorities on children's health, and ensuring that their standards take into account special risks to children. Children are more sensitive than the adult population to certain environmental effects, such as airborne asbestos and lead paint exposures from demolition, safety with regard to equipment, accidents within structures under demolition, and noise. Activities occurring near areas that tend to have a higher concentration of children than the typical residential area during any

given time, such as schools, churches, and community childcare facilities, may further intensify potential impacts to children.

3.4.6 Region of Influence and Existing Conditions – Environmental Justice

Table 3-6 identifies total population and percentage populations of concern in each of the three ROI counties, the state of Florida and the United States. The total population in 2000 for the ROI was 328,842 persons, representing 2.1 percent of the Florida population (15,982,378 persons). Population density in the region ranged from 38.4 persons per square mile in Walton County to 182.2 persons per square mile in Okaloosa County. By comparison, the state of Florida has an overall population density of 296.4 persons per square mile, reflecting the relatively sparse population in the region surrounding Eglin AFB.

Table 3-6. Total Population and Populations of Concern by County, 2000

Location	County Population	Percent Minority	Percent Low-Income	Percent Youth	Population Density*
Okaloosa County	170,498	19.0	8.8	24.7	182.2
Santa Rosa County	117,743	10.9	9.8	26.6	115.8
Walton County	40,601	12.7	14.4	21.7	38.4
Three-county ROI	328,842	15.3	9.8	25.0	109.2
Florida	15,982,378	34.6	12.5	22.8	296.4
United States	281,421,906	30.9	12.4	25.7	79.6

Source: U.S. Census Bureau 2000d, 2000e, 2000f, and 2000g
*Population density is calculated as average persons per square mile.

Minority persons represent 15.3 percent of the ROI population and 34.6 percent of the state population. African Americans are the predominant minority group in the ROI, while at the state level, Hispanic or Latino persons are the largest minority group. The minority population in the three counties of the ROI ranges from 10.9 percent in Santa Rosa County to 19.0 percent in Okaloosa County.

The percentage of persons and families in the ROI with incomes below the poverty level was somewhat lower than state levels, averaging 9.8 percent in the ROI compared to 12.5 percent in Florida as whole. Okaloosa County and Santa Rosa County exhibited relatively low poverty rates of 8.8 and 9.8 percent, respectively, while in Walton County 14.4 percent of the population was living below the poverty level. The map presented in Figure 3-1 displays the minority and low-income communities of concern in the Eglin AFB region.

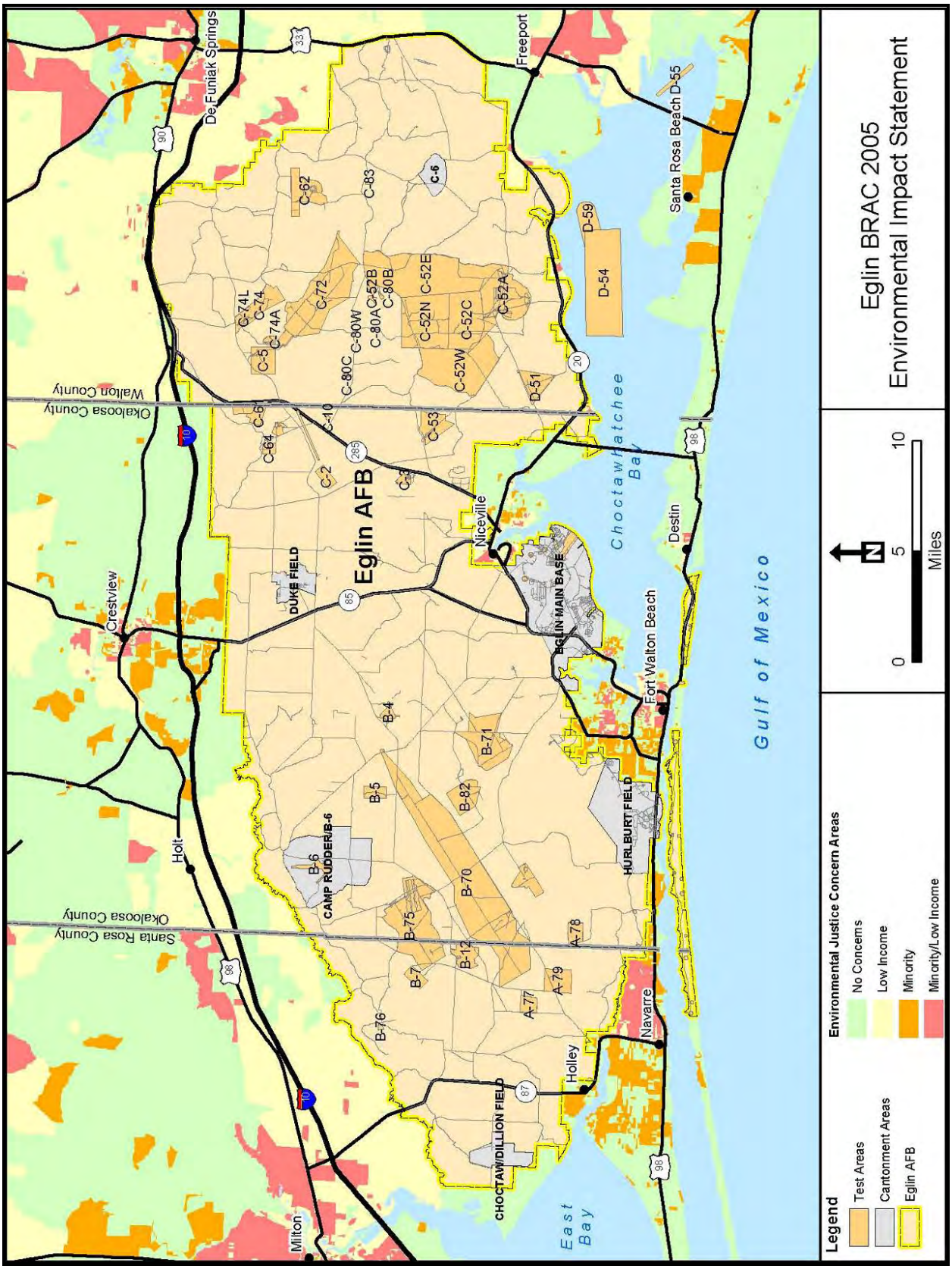

Figure 3-1. Areas with High Minority/Low-Income Populations as Compared to Each County's Average

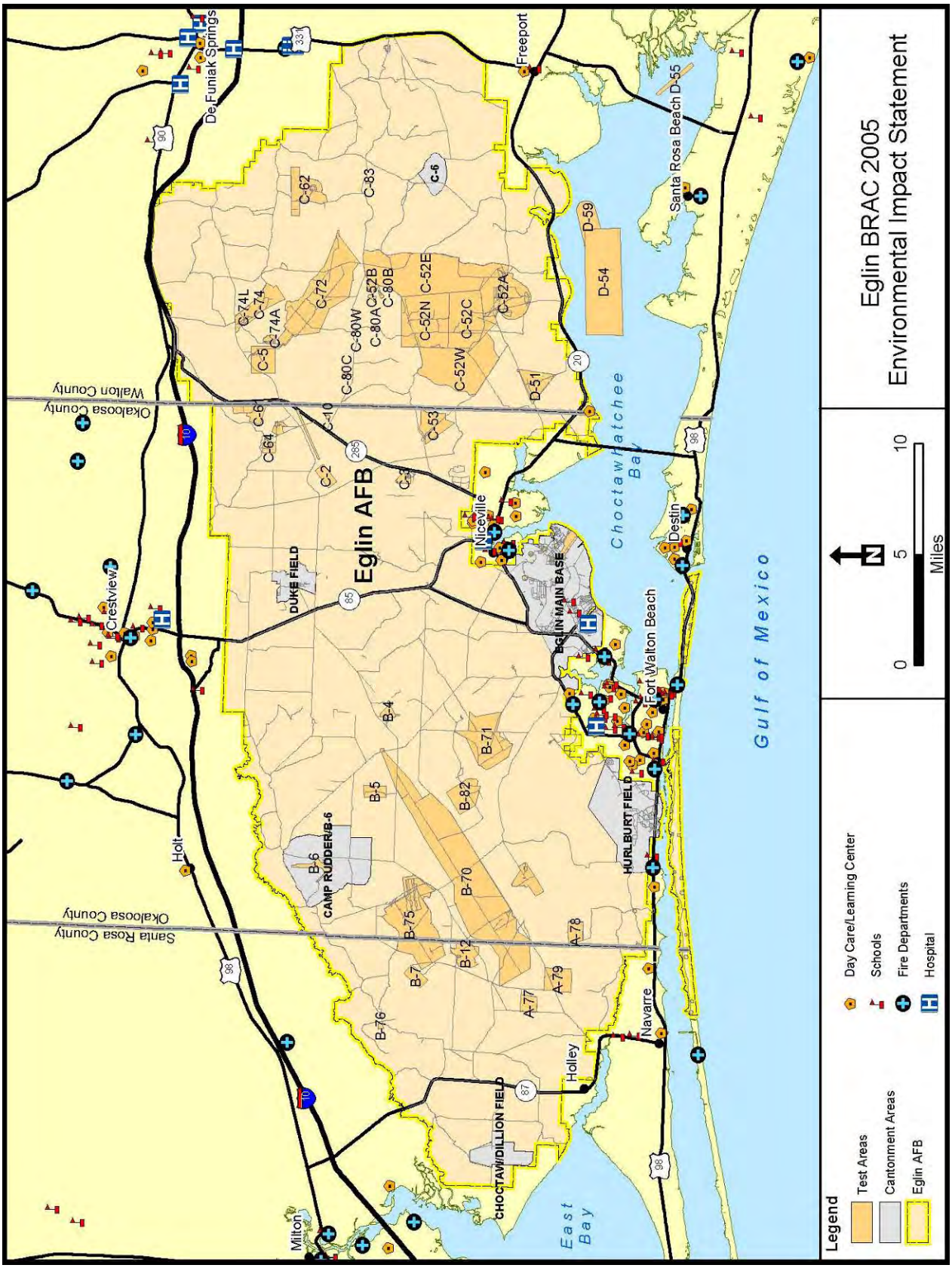

Figure 3-2. Areas with High Youth Population as Compared to County Average

The youth population, comprising children under the age of 18 years, constitutes 25 percent of the ROI population, ranging from 21.7 in Walton County to 26.6 percent in Santa Rosa County, compared to 22.8 percent for Florida overall. Schools and childcare centers, in addition to certain other public service establishments are displayed on the map presented in Figure 3-2.

3.4.7 Analysis Methodology – Environmental Justice

The analytical methods applied in this section are in accordance with the *Interim Guide for Environmental Justice with the Environmental Impact Analysis Process* (U.S. Air Force, 1997). Minority, low-income, and youth populations are defined in the guidance as follows.

- *Minority Population:* Blacks, American Indians, Eskimos, Aleuts, Asians, Pacific Islanders, and persons of Hispanic or Latino origin of any race.
- *Low-Income Population:* Persons living below the poverty level, based on a 2000 equivalent annual income of $17,603 for a family of four persons.
- *Youth Population:* Children under the age of 18 years.

The context is necessary to understand if environmental impacts would disproportionately affect minority, low-income, or youth populations. An appropriate basis for comparison is the community of comparison (COC), where COC is defined as the smallest governmental or geopolitical unit(s) that encompasses the impact footprint for each resource, which in this case is a county. Data from the 2000 Census of Population on race, ethnicity, poverty status, and age were collected at the block level (the smallest geographical unit for which this census data is available) for the three affected counties in the ROI: Okaloosa County, Santa Rosa County, and Walton County. In addition, general demographic profiles for the three counties, the state of Florida, and the United States were compiled to provide analytical context.

The percent minority and low-income populations in the affected census tracts are compared to the percent minority and low-income populations in the overall COC. Census blocks with a higher percentage of minority or low-income population than for the county as a whole are identified as communities of concern. An affected census tract that has a minority or low-income percentage greater than the state average is presumed to be high even if the encompassing COC exhibits a higher minority or low income percentage than the affected tract. If the percent minority and low-income populations in an affected census tract are less than the corresponding percentages in the COC overall, then no disproportionate impacts are presumed to occur on minority or low-income populations. With regard to special risks to children, census blocks exhibiting a higher than average youth population were identified, as well as the location of area schools and childcare centers.

3.4.8 Laws and Regulations – Environmental Justice

Each of the socioeconomic impact areas discussed in Sections 3.4.2 and 3.4.6 are subject to EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. Therefore, each area must be evaluated with respect to Environmental Justice and Special Risks to Children.

3.5 TRANSPORTATION

3.5.1 Definition

Transportation is defined as the movement of goods from place to place. In general, transportation refers to air, water, and ground vehicles and those services that make use of these infrastructures. Roadways are an example of a transportation infrastructure for automobiles, trucks, and buses to carry both people and goods.

3.5.2 Region of Influence and Existing Conditions

Transportation resources analyzed within this EIS include the regional roadway network adjacent to the proposed action areas and the local roadway network within Eglin Main Base gates. Collectively, these resources compose the ROI for transportation. Since the ROI for all components of the Proposed Action is not the same, the ROI is defined as the existing road network serving the area near each Proposed Action currently and includes roads within Okaloosa and Walton Counties. Figure 3-3 shows the overall ROI.

The key transportation resources generally include State Road (SR) 85 (also known as Hwy 85), SR 285, U.S. Highway (US) 98/SR 30, SR 20, SR 123, SR 188, SR 393, SR 189, US 331 and SR 397, as well as local roadways within Eglin Main Base. Several of the study area roadways have been designated as part of the Strategic Intermodal System (SIS). The SIS is a statewide network of high-priority transportation facilities, including the state's largest and most significant commercial service airports, the spaceport, deepwater seaports, freight rail terminals, passenger rail and intercity bus terminals, rail corridors, waterways, and highways. SIS facilities in the study area include Interstate 10 (I-10), SR 123, SR 85 (from SR 123 to the Okaloosa Regional Airport entrance and I-10 to SR 123), US 331, and US 98 through Walton County. A map of these SIS facilities is included in Appendix B, *Transportation*.

The Proposed Action and alternatives have the potential to affect specific areas of the overall ROI to different degrees, based on their location and access. For this reason, the existing conditions discussion is broken into three general transportation regions: the areas surrounding and leading to Eglin Main Base, the areas surrounding and leading to Duke Field, and the area near DeFuniak Springs in Walton County. An overview on the development of the existing and future conditions and the analysis methodology is

included in Section 3.5.3, Analysis Methodology. The existing conditions within the ROI are presented in the following paragraphs. Additional detailed information on the methodology and the existing conditions are contained in Appendix B, *Transportation*.

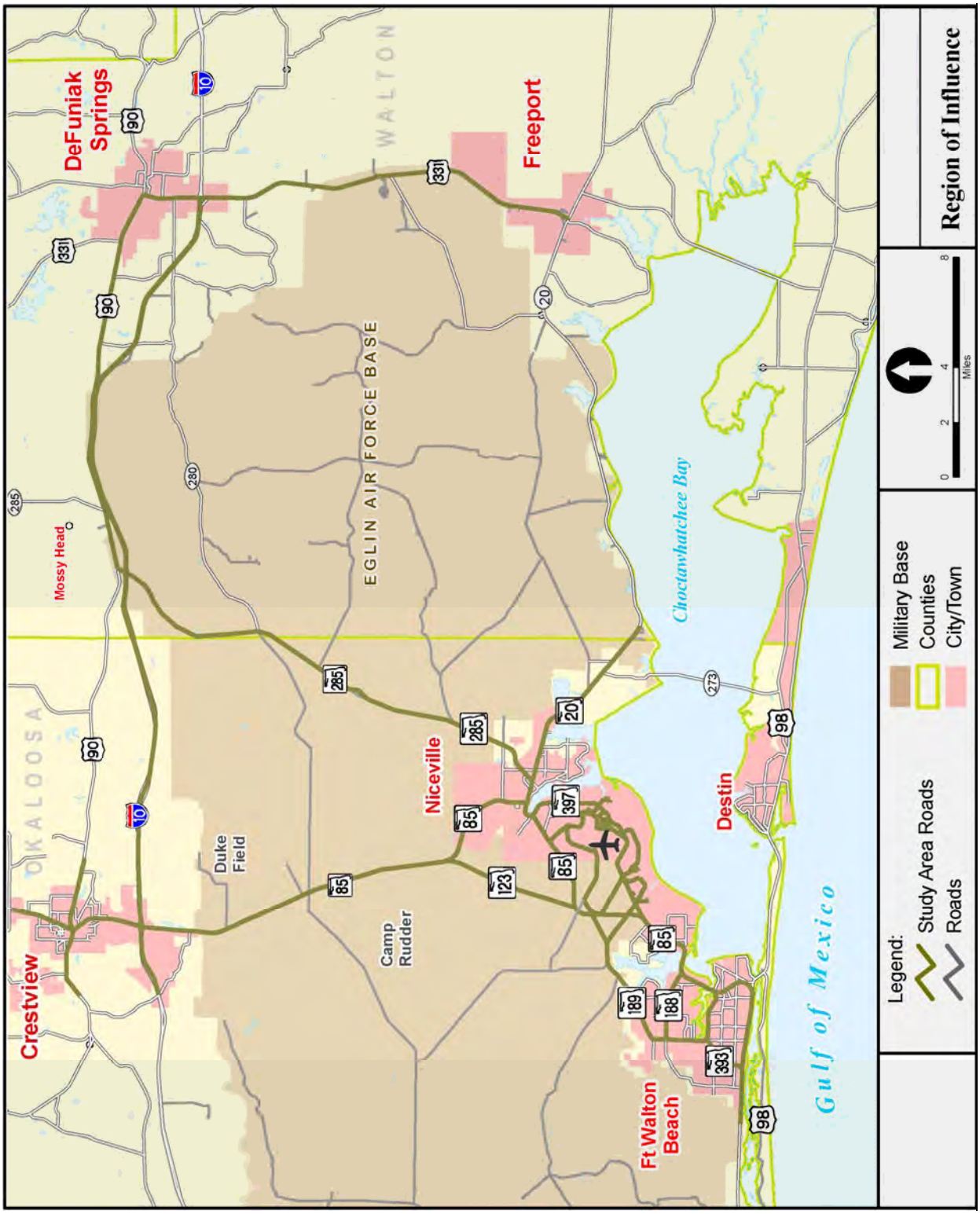

Figure 3-3. Existing Road Network and Region of Influence

Eglin Main Base Region – Existing Conditions

Table 3-7 shows the existing characteristics of the study area roadways, including the number of lanes, length in miles, adopted Level of Service (LOS) standard, current PM (afternoon) peak–hour, peak-direction traffic, and current operating PM peak-hour, peak-direction LOS. The adopted LOS standards are based on the Okaloosa County Comprehensive Plan, the Walton County Comprehensive Plan, the 1996 Eglin Transportation Master Plan (U.S. Air Force, 1996b), and the June 2005 Okaloosa-Walton Transportation Planning Organization (TPO) Congestion Management System Report. PM peak-hour, peak-direction traffic volumes were calculated, as discussed in the previous section. Current operating LOS is based on the PM peak-hour, peak-direction traffic volumes. As shown in Table 3-7, several of the roadway segments are currently operating worse than the adopted LOS standard for the PM peak-hour, peak-direction and are considered deficient. Deficient segments include portions of SR 85, Mary Esther Boulevard, US 98, SR 189, and SR 123. Projects scheduled for construction within the first three years of any adopted Transportation Improvement Program (TIP) or Florida Department of Transportation (FDOT) work program are typically considered to be complete in terms of existing-year transportation analysis. Currently, there are projects programmed for construction within the next three years on SR 85 (John Sims Parkway) from SR 397 (Government Avenue) to SR 85 (junction of SR 85 with SR 20), SR 85 at the Okaloosa Regional Airport entrance, SR 85 at SR 123 (South of General Bond Boulevard to north of Okaloosa Airport) and SR 189 at General Bond Boulevard. As such, these improvements have been included in the existing conditions analysis.

Table 3-7. Existing Characteristics of the Eglin Main Base Roadways

Primary Road Segments	Number of Lanes	Length (miles)	Adopted LOS Standard	Peak Hour Peak Direction Traffic Volumes (2006 - Rounded)	Peak Hour Peak Direction LOS (2006)
3rd Street					
Between Van Matre Ave & SR 397 (Eglin Blvd/John Sims Pkwy)	2 (one way)	0.27	E	250	C
4th Street					
Between F Ave & Magnolia St	1 (one way)	0.02	E	200	C
5th Street					
Between F Ave & Eglin Blvd	2	0.03	E	200	C
7th Street					
Between Daytona Ave & Eglin Blvd	2	0.38	E	250	C

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Table 3-7. Existing Characteristics of the Eglin Main Base Roadways, Cont'd

Primary Road Segments	Number of Lanes	Length (miles)	Adopted LOS Standard	Peak Hour Peak Direction Traffic Volumes (2006 - Rounded)	Peak Hour Peak Direction LOS (2006)
8th Street					
Between Daytona Ave & Eglin Blvd	2	0.37	E	300	C
Between Eglin Blvd & Biscayne Rd	2	0.41	E	100	C
Barrancas Avenue					
Between Choctawhatchee Rd & F Ave++	2	0.44	E	100	C
Between F Ave & 2nd St/Eglin Blvd	2 (one way)	0.13	E	250	C
Boatner Road					
Between Hatchee Rd & Hospital	2	0.23	E	500	D
Between Hospital & Ash Dr	2	0.20	E	350	C
Chinquapin Drive					
Between Eglin Blvd & Memorial Tr+	2	0.34	E	650	C
Between Memorial Tr & Wakulla Rd	2	0.33	E	100	C
Choctawhatchee Road					
Between 7th St & Barrancas Ave	2	0.36	E	200	C
Cypress Road					
Between Lido Rd & Kissimmee Rd	2	0.18	E	100	C
Daytona Avenue*					
Between 10th St & 8th St	2	0.27	E	90	C
Between 8th St & 7th St	2/4	0.25	E	200	C
General Bond Boulevard					
Between SR 85 & SR 189	2 (one way)	1.20	D	850	D
Hatchee Road					
Between Choctaw Rd & Eglin Blvd	2	0.81	E	100	C
Between Eglin Blvd & Choctaw Rd	2	0.82	E	70	C
Inverness Road					
Between Cypress Rd & De Leon Rd	2	0.10	E	150	C
Kissimmee Road					
Between Biscayne Rd & Cypress Rd	2	0.11	E	150	C

Continued on the next page…

Table 3-7. Existing Characteristics of the Eglin Main Base Roadways, Cont'd

Primary Road Segments	Number of Lanes	Length (miles)	Adopted LOS Standard	Peak Hour Peak Direction Traffic Volumes (2006 - Rounded)	Peak Hour Peak Direction LOS (2006)
Magnolia Street					
Between Eglin Blvd & F Ave	2	0.13	E	200	C
May Road					
Between Eglin Blvd & Gaffney Rd	2	0.15	E	20	C
Memorial Trail					
Between Eglin Blvd & Commissary/Exchange	2	1.58	E	300	C
Between Commissary/Exchange & Chinquapin Dr	2	0.41	E	350	C
Museum Drive					
Between Eglin Blvd & Minor Dr	2	0.09	E	450	D
Nomad Way					
Between SR 85 & Pumphouse	2	1.23	E	250	C
Between Pumphouse and Eglin Blvd	2	0.85	E	250	C
North Gate Road					
Between SR 85 & Perimeter Rd	2	0.71	E	40	C
Perimeter Road					
Between Daytona Rd & TWS	2	0.38	E	200	C
Between TWS & North Gate Rd	2	0.61	E	70	C
Between North Gate Rd & ACC Munitions (west end)	2	0.93	E	50	C
Between ACC Munitions (west end) & ACC Munitions (south end)	2	0.37	E	40	C
Between ACC Munitions (south end) & TWC	2	1.64	E	80	C
Between TWC & Nomad Way	2	0.42	E	60	C
State Road 20					
Between SR 85N & SR 285	6	0.78	D	2,700	C
Between SR 285 & Rocky Bayou Bridge	4	2.60	D	1,700	C
Between Rocky Bayou Bridge & White Point Road	4	2.10	D	1,800	C
Between White Point Road & Walton County Line	2	1.62	D	600	C

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Table 3-7. Existing Characteristics of the Eglin Main Base Roadways, Cont'd

Primary Road Segments	Number of Lanes	Length (miles)	Adopted LOS Standard	Peak Hour Peak Direction Traffic Volumes (2006 - Rounded)	Peak Hour Peak Direction LOS (2006)
State Road 30 (US 98)					
Between SR 85 & SR 393 (Mary Esther Boulevard)	4	3.02	D	1,800	D
Between SR 393 (Mary Esther Boulevard) & Hurlburt Field Gate	4	2.70	D	2,100	F
State Road 85					
Between College Blvd & SR 20	4	0.89	D	1,000	B
Between SR 20 & SR 397	6	0.68	D	2,900	F
Between SR 397 & North Gate at Perimeter Rd	4	1.26	D	1,000	B
Between North Gate at Perimeter Rd & SR 123	4	2.66	D	1,400	B
Between SR 123 & Nomad Way/ACC Gate	4	1.05	D	2,400	F
Between ACC Gate at Nomad Way & SR 189 (Lewis Turner Blvd)	4	0.94	D	2,100	F
Between SR 189 (Lewis Turner Blvd) & Eglin Blvd	4	0.50	D	900	B
Between Eglin Blvd & 12th Ave	4	1.36	Constrained ***	2,000	F
Between 12th Ave & SR 188 (Racetrack Rd)	6	1.58	Constrained ***	2,000	C
Between SR 188 (Racetrack Rd) & SR 30 (US 98)	6	2.96	Constrained ***	2,200	D
State Road 123					
Between SR 85 & SR 85N	2	5.00	D	1,000	E
State Road 188 (Racetrack Road)					
Between Beal Parkway & SR 85	4	2.60	D	1,700	C
State Road 189					
Between Eglin Blvd & SR 85	4	0.51	E	700	B
Between SR 85 & General Bond Blvd	4	1.26	E	1,300	B
Between General Bond Blvd & Mooney Rd	4	2.31	E	2,800	F
Between Mooney Rd & SR 188 (Racetrack Rd)	4	2.10	D	1,500	D
Between SR 188 (Racetrack Rd) & SR 393 (Mary Esther Blvd)	4	1.50	D	2,100	F

Continued on the next page…

Table 3-7. Existing Characteristics of the Eglin Main Base Roadways, Cont'd

Primary Road Segments	Number of Lanes	Length (miles)	Adopted LOS Standard	Peak Hour Peak Direction Traffic Volumes (2006 - Rounded)	Peak Hour Peak Direction LOS (2006)
Between SR 393 (Mary Esther Blvd) & Yacht Club Dr	4	1.50	D	1,100	B
State Road 285					
Between Swift Creek & SR 20	4	1.00	E	400	C
State Road 393 (Mary Esther Blvd)					
Between SR 189 & SR 30 (US 98)	4	1.84	D	1,800	F
State Road 397					
Between SR 190 & SR 85	4	0.90	D	1,500	B
Between SR 190 & East Gate	4	1.37	D	650	B
Between East Gate & 8th St	4	0.43	D	1,100	C
Between 8th St & 7th St	4	0.27	D	1,000	C
Between 7th St & 5th St	4	0.39	D	700	B
Between 5th St & Memorial Tr (northbound/eastbound)	3 (one way)	0.70	D	1,100	B
Between 5th St & Memorial Tr (southbound/westbound)**	3 (one way)	0.71	D	1,100	B
Between Memorial Tr & Eglin Blvd South End Split (eastbound)	2 (one way)	0.47	D	700	B
Between Memorial Tr & Eglin Blvd South End Split (westbound)	2 (one way)	0.54	D	1,100	B
Between Eglin Blvd South End Split & Museum Dr/Nomad Way	4	1.42	D	1,300	B
Between Museum Dr/Nomad Way & SR 189 (Lewis Turner Blvd)/West Gate	4	1.10	D	700	B
Between SR 189 (Lewis Turner Blvd)/West Gate & SR 85	4	0.47	D	850	B

* Capacity has been analyzed as a two-lane roadway.
** This section of Eglin Boulevard runs as F Avenue and 2nd Street.
*** Not able to be widened due to environmental, physical or political constraints.
\+ AADT has been generated from turning movement counts.
++ Count data estimated based on 1996 Eglin Transportation Plan

The results of the analysis for the existing conditions indicate that nine segments are deficient with respect to the adopted LOS; eight of these operate at LOS F in the PM peak-hour, peak-direction. None of the deficiencies identified are located on Eglin Main Base.

Duke Field Region – Existing Conditions

Several of the 7SFG(A) Cantonment proposed alternatives are proposed to be located near Duke Field east or west of SR 85. Access to the facilities is assumed to occur via SR 85—near or at the current access to Duke Field at McWhorter Avenue.

Study area roadways characteristics and LOS are shown in Table 3-8. For the purposes of this alternative, the existing conditions were analyzed for the roadways that may be impacted by the Proposed Action.

Table 3-8. Existing Characteristics of the Duke Field Region Roadways

Primary Road Segments	Number of Lanes	Length (miles)	Adopted LOS Standard	Peak Hour Peak Direction Traffic Volumes (2006 - Rounded)	Peak Hour Peak Direction LOS (2006)
State Road 8 (I-10)					
Between Antioch Road & SR 85	4	2.16	C	1,200	A
Between SR 85 & Walton/Okaloosa County Line	4	4.71	C	1,100	A
State Road 10 (US 90)					
Between Fairchild Road & SR 85	4	3.50	D	750	A
Between SR 85 & Antioch Road	4	0.65	D	1,900	C
State Road 85					
Between Old Bethel Rd & SR 10 (US 90)	4	2.40	D	1,400	B
Between SR 10 (US 90) & RS 8 (I-10)	4	2.17	D	1,700	E
Between SR 8 (I-10) & PJ Adams Pkwy	4	0.95	C	2,200	F
Between PJ Adams Pkwy & Duke Field	4	5.21	C	2,000	C
Between Duke Field & College Blvd	4	8.72	C	2,000	C

A general discussion on the process of developing the existing conditions and descriptions of LOS and roadway capacities is presented in Section 3.5.3, Analysis Methodology. As shown in Table 3-8, two of the roadway segments are currently operating deficiently with respect to the adopted LOS standard. These segments include portions of SR 85.

DeFuniak Springs Region – Existing Conditions

One of the 7SFG(A) cantonment alternatives plans to locate facilities near DeFuniak Springs in Walton County. Access to these facilities could occur from SR 285.

Study area roadway characteristics and LOS are shown in Table 3-9. Existing conditions were analyzed for the roadways that may be impacted by the Proposed Action.

Table 3-9. Existing Characteristics of the DeFuniak Springs Region Roadways

Primary Road Segments	Number of Lanes	Length (miles)	Adopted LOS Standard	Peak Hour Peak Direction Traffic Volumes (2006 - Rounded)	Peak Hour Peak Direction LOS (2006)
State Road 8 (I-10)					
Between Walton/Okaloosa County Line & SR 83 (US 331)	4	17.90	C	1,200	A
State Road 10 (US 90)					
Between SR 83 (US 331) & SR 187 (US 331)	4	1.88	C	1,500	C
Between SR 187 (US 331) & SR 285	2	11.40	C	700	D
State Road 83 (US 331)					
Between SR 10 (US 90) & SR 8 (I-10)	4	2.50	C	400	B
Between SR 8 (I-10) & Freeport City Limits	2	11.40	C	1,800	F
Between Freeport City Limits & SR 20	2	2.00	C	1,200	E
State Road 285					
Between SR 10 (US 90) & Okaloosa/Walton County Line	2	6.76	C	450	C
Between Okaloosa/Walton County Line & Swift Creek	2	8.76	C	450	C

An overview on the process of developing the existing conditions and descriptions of LOS and roadway capacities are discussed in Appendix B, *Transportation*. As shown in Table 3-9, three of the roadway segments are currently operating in a deficient condition. Deficient segments include portions of US 90, US 331 and SR 285.

3.5.3 Analysis Methodology

An analysis of the regional roadway segments within the ROI was conducted to identify current and future (projected) deficient segments within the existing roadway network, as well as the potential impacts of the proposed alternatives. Generally, data and analysis methods used for this analysis included: an origin-destination (O-D) survey, Florida Standard Urban Transportation Model Structure (FSUTMS), annual average daily traffic (AADT), peak-hour, peak-direction traffic, roadway LOS, volume to capacity (v/c) ratio, and significance and adversity. Additionally, roadways designated as part of Florida's SIS have also been identified, as more stringent standards apply to these roadways.

A detailed description of all of the data and analysis methods utilized to determine impacts to transportation resources is also provided in Appendix B, *Transportation*. A brief summary of the key methodologies used for analysis in this EIS is provided below.

For the purposes of this EIS, the existing conditions were analyzed for all roadways that may be impacted by the Proposed Action. Each of the proposed alternatives may have greater impact on certain facilities than the other alternatives, depending on location and access. The existing conditions analysis sets the baseline for determining impacts to all of the study area roadways and for identifying the impacts of each alternative on the regional and local roadway system. A roadway was determined to be deficient for both existing and future conditions if the PM peak-hour conditions, represented by the LOS, were worse than the LOS standards adopted for that roadway.

Existing conditions were quantified based on the amount of traffic along a particular study roadway segment. For purposes of this EIS, traffic counts were conducted at over 50 locations within the study area. These traffic counts were used to determine the current LOS of the study area roadways for both the daily and afternoon (PM) peak-hour, peak-direction periods. Daily traffic volumes were adjusted to account for seasonal variations in traffic to determine AADT. Additional adjustment factors were applied to the AADT to identify the PM peak-hour, peak-direction traffic volumes. A "K" factor, or planning analysis hour factor, was used to identify the PM peak hour of traffic. A "D" factor, or directional factor, was applied to the PM peak-hour volume to identify the PM peak-hour, peak-direction traffic volume. Both of these factors were calculated using the traffic counts collected for this study. The FDOT 2005 Florida Traffic Information compact disc (CD) released in late summer 2006 was used, where necessary, to supplement the data collected in the study area. This also includes the identification of the K and D factors used to calculate the PM peak-hour, peak-direction traffic. The peak-hour, peak-direction volumes included in the tables of this report have been rounded according to AASHTO (American Association of State Highway and Transportation Officials) standards. Copies of the counts conducted for this study and the relevant FDOT 2005 counts are included electronically with Appendix B, *Transportation*. The AASHTO rounding standards are also included in Appendix B.

The existing LOS of the roadway segments within the study area was analyzed based on the collected count data. LOS is a quantitative measure of operational conditions of a transportation facility in terms of travel time, speed, delay, and freedom to maneuver within the traffic stream, as perceived by motorists. LOS is given a letter designation ranging from A to F, with LOS A representing optimal free-flow conditions and LOS F representing forced-flow or breakdown conditions generally associated with the term "gridlock."

Capacities for area roadways are based on the FDOT 2002 Quality/Level of Service (Q/LOS) Handbook Generalized Tables. The FDOT developed the Q/LOS Handbook to be "used by engineers, planners, and decision-makers in the development and

review of roadway users' quality/level of service (Q/LOS) at planning and preliminary engineering levels." The handbook has tools to assist in both generalized planning and conceptual planning. Analysis of future-year alternatives and initial problem identification are considered to be generalized planning applications. The generalized tables in the Q/LOS Handbook are the primary tools for conducting this type of planning analysis. Capacities are provided in the Q/LOS handbook for each LOS standard (A through F) based on the functional classification, number of lanes, number of signals per mile, and area type. Copies of the Q/LOS generalized tables and the roadway characteristics used to determine capacities for each of the study area roadways are included in Appendix B, *Transportation*.

Transportation demand modeling software developed in conjunction with the TPO's Long Range Transportation Plan was used to develop reasonable traffic forecasts for roadways in and around Eglin AFB for 2016. The existing FSUTMS was obtained for the Okaloosa-Walton TPO. The model was modified to include roadways within Eglin Main Base and was checked against the existing conditions based on data collected. In addition, home ZIP code data for current base employees (civilian and military) were obtained to determine the general distribution of home-based trips for those working at Eglin. The model was also checked and adjusted to ensure that trips entering and leaving Eglin generally traveled to and from these ZIP code areas.

Once the base year (2006) model was validated and able to reasonably reproduce the observed existing conditions, a future year model was developed for 2016. The historical trend growth rates were compared to model growth rates, and adjustment factors were developed where model growth rates were either negative or were higher than acceptable based on professional judgment as compared to the trend analysis. A minimum growth rate of 1 percent per year was assumed for area roadways off base. One percent was used if the model growth rate and or trend analysis was less than 1 percent. Although no growth was proposed on base in the No Action Alternative, a minimum growth rate of 0.2 percent per year was assumed to account for additional trips due to changes in trip interaction patterns or shifts in trips from off base (e.g., trips to the exchange, commissary, or hospital). Reasonable growth rates used to forecast future traffic for each roadway segment were determined using model-predicted growth rates, historical growth rates, and anticipated future development trends in the area.

On base, the socioeconomic data was held constant and new traffic analysis zones (TAZs) were created for each of the alternatives. These new TAZs include any future growth at Eglin as detailed in Chapters 1 and 2 of this EIS. The distribution of employees to homes for the JSF IJTS alternatives was generally assumed to be similar to the existing conditions. Once each build alternative TAZ was populated within the 2016 model, the model was run to determine the future traffic on each of the study area roadways. Future year volumes for 2016 were developed based on the model runs. The models used in this EIS were based on the FSUTMS Okaloosa-Walton TPO Model. For

a more detailed description of the model and model refinements, refer to Appendix B, *Transportation*.

In order to determine the significance of project trips relative to the roadway capacity, it was necessary to estimate the number of trips associated with each alternative on the regional roadway network. The employment and population data associated with each of the components of the Proposed Action (i.e., the JSF IJTS and 7SFG[A]) was input into the transportation model and the model was run to determine the trip generation and distribution of trips associated with each of the actions and alternatives. A more detailed description of the transportation modeling process and the trip generation is provided in Appendix B, *Transportation*.

The Florida *Transportation Uniform Standard Code*, 9J-2.045, Florida Administrative Code (FAC), gives the Florida Department of Community Affairs (DCA) guidance on how they will evaluate transportation facility issues in the review of applications for local government development orders and Developments of Regional Impacts. According to 9J-2.045(6) FAC, a state and regionally significant roadway segment shall be determined by the DCA to be significantly impacted by the proposed development if, at a minimum, traffic projected to be generated at the end of any stage or phase of the proposed development, cumulatively with previous stages or phases, will utilize 5 percent or more of the adopted peak-hour, peak-direction LOS maximum service volume of the roadway. Additionally, if a significantly impacted roadway is projected to be operating below the adopted LOS standard at build-out of that stage or phase, then the impact is considered to be significant and adverse.

Although no development or construction to the regional roadway network is expected to occur as a result of the BRAC actions, increased traffic in association with each alternative is anticipated. Therefore, the traffic analysis in this EIS has adopted the 5 percent threshold for Developments of Regional Impacts as a measure of significant impacts to roadways.

The analysis evaluated future traffic volumes to determine potential impacts to existing roadways, as well as potential impacts to the traveling public. Future traffic volumes were estimated by including current roadway traffic, BRAC action related traffic, and anticipated future traffic growth not associated with the BRAC actions. Generally, if a roadway's LOS is anticipated to be deficient in the future, and the traffic generated by BRAC is significant, then the traffic generated by the alternative could be considered as having a major impact to the resource, as the future condition of the roadway could be made worse due to traffic growth associated with the BRAC. Conversely, if the anticipated traffic associated with the BRAC alternative is not significant on the deficient roadway, then the BRAC alternative could be considered to not have a significant impact to the resource.

The analysis notes which roadway segments are projected to operate deficiently and whether they are deficient today (2006). For the regional roadway network, the analyses indicate if the trips associated with the BRAC are significant and adverse, as defined in the previous paragraphs.

3.5.4 Laws and Regulations

The Florida *Transportation Uniform Standard Code*, 9J-2.045, FAC, gives the Florida DCA guidance on how they will evaluate transportation facility issues in the review of applications for local government developer orders and Developments of Regional Impacts. The *Transportation Uniform Standard Code* implements, in part, Chapter 380 of the Florida Statutes, Land and Water Management. Chapter 380 is one of the 23 statutes in the state of Florida that compose the Florida Coastal Management Program and is administered by the Florida DCA. The purpose of Chapter 380, Land and Water Management, is to facilitate orderly and well-planned development, by authorizing the state land planning agency to establish land management policies to guide local decisions relating to growth and development. As Eglin AFB could submit a Federal consistency review under the Coastal Zone Management Act (CZMA) for the BRAC actions, potential impacts to the regional transportation network, as well as to the public, could be reviewed by the DCA.

3.6 UTILITIES

3.6.1 Definition

The utilities described and analyzed for potential impact resulting from BRAC implementation include potable water, wastewater, electricity, and natural gas. The description of each utility and the impact analysis focus on the existing infrastructure (e.g., wells, water systems, wastewater treatment plants), current utility use, and any pre-defined capacity or limitations as set forth in permits or regulations. A comparison is made between the amount of the utility being used, regulatory limitations on consumption, and how implementation of each alternative would affect those factors.

3.6.2 Region of Influence and Existing Conditions

The Northwest Florida Water Management District (NWFWMD) regulates the quantity of water drawn from the aquifers by issuing Consumptive Use Permits (CUPs). Water consumption is measured using several different timeframes: average daily rates, maximum daily rates, maximum monthly rates, and total annual consumption. A water system must stay within all of these permitted limits; however, each individual well within the system may not always be within the permitted limits. The three most important measures for adhering to the CUP authorizations are the average daily amount used, the maximum daily amount used, and the maximum monthly amount of water used by the entire water system.

For domestic wastewater systems such as those used on the Eglin Range, according to Florida Department of Environmental Protection (FDEP) regulations, permits are not required if the domestic wastewater system treats less than 10,000 gallons of wastewater per day. Most of the septic tanks on the Eglin Range would fall into this category. For commercial wastewater, the level at which a permit is required is 5,000 gallons of wastewater treated per day. All industrial wastewater treatment facilities must be permitted (FDEP, 2006a).

Domestic wastewater systems are designed to treat sanitary waste or sewage resulting from regular human activities at home, offices, restaurants, schools, etc. While commercial wastewater systems are almost the same as domestic, they are designed to treat non-toxic, non-hazardous wastewater from commercial facilities that may have constituents that exceed the domestic wastewater range. Examples of facilities producing commercial wastewater include institutional and commercial food services, beauty salons, or laundry facilities with less than four washing machines. Industrial wastewater systems treat waste resulting from industry's pollutants such as suspended solids, nitrogen, phosphorous (used as fertilizer), heavy metals, pesticides, oil and grease, and other toxic chemicals (FDEP, 2006a).

3.6.3 Analysis Methodology

Potable Water

Water that is drinkable by humans is referred to as potable water. Potable water is safe to consume because it either comes from an uncontaminated aquifer (an underground layer of porous rock containing water), or it has been pre-treated to eliminate contaminants that would potentially cause illness in humans.

The methodology used to estimate potable water use is based on the number of personnel expected to be affiliated with the JSF IJTS and the 7SFG(A). The number of personnel is multiplied by coefficients that represent the gallons consumed on average and at a maximum per person per day at Eglin AFB. The coefficients are based on actual and projected consumption and population estimates for Eglin AFB and were derived by the Eglin Environmental Compliance office (96 CEG/CEVC).

The coefficients used may overestimate the number of gallons expected to be consumed. However, the potable water estimates are based solely on the number of personnel. The estimates do not incorporate water use by equipment or industrial processes, such as the two freshwater rinses and aircraft wash rack being proposed for the JSF aircraft and the vehicle wash rack proposed for the 7SFG(A). The reason for this is because industrial water use has not been quantified enough to develop a valid coefficient. By using the higher multiplier, the various industrial uses of water are accounted for in initial analysis, providing more flexibility later in the planning process.

The EIS compares the permitted capacities for each water system to the combination of current water consumed plus the estimated water to be consumed. If the estimate surpassed the permitted limit, water agency action would be required to expand the existing water system and amend the CUP, or to apply for a new CUP to add a water system.

Wastewater

Wastewater is water that has been used and contains dissolved or suspended waste materials. The waste materials include a wide variety of pollutants such as human excreta, food waste, soaps, detergents, and other cleaning materials. Before the wastewater can be released into waterways, it is treated at wastewater treatment plants to get rid of the pollutants.

The methodology used to estimate wastewater rates for the JSF IJTS and the 7SFG(A) is a combination of methods outlined in the USEPA's *Onsite Wastewater Treatment Systems Manual* (USEPA, 2002a) and the American Water Works Association website (American Water Works Association [AWWA], 2006). Wastewater estimates can be based on number of personnel inhabiting certain pre-defined facilities or on the amount of square footage of structures.

The *Onsite Wastewater Treatment Systems Manual* (USEPA, 2002a) categorizes facilities and estimates typical wastewater flow rates per unit. For example, an office has a typical wastewater flow rate of 13 gallons per employee per day. A dining hall however measures typical wastewater flow rates per meal served (7 gallons per meal per day). After estimating wastewater flow rates for each facility, each amount was added to calculate the total amount of wastewater flow rates expected from the JSF IJTS or the 7SFG(A).

Square footage was used as the basis for estimating typical wastewater flow rates when the type of facility was not included in the USEPA's report or when the number of units could not be accurately estimated. For example, the number of JSF aircraft to be processed through the freshwater rinse on a daily basis was not available. Instead of using a per-aircraft–per-day unit of measurement, the square footage of the rinses were used to estimate flow rates.

The permitted capacities for each wastewater treatment plant (WWTP) were compared to the combination of current wastewater produced plus estimated wastewater. If the combined amount of wastewater caused the permitted capacity to be exceeded, potentially adverse wastewater discharge impacts could result. Capacity through expansion or creation of a new facility would be needed to accommodate the additional wastewater and achieve discharge standards.

Electricity and Natural Gas

The context and intensity for each proposed BRAC action are used to quantify potential consequences upon electricity and natural gas resources. Current consumption of electricity was compared to the capacity to generate electricity in Northwest Florida. The natural gas infrastructure capability was compared with the permitted capacity for Eglin Main Base and to the current level of natural gas consumed. A large amount of excess natural gas capacity currently exists.

3.6.4 Laws and Regulations

Water

The FDEP regulates potable water supply systems in Florida. The Florida Safe Drinking Water Act and FDEP rules have incorporated federal primary and secondary drinking water standards as identified in the Safe Drinking Water Act (42 USC 201, 300 et seq.) and the National Primary Drinking Water Regulations. A Public water supply system is classified by the FDEP as a system that has at least 15 service connections or regularly serves 25 individuals daily for at least 60 days of the year. The Florida Water Resources Act (Florida Statutes, Title 28 Section 373) requires a comprehensive approach to water management based on regional hydrological boundaries. The Act also provides for the creation of five regional water management districts; Eglin AFB is within one of these five districts, the NWFWMD.

Wastewater

The Clean Water Act (33 USC 1151 et seq., 1251 et seq.) is the basic federal legislation governing wastewater discharges. The implementing federal regulations include the National Pollutant Discharge Elimination System (NPDES) permitting process (40 CFR 122), general pretreatment programs (40 CFR 403), and categorical effluent limitations, including limitations for pretreatment of direct discharges (40 CFR 405, et seq.).

The Florida Air and Water Pollution Control Act (Florida Statutes, Title 28 Section 403) governs industrial and domestic wastewater discharges in the state. The NWFWMD has been delegated as the enforcement authority by the FDEP. The implementing state regulations are contained in FAC 62. These regulations establish water quality standards, regulate domestic wastewater facility management and industrial waste treatment, establish domestic WWTP monitoring requirements, and regulate stormwater discharge.

Electricity and Natural Gas

There are no specific regulations associated with electrical or natural gas infrastructure or supply.

3.7 AIR QUALITY

3.7.1 Definition

Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The levels of pollutants are generally expressed on a concentration basis in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$).

The baseline standards for pollutant concentrations are the National Ambient Air Quality Standards (NAAQS) and state air quality standards. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare. Further discussion of the NAAQS and state air quality standards are included in Appendix D, *Air Quality*. Based on measured ambient air pollutant concentrations, the USEPA designates whether areas of the United States meet the NAAQS. Those areas demonstrating compliance with the NAAQS are considered "attainment" areas, while those that are not are known as "nonattainment." Those areas that cannot be classified on the basis of available information for a particular pollutant are "unclassifiable" and are treated as attainment areas until proven otherwise.

3.7.2 Region of Influence and Existing Conditions

For this air quality analysis, the ROI is Okaloosa, Santa Rosa, and Walton Counties.

Baseline Emissions

The FDEP operates air quality monitors in various counties throughout the state (FDEP, 2004). Although there are no ambient monitors in Okaloosa County, there are monitors in neighboring Santa Rosa and Bay Counties. Both of these counties are classified as attainment areas, as all counties within Florida are classified as attainment areas for the NAAQS (USEPA, 2007).

An air emissions inventory qualitatively and quantitatively describes the amount of emissions from a facility or within an area. Emissions inventories are designed to locate pollution sources, define the type and size of the sources, characterize emissions from each source, and estimate total mass emissions generated over a period of time, normally a year. These annual rates are typically represented in tons per year. Inventory data establishes relative contributions to air pollution concerns by classifying sources and determining the adequacy as well as the necessity of air regulations. Accurate inventories are imperative for the development of appropriate air quality regulatory policy.

The most recent air emissions inventories for Eglin AFB quantify emissions from stationary and mobile sources based on calendar year activities. Stationary sources

include equipment/processes such as boilers, electric generators, surface coating, and fuels handling operations. Mobile sources include motor vehicles, aerospace ground support equipment, and aircraft operations.

For comparison purposes, Table 3-10 presents the USEPA's 2002 National Emissions Inventory (NEI) data for Okaloosa, Santa Rosa, and Walton Counties (USEPA, 2002b). The county data includes emissions data from point sources, area sources, and mobile sources. *Point sources* are stationary sources that can be identified by name and location. *Area sources* are point sources whose emissions are too small to track individually, such as a home or small office building or a diffuse stationary source, such as wildfires or agricultural tilling. *Mobile sources* are any kind of vehicle or equipment with gasoline or diesel engine, an airplane, or a ship. Two types of mobile sources are considered: on-road and non-road. On-road mobile sources consist of vehicles such as cars, light trucks, heavy trucks, buses, engines, and motorcycles. Non-road sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural and construction equipment, and recreational vehicles (USEPA, 2005a).

Table 3-10. Baseline Emissions Inventory for Okaloosa, Santa Rosa, and Walton Counties

Source Type	Emissions (tons/year)				
	CO	NO_x	PM	SO_x	VOCs
Okaloosa County					
Area Sources	1,867	281	8,397	462	4,527
Non-Road Mobile	16,150	1,099	162	109	1,897
On-Road Mobile	45,228	5,703	153	256	3,829
Point Sources	28	49	24	12	79
Total	**63,274**	**7,132**	**8,736**	**839**	**10,333**
Santa Rosa County					
Area Sources	2,142	233	13,265	323	3,291
Non-Road Mobile	9,806	950	120	89	1,524
On-Road Mobile	40,237	5,341	147	238	3,286
Point Sources	867	4,570	776	2,362	418
Total	**53,052**	**11,095**	**14,308**	**3,012**	**8,519**
Walton County					
Area Sources	1,060	77	7,381	21	1,515
Non-Road Mobile	8,892	741	208	67	1,675
On-Road Mobile	23,915	3,849	190	153	1,671
Point Sources	25	14	6	4	28
Total	**33,893**	**4,681**	**7,785**	**246**	**4,890**
Region of Influence					
Area Sources	5,069	591	29,042	805	9,333
Non-Road Mobile	34,849	2,790	491	266	5,097
On-Road Mobile	109,380	14,894	490	648	8,787
Point Sources	921	4,633	806	2,378	526
Total	150,219	22,909	30,829	4,097	23,742

Source: USEPA, 2002b; CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM = Particulate Matter; SO_x = Sulfur Oxides; VOCs = Volatile Organic Compounds

3.7.3 Analysis Methodology

In order to evaluate air emissions and their impact on the overall ROI, the emissions associated with the project activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 NEI data. Potential impacts to air quality are identified as the total emissions of any pollutant that equals 250 tons per year or more emissions for that specific pollutant and exceeds 10 percent of the total ROI's emissions for each pollutant as compared to the ROI's 2002 NEI data (Shipley Associates, 1995). The 250 tons per year criterion approach is used in the USEPA's New Source Review (NSR) standards as an indicator for impact analysis for listed new major stationary emissions sources (such as a chemical process plant) in attainment areas for Prevention of Significant Deterioration (PSD), while the 10 percent criterion approach is used in the USEPA's General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas. Although the ROI is an attainment area, the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of construction emissions.

The Air Conformity Applicability Model (ACAM) version 4.3.0 was utilized to provide a level of consistency with respect to emissions factors and calculations. The ACAM provides estimated air emissions from proposed federal actions in areas designated as non-attainment and/or maintenance for each specific criteria and precursor pollutant as defined in the NAAQS. ACAM was utilized to provide emissions for construction, demolition, grading, and paving activities by providing user inputs for each; details are discussed in Appendix D, *Air Quality*. Commuter emissions were calculated based on personnel increases, which were input into ACAM. The ACAM calculations were augmented by emission calculations of munitions, tactical, watercraft and aircraft emissions completed in Microsoft Excel. Emission factors for munitions were obtained from the USEPA AP-42 (USEPA, 2006a). The Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis (AFIERA) (O'Brien and Wade, 2003) provided emission factors for various tactical vehicles, and the aircraft emissions were provided by using proprietary engine data (emission factors and fuel flow rates) from the aircraft engine manufacturer, Pratt & Whitney.

Calculated air emissions were compared to the established 250 tons per year PSD criterion and, using the General Conformity Rule, were also compared to the appropriate counties (Okaloosa, Santa Rosa, and Walton Counties) as represented in the 2002 NEI to identify impacts. The air quality analysis focused on emissions associated with the construction activities, increased flight operations, munitions use, tactical vehicles, and the increases in personnel at the installation. Air quality issues associated with operational activities at Eglin AFB after the completion of construction are not included in this evaluation. It is assumed that aircraft, munition, and mobile/vehicular emissions would remain at the elevated levels calculated in this analysis once construction is complete at full BRAC implementation.

Chemical releases to the environment are presented in the Hazardous Materials sections in Chapters 4 through 7 of this EIS. These sections discuss emissions other than the air emission criteria pollutants of carbon monoxide, nitrogen oxides, particulate matter with an aerodynamic diameter less than 10 microns, sulfur oxides, and volatile organic compounds. The chemicals of concern with air releases are antimony compounds, barium compounds, and lead compounds. Antimony and lead compounds are on the USEPA hazardous air pollutants (HAP) list (USEPA, 2006b). Hazardous air pollutants are regulated by point sources (such as reciprocating internal combustion engines). It was assumed that the HAP levels of emissions from munitions would be insignificant and would have little effect on overall air quality for the ROI.

3.7.4 Laws and Regulations

In accordance with EO 12088, *Federal Compliance with Pollution Control Standards*, DoD facilities must ensure that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to the Clean Air Act and other environmental laws. In support of EO 12088, Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, requires Air Force facilities to comply with applicable federal, state, and local environmental laws and standards. Furthermore, AFI 32-7040, *Air Quality Compliance*, establishes a framework for Air Force facilities to follow in order to comply with applicable Clean Air Act requirements. Within this framework are the requirements to obtain and maintain operating permits as required and to prepare and periodically update a comprehensive base emissions inventory.

In 1996, Eglin AFB determined that emission thresholds needed to qualify as a "major" source under the Federal Title V Operating Program promulgated in 40 CFR 70, were exceeded for various criteria pollutants and HAPs. As a result of this determination, Eglin AFB submitted a Title V permit application to the FDEP during June 1996. The FDEP issued a final Title V permit dated 2 July 1999.

During 2003, Eglin AFB prepared the Title V five-year renewal application for submittal to the FDEP. The renewal application was submitted during December 2003, and the final Title V Operation Permit, No. 0910031-009-AV, was issued 16 June 2004. In general, a major source is defined as any stationary facility or source of air pollutants that directly emits, or has the potential to emit, 100 tons per year or more of any criteria air pollutant (with the exception of HAPs) or has the potential to emit (considering controls) 10 tons per year or more of any USEPA-listed HAP or 25 tons per year or more of any combination of HAPs. Eglin AFB was classified as a major source for the pollutants based on its potential to emit.

3.8 SAFETY

3.8.1 Definition

The safety analyses address explosive safety, ground safety, and flight safety issues. Explosive safety relates to the management and use of ordnance or munitions associated with training activities including the application of ESQDs. These are separation distances between explosive storage facilities that are based on the maximum storage capacity of each facility to prevent explosive propagation from one storage facility to another.

Ground safety considers issues associated with operations and maintenance activities that support range operations, including fire response. Ground safety also includes construction safety issues associated with development of the cantonment area.

Flight safety considerations include aircraft mishaps and bird-aircraft strike hazards. The Air Force defines four categories of aircraft mishaps: Classes A, B, and C and High Accident Potential. Class A mishaps result in loss of life, permanent total disability, a total cost in excess of $1 million, or the destruction of an aircraft. The analysis focuses on Class A mishaps because of their potential to affect private property or the public. Bird-aircraft strikes are also addressed since these constitute a safety concern because of the potential for damage to aircraft or injury to aircrews or local populations if an aircraft crash should occur.

3.8.2 Region of Influence and Existing Conditions

The ROI for safety at Eglin AFB is the base itself, with an emphasis on areas used for munitions storage or where training activities would occur, as well as any adjacent off-base areas that potentially would be affected by safety issues related to the Proposed Action. The existing conditions with regard to safety vary among the components of the Proposed Action and individual alternatives. Therefore, existing conditions are presented in alternative-specific sections in Chapters 4 through 7.

3.8.3 Analysis Methodology

In the analyses, issues that have a potential to affect safety are evaluated relative to the degree to which the activity increases or decreases safety risks to military personnel, the public, and property. For example, the analyses evaluated whether existing buildings or roads on the installation would fall within the projected footprint of munition storage ESQDs. Likewise, the potential for an increase in the number of aircraft Class A mishaps from flight operations or bird-aircraft strikes were evaluated by comparing the projected operational tempo (i.e., number of proposed aircraft sorties) against aircraft-specific aircraft mishap rates or installation historic bird-aircraft impact data.

3.8.4 Laws and Regulations

As discussed in this document, a variety of Air Force regulations address and govern safety. These include Air Force Manual 91-201, *Explosives Safety Standards*, AFI 91-202, *U.S. Air Force Mishap Prevention Program*, Air Force Pamphlet 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques*, and AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Standards*. Under 29 CFR 1960 series, Occupational Safety and Health Administration (OSHA) standards do not apply to military-unique workplaces, operations, equipment, and systems. However, according to DoD instruction, they apply insofar as is possible, practicable, and consistent with military requirements. AFOSH standards apply unless specifically exempted by variance or determined to be an acceptable deviation.

3.9 SOLID WASTE

3.9.1 Definition

Solid waste is defined in the Florida Solid Waste Disposal Facility regulations as any sludge (unregulated by the federal Clean Water Act or Clean Air Act), garbage, rubbish, refuse, special waste, or other discarded material resulting from domestic, industrial, commercial, mining, agricultural, or government activities. Solid waste includes wastes commonly referred to as municipal solid wastes (such as garbage and refuse) and construction and demolition (C&D) debris, which consists of discarded materials generally not soluble in water (steel, glass, brick, concrete, asphalt, and so on).

3.9.2 Region of Influence and Existing Conditions

The ROI for solid waste resources includes Eglin AFB and the surrounding counties where landfill resources are located. Available resources in the immediate vicinity of Eglin AFB include landfills operated in Okaloosa, Walton, and Santa Rosa Counties. The analysis assumed that additional personnel identified within the alternatives would be living throughout the ROI, with the majority expected to reside within Okaloosa County, thereby increasing the county's municipal solid waste generation rate.

Solid waste would be generated within the ROI in the form of municipal solid waste from the additional personnel that increase population; construction debris from construction, renovation, and demolition activities associated with cantonment and range configuration; and debris from the expenditure of ordnance during range operation. Solid wastes requiring disposal would require landfill capacity within the ROI. The management and disposal of solid waste is regulated at both the state and federal level.

The Solid Waste Disposal Act (42 USC 3251 et seq.) established guidelines for solid waste collection, transport, separation, recovery, and disposal. The Act was amended

by the Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.) by emphasizing the recycling and recovery of materials. Florida has also established statutes and regulations that govern solid waste facilities, resource recovery and management programs, certification of resource recovery equipment, and used oil and domestic sludge classification, utilization, and disposal criteria. The FDEP develops and adopts rules that govern the management of solid waste within the state. To a large extent the responsibility for the management of solid waste resides with the local government under Florida law. In general, counties operate solid waste disposal facilities (i.e., landfills) that serve the cities and towns within their jurisdictions. In addition to those landfills operated by county governments, a portion of the landfills located within the state are privately owned and operated.

Collection and disposal of municipal solid waste at Eglin AFB is handled by contract and administered by the 96th Civil Engineer Group (96 CEG). Arrow Inc. hauls refuse to a transfer station in Fort Walton Beach prior to final disposal at a Class I Landfill. C&D debris is also collected as part of this contract as well as by independent contractors. Most is taken to Point Center Landfill, a permitted C&D disposal facility located in Okaloosa County (Whittington, 2006a). In 2005, a total of 16,800 tons of municipal solid waste was generated at Eglin AFB. A portion of this waste, or 6,100 tons, was recyclable and diverted from disposal. A total of 10,700 tons of municipal solid waste was disposed of at Spring Hill Landfill. A total of 3,707 tons of C&D waste was generated at Eglin AFB in 2005. A large portion (1,799 tons) of this waste was reused either as fill, mulch, or road repair. The total mass of C&D waste disposed of at the Point Center Landfill in 2005 was 1,908 tons (Whittington, 2006b).

Available resources in the immediate vicinity of Eglin AFB include landfills operated in Okaloosa, Walton, and Santa Rosa Counties. All landfills are permitted by the FDEP. Landfills within the immediate area of Eglin AFB include a Class I landfill near Baker, Florida, operated by Okaloosa County, a Class I and Class III landfill near DeFuniak Springs, Florida, operated by Walton County, and two landfills operated by Santa Rosa County, a Class I landfill and Class III landfill. In addition to the landfills operated by the individual counties, three privately owned C&D landfills are located within Okaloosa County (Waste Recyclers, Point Center, and Arena Landfills), four are within Walton County (Coyote East, Coyote West, J&K, and Waste Recyclers Landfills), and four are located within Santa Rosa County (Coyote Navarre, Joiner Fill Dirt, Inc., Persimmon Hollow, and Tower Ridge Landfills). Although a large influx of wastes, especially C&D wastes, from hurricanes in 2004 and 2005 has occurred at these facilities, the estimated life expectancy of these facilities until capacity is reached ranges from 18 to 30 years or more (Floyd, 2005; Ensor, 2005; Lingenfelter, 2005). The Central Landfill in Santa Rosa County is not expected to reach capacity until 2075 (Floyd, 2005).

3.9.3 Analysis Methodology

Municipal Solid Waste Estimation

Municipal solid waste is made up of household generated trash, refuse, or garbage and includes paper, metal, cardboard, putrid waste (e.g., discarded food scraps), wood, plastics, and yard wastes. The latest available statistics were published by the USEPA in *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2003* (USEPA, 2005b). Based upon this guidance document, the average generation rate for municipal solid waste is 4.5 pounds per person per day. This generation rate was used to evaluate solid waste impacts. For each alternative evaluated involving additional personnel, the generation rate of 4.5 pounds per person per day was multiplied by the number of personnel. Annual volumes of municipal solid waste generated were then calculated using the following equation:

[(4.5 pounds) x (number of additional personnel) x (365 days in a year)] ÷ 2,000 pounds in a ton = Annual Municipal Solid Waste (in tons)

Construction/Demolition Debris Estimation

C&D debris includes materials such as construction materials for buildings, concrete and asphalt rubble, and land-clearing debris. Sampling studies documented in *Characterization of Building-Related Construction and Demolition Debris in the United States* (USEPA, 1998) indicate that the solid waste generation rate during nonresidential construction activities is 3.89 pounds per square foot (lbs/ft^2) of debris and 155 lbs/ft^2 for demolition activities within the United States. Generation rates associated with renovation of facilities have not been established; therefore, the generation rate associated with demolition activities (155 lbs/ft^2) was used in calculating the mass of debris from renovation activities. Estimated quantities of C&D waste generated from each type of activity were established using the following equations:

Construction:
[(3.89 lbs/ft^2) x (square footage)] ÷ 2,000 pounds = C&D waste (in tons)

Renovation/Demolition:
[(155 lbs/ft^2) x (square footage)] ÷ 2,000 pounds = C&D waste (in tons)

Debris from Land Clearing

Land clearing wastes would consist of soil and woody wastes associated with site preparation prior to construction activities. Although land clearing activities would generate soils and wood debris, it was assumed that none of the of soil and debris generated from tree removal and land clearing would require disposal in a C&D or solid waste landfill. Therefore, these materials would not be expected to impact solid

waste resources. This was based upon the assumptions that soils generated from grubbing activities would be used as fill during the construction projects and woody wastes would be (1) used by the wood or woodpulp industry, (2) chipped and reused as mulch or compost, or (3) burned in place under an open burning permit.

Metal Debris from Range Operations

The debris from range operations was calculated based upon the type, or types, of ordnance used. The mass of debris was calculated based upon the actual weight and composition of the utilized munitions according to several sources, including the Toxic Release Inventory-Data Delivery System (TRI-DDS) for small caliber munitions (DoD, 2006) and published information for guided and unguided bombs and large caliber munitions. The mass of casings, guidance units, and bullets was then multiplied by the quantity of ordnance. It was assumed that metallic debris would be recycled and therefore not disposed of in a debris landfill.

Debris from Aircraft Maintenance

Maintenance of the F-35 aircraft would result in the generation of debris from replacement parts and components. The estimate of debris was based upon information on the F-15 maintenance conducted at Robbins AFB where programmed depot maintenance is conducted. The F-35 aircraft is new, and valid waste estimates specific to the F-35 are not available at this time. The quantity of debris from aircraft maintenance was estimated using the quantities from the programmed depot maintenance multiplied by the number of F-35 aircraft anticipated at Eglin AFB. Although scrap metal debris will be generated from maintenance of the F-35 aircraft, it was assumed that the scrap metal debris would be recycled and would not result in an impact to landfill capacity as it is not disposed.

The volume of solid wastes (e.g., municipal solid waste, C&D waste, and metallic debris) calculated using the methodology outlined above was compared to existing generation and disposal rates for the wastes within the ROI. These volumes were used to establish a percentage increase in the solid waste generation and disposal rates for specific landfills within the region. The information was also used to evaluate potential impacts to the life expectancy of the landfill used in the evaluation. Landfill calculations assumed that all of the alternative-related debris would be disposed of at a single respective landfill.

3.9.4 Laws and Regulations

The Florida statutes and regulations governing solid waste management include:

- **Florida Solid and Hazardous Waste Management Act (Florida Statutes 29 Chapter 403)**: Requires that counties establish and operate solid waste

disposal facilities and that each county implement a recycling program to achieve reduction in the levels of solid waste disposed.

- **Florida Resource Recovery and Management Regulations (FAC 67.2)**: Establishes local resource recovery and management programs and regulates the collection, transport, storage, separation, processing, recycling, and disposal of solid wastes.
- **Florida Solid Waste Disposal Facility Regulations (FAC 62-701)**: Establishes regulations for the construction, operation, and closure of solid waste facilities including landfills.

The regulations governing solid waste disposal in Florida provide for three categories of landfills: Class I, Class II, and Class III. The permitting requirements for Class I and Class II landfills are the same. Class I and Class II landfills are differentiated based upon size, with Class II landfills being smaller than Class I. Class III landfills are landfills limited to the disposal of C&D (construction and demolition) debris or other inert wastes that are generally considered to be nonhazardous in nature or not water soluble. Solid wastes acceptable for disposal at a Class III landfill are limited to materials (concrete, wood, plastic, glass, etc.) that are not expected to produce leachate when disposed.

Air Force regulatory requirements for the management of solid waste are established by the AFPD 32-70, *Environmental Quality*. This Directive requires compliance with applicable federal, state, and local environmental laws and standards. For solid waste, AFPD 32-70 is implemented by AFI 32-7042, *Solid and Hazardous Waste Compliance*.

AFI 32-7042 requires that each installation have a solid waste management program that includes a solid waste management plan to address handling, storage, collection, disposal, and reporting of solid waste. AFI 32-7080, *Pollution Prevention Program*, contains the solid waste requirement for preventing pollution through source reduction, resource recovery, and recycling.

3.10 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

3.10.1 Definition

Hazardous Materials

Hazardous *materials* listed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Emergency Planning and Community Right-to-Know Act (EPCRA) are defined as any substances that, due to quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health, welfare, or the environment. Examples of

hazardous materials include petroleum products/fuels and paint-related products. It includes potential chemical releases to the environment resulting from proposed ordnance used in training operations.

Hazardous Wastes

Hazardous *wastes* listed under RCRA are defined as any solid, liquid, or contained gaseous or semisolid waste, or any combination of wastes that pose a substantive present or potential hazard to human health or the environment.

Asbestos

The affected resources include the potential presence in structures of asbestos. Asbestos is a naturally occurring mineral that is a very effective heat and sound insulator. Consequently, it has been used in many buildings as a fire and noise retardant. However, asbestos has been linked to several diseases, including lung cancer, and has not been used in construction materials since 1987. Friable (brittle) asbestos becomes hazardous when fibers become airborne and are inhaled.

Lead-Based Paint

The affected resources include the potential presence of lead-based paint (LBP) in structures. Lead was used as an additive and pigment in paints for many years prior to 1978; therefore, older structures on the base that have multiple layers of older paint are potential sources of lead. Lead has been associated with central nervous system disorders, particularly among children and other sensitive populations. Exposure to lead is usually through inhalation during renovation and demolition activities or through ingestion of paint chips or lead-contaminated drinking water.

Environmental Restoration Program Sites

Affected resources may also include Air Force Environmental Restoration Program (ERP) sites. The ERP is used by the Air Force to identify, characterize, clean up, and restore sites contaminated with toxic and hazardous substances, low-level radioactive materials, petroleum, oils, lubricants, or other pollutants and contaminants. The ERP has established a process to evaluate past disposal sites, control the migration of contaminants, identify potential hazards to human health and the environment, and remediate the sites.

3.10.2 Region of Influence and Existing Conditions

The ROI for hazardous materials and hazardous waste for the Proposed Action comprises Eglin AFB, including all areas on the installation that store and/or use hazardous materials or generate and/or store hazardous waste. The ROI is not solely limited to specific areas associated with the components of the Proposed Action, since

the impact of those actions may affect basewide hazardous waste generation rates and management of hazardous wastes.

Hazardous Materials Management

Eglin AFB has implemented a comprehensive Hazardous Material Management Process for the management of hazardous materials on the installation. This process comprises several elements. The first is the Hazardous Material Cell (HMC), a single point for hazardous material requests, evaluation, and authorization. The second element is the tracking system that connects the review/authorization and the distribution/collection process, the Hazardous Materials Management System (HMMS). Third is customer service-based storage and distribution process.

Key among these elements is the HMC, whose role is to screen, control, track and report the acquisition of hazardous materials. The HMC consists of representatives from each of the organizations on Eglin AFB that are most closely associated with hazardous material acquisition, storage, distribution, use and disposal: 96 LG (Supply), Bio-environmental Engineering (BEE), AAC/SEOG (Safety), 96 CEG/CEV (Environmental Management) and AAC/PK (Contracting). The HMC oversees the procurement of all hazardous material entering Eglin AFB. Hazardous materials are procured only for those organizations on base with an approved authorization. The HMC controls material procurement by monitoring material demand and maintaining warehouse stock levels sufficient to meet the demand and provide a reasonable working reserve (U.S. Air Force, 2003a).

The HMC manages hazardous materials by means of the HMMS computer database, an automated environmental tracking tool that controls and manages the use of hazardous materials from "cradle to grave." It provides for hazardous materials management, chemical distribution point management, and shelf-life and waste management. It tracks supply data, vendor information, shops, employees, and authorizations to use hazardous materials. Hazardous materials are authorized only for those organizations that demonstrate a legitimate requirement for the material and have the required expertise to manage and use that material in compliance with all applicable federal, state and local regulations. Materials are to be procured in the smallest unit of issue required to perform the process (U.S. Air Force, 2003a).

Eglin uses a shop-level issue point (IP) to consolidate and minimize hazardous materials in a centrally managed service-oriented function. Shops may maintain limited quantities of hazardous materials located in kits as approved by the IP operating instruction. Inventory management in the IP ensures stock is rotated; materials with sufficient remaining shelf-life are issued for customer use to preclude testing or disposal. This reduces the hazardous materials storage responsibility of each shop; reduces the overall risk of violating hazardous materials storage regulations; facilitates reuse to completion; and allows better overall management of shelf-life

materials. The information describing the hazardous material use of each base organization is automated for the purpose of basewide reporting (U.S. Air Force, 2003a).

Eglin has also developed programs to comply with all federal/state hazardous materials reporting requirements. This effort includes submittal to the state and local emergency planning committees and local fire departments of annual Tier II forms, which are updated inventories of hazardous materials (e.g., jet fuel, diesel) or extremely hazardous substances in excess of specific threshold limits.

Hazardous Waste Management

Eglin AFB is classified as a Large Quantity Generator of hazardous waste per Federal Guidelines Title 40 of the CFR 260.10 and 262.34. The installation maintains a USEPA hazardous waste generator identification number (FL8570024366).

Hazardous wastes are generated during operations and maintenance activities. Types of waste include combustible solvents from parts washers, inorganic paint chips from lead abatement projects, fuel filters, metal-contaminated spent acids from aircraft corrosion control, painting wastes (e.g., paper with chrome from overspray, thinners), battery acid, fixer, corrosive liquids from boiler operations, toxic sludge from wash racks, aviation fuel from tank cleanouts, and pesticides. Hazardous wastes are initially stored at approximately 155 Initial Accumulation Points (IAPs) at work locations. No more than 55 gallons of hazardous waste or 1 quart of acutely hazardous waste can be accumulated at these points. Once the storage limit is reached, the waste is taken to the central Hazardous Waste Accumulation Site, building 524, where the material may be accumulated for up to 90 days (U.S. Air Force, 2006e).

There are six accumulation sites on Eglin AFB. A licensed contractor, American Environmental Services, manages a central 90-day storage facility for collecting, consolidating, and processing hazardous waste. The other sites are managed by various organizations across the base. They transport the waste to the Defense Reutilization and Marketing Office (DRMO) Part B storage facility. A licensed disposal contractor under contract to DRMO picks up the wastes from the DRMO facility and transports it off base for disposal in a licensed disposal facility. In 2005, approximately 79 tons of hazardous waste were generated and disposed at Eglin AFB (Birdsong, 2006).

Eglin AFB has implemented a *Hazardous Waste Management Plan*, Air Armament Center (AAC) Instruction 32-7003 that identifies hazardous waste generation areas and addresses the proper packaging, labeling, storage, and handling of hazardous wastes. The plan also addresses record keeping; spill contingency and response requirements; and education and training of appropriate personnel in the hazards, safe handling, and transportation of these materials (U.S. Air Force, 2006e). Procedures and responsibilities for responding to a hazardous waste spill or other incident are also described in the

Eglin AFB *Spill Prevention, Control, and Countermeasures (SPCC) Plan* (U.S. Air Force, 2005d).

Asbestos-Containing Materials Management

Asbestos has been identified in older buildings at Eglin AFB. Asbestos-containing materials (ACMs) include insulation, floor tiles, mastic, pipe-wrap, roofing, and other materials, such as transite siding. Eglin maintains a computerized database system for the management of ACM. The system supports activities that include asbestos physical survey data (e.g., building number, survey date, inspector, location/functional space, material type/description, assessment comments); asbestos laboratory analysis data; and asbestos abatement data (e.g., abatement start/completion dates, contractor name, contractor rating, abatement cost, disposal fee, air monitoring costs, total cost). The database system provides Eglin AFB environmental staff with on-demand data for managing ACM.

ACM is managed in accordance with the base's *Asbestos Management Plan* (U.S. Air Force, 2004b) and Asbestos Operations Plan (U.S. Air Force, 2006f). These plans specify procedures for removal, encapsulation, enclosure, and repair activities associated with ACM abatement projects and are designed to protect installation personnel and residents from exposure to airborne asbestos fibers. The base manages asbestos in-place where possible; removing it only when there is a threat to human health or the environment or when it is in the way of construction or demolition. Removal and disposal of asbestos is carried out in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards.

Lead-Based Paint Management

An LBP survey conducted at Eglin AFB identified LBP in older buildings. As with ACM, Eglin has implemented a computerized database system for the management of LBP. Any projects that require alteration or demolition of identified or older structures are reviewed by the Civil Engineering and Bio-environmental Office and may trigger the requirement for LBP surveys. Project designs stipulate appropriate abatement and disposal requirements for LBP. Projects that are likely to crush lead-containing coatings to a form that can be inhaled or ingested are managed in accordance with federal, state, and local transportation, treatment, storage, and disposal requirements.

The Eglin AFB *Lead Based Paint Management Plan* provides specific policy and guidance to identify and address LBP hazards and to protect the public from exposure to these hazards (U.S. Air Force, 2004c). The plan also provides guidance on proper management/disposal of material containing LBP.

ERP Sites Management

The ERP is used by the U.S. Air Force to identify, characterize, clean up, and restore contaminated sites. As of June 2007, a total of 119 ERP sites have been identified at Eglin AFB as containing hazardous material resulting from past disposal activities. All 119 of these contaminated sites have remedies in place (U.S. Air Force, 2007d).

Additionally, Eglin AFB has identified 32 locations, grouped around eight sites, where there is suspected contamination associated with the past use of ordnance or munitions. These sites, referred to military Munitions Response Areas, are undergoing initial investigations to document the extent of any contamination (Armstrong, 2006). Eglin has implemented an *ERP Management Action Plan* to track activities and progress associated with contaminated sites on the installation (U.S. Air Force, 2003b).

3.10.3 Analysis Methodology

The analyses focused on how and to what degree the alternatives would affect hazardous materials usage and management and hazardous waste generation and management. Potential impacts related to hazardous materials and hazardous wastes were analyzed for the following three (3) effects:

1. Generation of hazardous waste types or quantities that could not be accommodated by the current management system
2. Increased likelihood of an uncontrolled release of hazardous materials that could contaminate soil, surface water, groundwater, or air
3. Adverse impacts to an existing ERP or installation restoration program (IRP) site

Generation of hazardous waste types or quantities that could not be accommodated by the current management system could result from the generation of waste classified as acute, which are very toxic and can be fatal to humans in small amounts. The analysis methodology utilized was to identify processes and activities associated with the Proposed Action and, using process knowledge or other available data, predict the type and quantity of hazardous waste that would likely be generated from these processes and activities. These data were compared to current generation rates, waste types, and base capability for managing hazardous wastes to determine the effects of hazardous waste on base management capabilities and the general classification of the base for hazardous wastes.

An increased likelihood of an uncontrolled release of hazardous materials that could contaminate soil, surface water, groundwater, or air, could result from the release of chemicals from ordnance use in firing range or field training activities. The analysis methodology utilized was to estimate ordnance-related chemical releases and evaluate the resulting potential impact of these releases on the environment. (Note: Potential impacts from

chemical releases to specific media (i.e., soil, water, air, biological resources) are discussed in each of those respective sections.)

Chemical releases to the environment from metallic residue resulting from the use of munitions, were based on the type and quantity of ordnance associated with 7SFG(A) and JSF range operations, combined with chemical composition data obtained from the TRI-DDS. The TRI-DDS database, which is a product of the Joint Service EPCRA Workgroup, is intended to provide a consistent method to assess chemical constituent data that may be used by DoD installations when reporting chemical releases and waste management practices.

Table 3-11 (TRI-DDS Surrogates used in the Analysis) lists the ordnance items that are projected to be used as part of 7SFG(A) and JSF range operations. Where detailed information regarding the munition item was available, such as specific DoD Identification Code (DODIC), TRI-DDS characterization data for that item was employed. In cases where only the item type (e.g., 9–millimeter [mm] round) was available, characterization data for a similar munition item (a surrogate) was utilized. (Note: Surrogate items are noted in the table.) The table includes a description of the ordnance item utilized in the analyses (obtained from the TRI-DDS) and the associated DODIC and National Stock Number (NSN).

Releases to the environment from munitions utilized in proficiency and qualification training require reporting to the USEPA under the EPCRA Toxic Release Inventory (TRI) program. Training is subject to a TRI reporting threshold of 10,000 pounds per year for most common chemicals, with lower reporting thresholds for chemicals classified as persistent bioaccumulative toxic (PBT). These chemicals include mercury, with a reporting threshold of 10 pounds, and lead, with a threshold of 100 pounds. In cases when a threshold is exceeded, the installation must report on a "Form R" report to the USEPA the quantity of munitions-related waste released to the environment or recovered and recycled.

Table 3-11. TRI-DDS Surrogates Used in the Analysis

Item	TRI-DDS Surrogate Item Description*	DODIC	NSN
7SFG(A) Operations			
9MM	CTG 9MM TP-T M939 F/AT-4 TRNR*	A358	–
5.56MM	CTG 5.56MM BALL M193*	A066	1305007731257
7.62MM	CTG 7.62MM NATO BALL M80*	A130	1305002314630
.45 CALIBER	CTG CAL .45 BALL M1911*	A475	1305005409227
.50 CALIBER	CTG CAL .50 4 AP M2/1 TR M17*	A530	1305000286562
12 GAUGE	CTG 12GA # 7 1/2 SHOT *	A014	–
40MM	CTG 40MM HEDP M430A1	B542	1310013625295
	CTG 40MM HEDP M433	B546	1310009920451
60MM	CTG 60MM SMK WP M302A1	B630	1310009263951
	CTG 60MM HE M720	B642	1310010227680

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Table 3-11. TRI-DDS Surrogates Used in the Analysis, Cont'd

Item	TRI-DDS Surrogate Item Description*	DODIC	NSN
81MM	CTG 81MM ILLUM M853A1	C871	1315012899789
	CTG 81MM HE M889/M889A1 W/ FUZE	C869	–
	CTG 81MM HE M821 W/MO FUZE M734	C868	–
	CTG 81MM HE M374A3 W/PD FUZE	C256	1315005637067
84MM	CTG & LAUNCHER 84MM M136 AT-4*	C995	–
FLARES	FLARE ACFT PARA M9A1*	L389	1370009844472
GRENADES	CHG PRAC HAND GRENADE M21*	G850	1330003085657
MINES	MINE AT HEAVY M19 NON METALLIC	K250	1345003488646
	MINE AT HEAVY M21	K181	1345001732716
	MINE AT HEAVY M15	K180	1345001732715
	MINE APERS M18A1 W	K145	1345009263950
	MINE APERS M18A1 W/ACCESSORIES	K143	1345007106946
	MINE APERS PRAC M8*	K105	1345005555870
ROCKETS	ROCKET HE 2.75INCH W/WHD & FUZE*	H490	1340007825852
SIMULATORS	SIMULATOR GROUND BURST M115A2*	L594	1370007528126
Total Demo/Devices	CHG DEMO BLOCK TNT 1LB*	M032	1375005297701
JSF Operations			
25 MM (TP)	CTG 25MM TP-T M793*	A976	1305013560189
Flares (MJU-8/27)	FLARE, IR CM, MJU-7/B*	L429	1370010385111
GBU-12 (inert)	BOMB PRAC MK82 LD INERT*	F243	–
GBU-12 (live)	BOMB GP 500LB MK82 MOD1*	E482	1325007106769

7SFG(A) = 7th Special Forces Group (Airborne); AP = Armor Piercing; CAL = Caliber; CHG = Charge; CTG = Cartridge; DODIC = Department of Defense Identification Code; GBU = Guided Bomb Unit; HE = High Explosive; HEDP = High Explosive Dual Purpose; ILLUM = Illuminating; IR CM = Infrared Countermeasure; JSF = Joint Strike Fighter; LB = Pound; MJU = Munitions Countermeasures Unit; MK = Mark; MM = Millimeters; NSN = National Stock Number; PRAC = Practice; TNT = 2, 4, 6-trinitrotoluene; TP = Training Projectile; TRI-DDS = Toxic Release Inventory-Data Delivery System; W/ = With; W/WHD = With Warhead; WP = White Phosphorous
* Surrogate used in the analyses

Eglin AFB has procedures to comply with TRI reporting requirements and would track ordnance use associated with the proposed alternatives. This could require new procedures if proposed training activities would result in reporting thresholds being exceeded at the base for any new chemicals.

Adverse impacts to an existing ERP/IRP site could be caused by disturbing the ground in a site identified as having contaminated soil or by causing damage to existing site remediation infrastructures (e.g., pumps, tanks) from proposed activities. The analysis methodology identified existing ERP/IRP sites and compared the location of these sites with the location of proposed activities. Site-specific conditions, such as the existence of land use controls, were analyzed against proposed construction/training activities to assess the extent of impacts that overlapped existing ERP/IRP sites.

3.10.4 Laws and Regulations

Hazardous wastes must meet either a hazardous characteristic of ignitability, corrosivity, toxicity, or reactivity under 40 CFR 261 or be listed as a waste under 40 CFR 261.

Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 USC 669 et seq. Emissions of asbestos fibers to ambient air are regulated under Section 112 of the Clean Air Act.

Lead contamination is regulated by the Toxic Substances Control Act (TSCA), Titles I and IV, and OSHA. Additionally, the Lead-Based Paint Poisoning Prevention Act (42 USC 4821 et seq.), as amended by the Residential Lead-Based Paint Hazard Reduction Act of 1992 (Public Law 102-550, also known as Title X), requires that lead-based paint hazards in some federal structures be identified and eliminated.

The Air Force ERP provides for internal standards and procedures for dealing with past contaminated areas. Although this program was developed in order to ensure compliance with hazardous materials standards promulgated under CERCLA and RCRA, it is not specifically regulated or enforced by any outside agency.

3.11 PHYSICAL RESOURCES

Physical resources include topography, geology, soils, and water. Topography pertains to the relief (elevation) and landforms of a given region. Geological resources of an area consist of surface and subsurface parent materials and their inherent properties. Geology is not addressed in this EIS since there would be no impacts to the geology based on implementation of any of the proposed actions or alternatives. However, topography is addressed since this includes the slope of a particular affected environment. Soil/sediment refers to unconsolidated materials formed from the underlying bedrock or other parent material. Water resources pertain to freshwater, aquatic environments such as wetlands, rivers, creeks, streams, aquifers, and the marine environment such as sounds, bays, estuaries, and the Gulf of Mexico. In this EIS, both soil and water resources play critical roles in evaluating potential ground stabilization pertaining to the physical environment of a particular area.

3.11.1 Definition of Soils

Soil is produced by forces of weathering and soil formation acting on parent material (U.S. Air Force, 2003c). The main processes of soil formation are accumulation of organic matter, leaching of calcium carbonate, reduction of iron, and the reduction of silicate clay minerals. If all of these processes do not occur, the resulting matrix is then referred to as sediment.

Under certain conditions, interaction between stormwater runoff and the soil surface, in association with land disturbances, can create conditions prone to exacerbate erosion. This may result in adverse effects to land and water resources. In the absence of intervention, the loss of soil through human-induced activity can lead to erosion and permanent loss of soil. Soil erosion is a process of displacement and deposition of surface materials by either wind or water. Erosion can reduce land productivity, pollute waters, and degrade habitats.

Eroded soil particles moved and deposited by water are known as sediment. The delivery and deposition of sediment in waterways is known as sedimentation. Sediment generated by erosion can alter water quality, aquatic habitats, and hydrologic characteristics of streams and wetlands, damage or destroy cultural resources, reduce recreational usage, and increase flooding. Once erosion has occurred, it can lead to increased land management and operating costs. Sediment erosion can also serve as a transport for chemical contaminants that may be attached to sediment particles (U.S. Air Force, 2003c).

3.11.2 Region of Influence and Existing Conditions – Soils

The affected environment for physical resources includes the soil resource areas that lie within the boundaries of the proposed cantonment and training areas. These areas would vary among the components of the Proposed Action and alternatives, so the ROI and existing conditions for each alternative are discussed in sections related to each alternative in Chapters 4 through 7.

3.11.3 Analysis Methodology – Soils

Soils in the proposed project area were evaluated to identify soil types, define prominent soil properties, and describe relevance to possible soil erosion. Soil types and properties are critical when determining the level of soil erosion that can occur. If activities were to occur in an area where soil loss or erosion is high, the potential effects can damage waterways, cause ground instability, and impact animal and human habitats.

Soil is defined in terms of permeability, erodibility, composition, and the topography (slope) at proposed project locations. Soil drainage, texture and strength combine to determine erosion, thus determining the suitability of the ground to support structures, and facilities, as well as military activities. The environment for soils that may be affected by proposed changes from training and construction and demolition are evaluated in this EIS. The following attributes were examined to determine soil suitability for the proposed activities:

- **Natural surface road construction.** Soil properties such as slope, rock fragments, ponding, and soil slippage could cause problems for roads of minimal design

and construction. These are possible issues since soil type and associated soil properties are important stability factors.

- **Small commercial buildings.** Soil properties that influence site selection should be weighed for design, construction, and maintenance of structures greater than three stories high and that are without basements. Rating terms (low, medium, or high erosion) indicate the extent to which structures affect soil features such as erosion and runoff. Construction of structures in medium and high erosion rating soil types could require engineering actions to protect soils and structures.
- **Corrosion of concrete and steel.** Susceptibility of concrete and uncoated steel to decompose exists when in contact with the soil. Variability for corrosion or decomposition is a direct result of soil acidity. Corrosion is the result of soil-induced electrochemical or chemical action that breaks down and weakens concrete and steel in the soil. High soil acidity is specified in county soil surveys (e.g., Overing et al., 1995) and could require additional engineering actions where structures are proposed.

The above attributes were considered when evaluating soil potential for construction, demolition, and training. Adverse impacts to soils and associated potential indirect impacts to water resources can be minimized through the implementation of best management practices (BMPs). The Air Force would be expected to comply with these practices as specified in existing or required permits (discussed in Section 3.11.4).

3.11.4 Laws and Regulations – Soils

Typically, compliance with the Clean Water Act and the NPDES program administered by the USEPA or state environmental quality departments are mandated. Further, a Construction General Permit for surface disturbance of 1 or more acres is required. Compliance with this permit involves developing and implementing a Storm Water Pollution Prevention Plan (SWPPP) and erosion and sediment control plan that includes site-specific mitigation measures. Among other requirements, this SWPPP would:

1. Describe slopes, drainage patterns, areas of soil disturbance, areas where stabilization practices will occur, water locations, and storm discharge locations.
2. Describe erosion and sediment controls, BMPs, and construction site measures (e.g., implementing mitigation measures such as vegetating barren slopes over 15 percent, and using hay bales and silt fences to reduce surface runoff into local waterways).
3. Outline stabilization and structural plans to permanently stabilize soils and divert water off site and manage stormwater.
4. Provide control for potential pollutants, use approved state and local plans, and prevent non-stormwater discharges.
5. Provide for maintenance and inspection of all designed systems.

3.11.5 Definition of Water Resources

Groundwater

Groundwater is defined by the U.S. Geological Survey (USGS) as "all subsurface water" (USGS, 2004). Subsurface water that is in significant enough amounts to tap via a well are referred to as aquifers. The two aquifers located under Eglin AFB are the Sand and Gravel Aquifer and the Floridan Aquifer. Eglin AFB uses only a small amount of water from the Sand and Gravel Aquifer, but the Floridan Aquifer is used extensively for drinking water. The Floridan Aquifer is located below the Sand and Gravel Aquifer and extends beneath peninsular Florida. The descriptions of the Sand and Gravel Aquifer and Floridan Aquifer given below apply to all of Eglin AFB, and therefore all proposed and alternative actions in this EIS.

Sand and Gravel Aquifer

The Sand and Gravel Aquifer consists of Citronelle formation and marine terrace deposits, which begin at the land surface. The thickness of the Sand and Gravel Aquifer at Eglin ranges from 25 to 300 feet. Water flows generally south to southeast. Although the aquifer is composed of clean, fine-to-coarse sand and gravel, locally it contains some silt, silty clay, and peat beds. The Sand and Gravel Aquifer is segregated from the underlying limestone of the Floridan Aquifer by the Pensacola Clay confining bed. Water in the Sand and Gravel Aquifer exists in generally unconfined (a free water surface or water table conditions) and confined (under pressure) conditions (Becker et al., 1989). The quality of water in the aquifer has been rated good (i.e., meets its intended use) by the FDEP (U.S. Air Force, 1995). Water from this aquifer is not a primary source of domestic or public supply water on Eglin AFB because of the large quantities of higher quality water available from the underlying Upper Limestone of the Floridan Aquifer (Becker et al., 1989; Overing et al., 1995).

Floridan Aquifer

The Floridan Aquifer consists of a thick sequence of interbedded limestone and dolomite. The top of the aquifer is about 50 feet below mean sea level (MSL) in the northeast corner of the base and increases to about 700 feet below MSL in the southwestern area of the base. The top of the aquifer is about 400 to 450 feet below MSL in the main base area. The thickness of the potable-water zone in the aquifer varies from less than 250 feet along the Gulf of Mexico to over 750 feet in central Okaloosa and Walton Counties. Water flow direction is northeast to southwest. Throughout the Eglin Reservation, the Floridan Aquifer exists under confined conditions, bounded above and below by the Pensacola Clay Formation confining bed. This clay layer restricts the downward migration of pollutants and restricts saline water from Choctawhatchee Bay and the Gulf of Mexico from entering the upper limestone layer of the aquifer. The clay layer of the Bucatunna Formation separates the upper and lower limestone units. Since this layer has a high saline content, the lower limestone unit is not used as a water

source (Overing et al., 1995). Groundwater storage and movement in the upper limestone layer occurs in interconnected, intergranular pore spaces, small solution fissures, and larger solution channels and cavities. The wells on Eglin AFB tap into both the Sand and Gravel and Floridan Aquifers and are used for both potable and nonpotable supply.

Surface Water

Surface waters have the potential to be impacted by land clearing and construction and demolition activities. Surface waters include bays, bayous, lakes, rivers, streams, ponds, and springs.

The FDEP divides river basins across Florida into groups, which the FDEP addresses according to an established rotation schedule. The eastern portion of Eglin AFB drains to the Choctawhatchee-St. Andrews Bay Basin (Group 3) and the west side drains into the Pensacola Bay Basin (Group 4) (FDEP, 2006a). Surface waters on Eglin AFB are Class 3 waters, meaning that they are designated for "recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife" (FDEP, 2006a). Impaired waters on or adjacent to Eglin AFB include: Boggy Bayou, Poquito Bayou, Rocky Bayou State Park, Choctawhatchee Bay, East Bay, and Yellow River (FDEP, 2006c and FDEP, 2006d).

Wetlands

Wetlands are areas of transition between terrestrial and aquatic systems where the water table is usually at or near the surface. Conversely, these can occur where shallow water covers land (U.S. Fish and Wildlife Service [USFWS], 1979). Factors such as morphology, hydrology, water chemistry, soil characteristics, and vegetation contribute to the diversity of wetland community types. The term *wetlands* describe marshes, swamps, bogs, and familial areas. Local hydrology and soil saturation largely affects soil formation and development as well as the plant and animal communities found in wetland areas (USEPA, 1995). One of the most important factors in establishing and maintaining wetland processes is wetland hydrology, which is the inflow and outflow of water through a wetland and its interaction with other site characteristics (Mitsch and Gosselink, 2000).

Wetlands are defined in the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual 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" (USACE, 1987). The majority of jurisdictional wetlands (wetlands that fall under state or federal regulatory authority) in the United States are described using the three wetland delineation criteria: hydrophytic vegetation, hydric soils, and hydrology (USACE, 1987).

Floodplains

Floodplains are lowland areas adjacent to surface water bodies (i.e., lakes, wetlands, and rivers), where flooding events periodically cover flat areas with water. Floodplain vegetation and soils act as water filters, intercepting surface water runoff before it reaches lakes, streams, or rivers and store floodwaters during flood events. This filtration process aids in the removal of excess nutrients, pollutants, and sediments from the water and helps reduce the need for costly cleanups and sediment removal. Conversely, if soils and sediments are contaminated, these contaminants can then be deposited on floodplains.

The Coastal Zone

The term *coastal zone* is defined as coastal waters and adjacent shorelands strongly influenced by each other and in proximity to the several coastal states, and including islands, transitional and inner tidal areas, salt marshes, wetlands, and beaches. The entire state of Florida is considered part of the Coastal Zone and is subject to the CZMA. Coastal waters are defined as any waters adjacent to the shoreline that contain a measurable amount of sea water, including but not limited to sounds, bays, lagoons, bayous, ponds, and estuaries. The outer boundary of the coastal zone is the limit of state waters, which for the Gulf coast of Florida is 9 nautical miles from shore. Some components of the Proposed Action would take place within the jurisdictional concerns of the FDEP and therefore required a consistency determination with respect to Florida's Coastal Zone Management Plan and the CZMA (Appendix I, *CZMA Determination*).

Stormwater

Stormwater-carried sediment can alter water quality, aquatic habitats, hydrologic characteristics of streams and wetlands, and increase flooding. Land-disturbing activities (such as clearing) and the addition of impermeable surfaces (concrete, asphalt, etc.) would result in increases in stormwater runoff. The effects, however, vary based on the amount of new impervious surface areas, topography, rainfall, soil characteristics, and other site conditions. The rate and volume of stormwater runoff has the potential to impact the quality and utility of water resources (FDEP, 2002).

3.11.6 Region of Influence and Existing Conditions – Water Resources

Water resources are distributed across Eglin AFB. Depending upon the alternative, one or more water resources may be affected by BRAC-related activities. Because the affected resources would differ among the alternatives, the ROI and existing conditions in that area would differ as well. For that reason, the ROI and existing conditions are addressed in the alternative-specific sections in Chapters 4 through 7.

3.11.7 Analysis Methodology – Water Resources

Analysis of potential impacts began by identifying and mapping the location of each alternative and the water resources in and around each alternative area. This allowed for the determination of direct impacts to water resources (construction in floodplains, etc.) for each alternative.

Further analysis focused on stormwater runoff and possible increases in runoff volume and velocity due to land clearing and increases in impervious surfaces over current conditions. To determine stormwater runoff volume and velocity changes, the Natural Resources Conservation Service (NRCS) WinTR-55 computer model was utilized. WinTR-55 is a single-event rainfall-runoff small watershed hydrologic model based on the U.S. Department of Agriculture, Soil Conservation Service TR-55 (NRCS, 2005). The model allows great flexibility in subdividing watershed areas, calculates combined land use and soil type parameter values based on the multiple land uses and soil types in one location, and provides calculations of other necessary parameters. The WinTR-55 model was run for each alternative using current condition values and the proposed land development values to determine pre- and post-Proposed Action conditions. See Appendix G, *Physical Resources*, for a more detailed explanation of the WinTR-55 model and how it was used.

The USEPA gives guidance on acceptable stormwater runoff volumes and velocities in its *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. Chapter 4, Section II of that document states, "To the extent practicable, maintain postdevelopment peak runoff rate and average volume at levels that are similar to predevelopment levels" (USEPA, 1993). Using this guidance, impacts were determined by comparing calculated pre- and post-Proposed Action stormwater runoff volumes and velocities obtained from the WinTR-55 model.

3.11.8 Laws and Regulations – Water Resources

The state of Florida has developed and retains jurisdiction for surface water quality standards for all waters of the state in accordance with the provisions of the Clean Water Act (CWA). Section 303 of the CWA requires the state to establish water quality standards for waterways, identify those that fail to meet the standards, and take action to clean up these waterways. Florida recently adopted the Impaired Waters Rule (FAC 2-303), with amendments, as the new methodology for assessing the state's waters for 303(d) listing. The FDEP submits names of surface waters that are determined to be impaired, using the methodology in the Impaired Waters Rule and adopted by secretarial order, to the USEPA for approval as Florida's 303(d) list. The FDEP submits updates to Florida's 303(d) List of Impaired Surface Waters to the USEPA every two years. The 2006 Integrated Water Quality Assessment for Florida: 2006 305(b) Report and 303(d) List Update (FDEP, 2006b) satisfies the listing and reporting requirements of Sections 303(d) and 305(b) of the CWA.

USACE is the lead agency in protecting wetland resources. This agency maintains jurisdiction over federal wetlands (33 CFR 328.3) under Section 404 of the CWA (30 CFR 330) and Section 10 of the Rivers and Harbors Act (30 CFR 329). The USEPA assists USACE (in an administrative capacity) in the protection of wetlands (40 CFR 225.1 to 233.71). The state of Florida regulates wetlands under the Wetlands/Environmental Resource Permit program under Part IV, Florida Statutes Section 373. Furthermore, EO 11990, *Protection of Wetlands*, offers additional protection to these resources. In addition, the USFWS and the National Marine Fisheries Service (NMFS) have important advisory roles. The FDEP's Chapter 62-312, Dredge and Fill Program, affords regulatory protection to wetland resources (protection from excavating or filling a wetlands area with dirt, rip-rap, and so on) at the state level. The FDEP issues a Section 401 certification under the authority of the CWA (40 CFR 230.10[b]). Section 401 of the CWA requires federal agencies to obtain certification from the state before issuing permits that would result in increased pollutant loads to a water body. The certification is issued only if such increased loads would not cause or contribute to exceedances of water quality standards (USEPA, 2006c). Stormwater management is addressed in Chapter 62-346, FAC, which stipulates permits required for the construction, alteration, or maintenance of stormwater management systems in northwest Florida. Under Chapter 62-346, FAC, any changes to or creation of stormwater management systems by the project would require an individual permit. Consumptive uses of water are regulated by the state according to Chapter 40 A-2, FAC, which addresses withdrawal guidelines, required permits, water use, and special conditions.

Federal agencies must evaluate any proposed activity to determine whether it would occur within a floodplain. Agencies must address those areas that have a 1 percent chance of floodwater inundation in a given year (also known as a 100-year floodplain). EO 11988, *Floodplain Management*, requires federal agencies to avoid adverse impacts associated with the occupancy and modification of floodplains and to avoid floodplain development whenever possible. Parts of the floodplain that are also wetlands receive further protection under USACE's Section 404 Permit Program.

The CZMA provides for the effective, beneficial use, protection, and development of the U.S. coastal zone. Federal agency activities in the coastal zone are required to be consistent to the maximum extent practicable with approved state Coastal Zone Management Plans. Federal agencies make determinations whether their actions are consistent with approved state plans and submit these determinations for state agency review and concurrence. All relevant state agencies must review the Proposed Action and issue a consistency determination. The Florida Coastal Management Program is composed of 23 Florida statutes administered by 11 state agencies and four of the five water management districts (U.S. Marine Corps, 2003).

3.12 BIOLOGICAL RESOURCES

3.12.1 Definition

Biological resources include the native and introduced terrestrial and aquatic plants and animals found on and around Eglin AFB. The habitats of Eglin AFB are home to an unusually diverse biological community including several sensitive species and habitats.

Eglin applies a classification system of ecological associations to all its lands, based on floral, faunal, and geophysical characteristics. Four broad matrix ecosystems exist on Eglin AFB: Sandhills, Flatwoods, Wetlands/Riparian, and Barrier Island. Artificially maintained open grasslands/shrublands and urban/landscaped areas also exist on Eglin, primarily on test areas and Main Base. Appendix H, *Biological Resources*, provides descriptions of the ecological associations at Eglin AFB and includes typical flora (plants) and fauna (animals) found within each of these associations.

Sensitive habitats include areas that the federal government, state government, or the DoD have designated as worthy of special protection due to certain characteristics such as high species diversity, rare plant species, or other unique features. Sensitive habitats on Eglin AFB include State Aquatic Preserves, Significant Botanical Sites, Outstanding Natural Areas, High Quality Natural Communities, piping plover critical habitat, Gulf sturgeon critical habitat, and essential fish habitat (EFH). Wetlands and floodplains are covered in Section 3.11. Appendix H, *Biological Resources*, provides details on the sensitive habitats found at the Proposed Action areas.

Sensitive species are those species protected under federal or state law (see Section 3.12.4), to include migratory birds and threatened and endangered species. An *endangered* species is one that is in danger of extinction throughout all or a significant portion of its range. A *threatened* species is any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Also, Appendix H, *Biological Resources*, provides additional detail on the natural history of sensitive species related to the Proposed Action.

3.12.2 Region of Influence and Existing Conditions

Ecological associations and associated flora and fauna differ geographically across Eglin AFB. Therefore, the ROI and existing conditions with respect to biological resources are different among the alternatives being analyzed. Consequently, the ROI and existing conditions are addressed in sections associated with each individual alternative in Chapters 4 through 7.

Eglin AFB has conducted an Endangered Species Act (ESA) Section 7 consultation with the USFWS on federally listed species for all of the preferred alternative locations

(Appendix H, *Biological Resources*). Biological surveys conducted by FNAI for sensitive species have been completed and the results of these surveys revealed no significant changes to current data. The FNAI surveys provided a more thorough knowledge of state listed species and can be found in Appendix H, *Biological Resources*.

3.12.3 Analysis Methodology

The first step in the analysis of potential impacts to biological resources was to determine the locations of sensitive habitats and species in relation to the Proposed Action. Maps were examined to locate sensitive species and habitats, and where necessary, site visits and additional surveys were conducted to confirm locations. Next, areas of overlap for the Proposed Action and sensitive habitats and species were identified. Scientific literature was reviewed for studies that examined similar types of impacts to biological resources. The literature review included a review of basic characteristics and habitat requirements of each sensitive species. Where available, information was also gathered relative to management considerations, incompatible resource management activities, and threats to each sensitive species. Impact analyses were then conducted based on the information gathered from the literature review and discussions with experts in these areas. The analyses included an assessment of the impacts on biological resources resulting from both construction activities and daily operations.

Where appropriate, projected conditions were compared to the baseline, and a determination was made as to whether the impact would be beneficial or adverse. For biological resources, conclusions were drawn regarding the extent of impacts in which the level of anticipated impact is or is not likely to result in jeopardizing the continued existence of the species (USFWS, 2007). Direct and indirect impacts to the species and its habitat are included in the analysis. The USFWS considers any impact to be significant if potential impacts are anticipated and the action is likely to jeopardize the continued existence of the species.

3.12.4 Laws and Regulations

The ESA of 1973 (16 USC 1531 to 1544; 1997–Supp) was enacted to provide for the conservation of endangered and threatened species and the ecosystems on which they depend. AFPD 32-70 directs the implementation of the ESA. Certain federal activities may require an ESA Section 7 consultation with the USFWS and/or NMFS if impacts to federally listed species are possible. Avoidance of impacts by changing the time of action, place of action, or types of activities in locations of federally listed species can be cost- and time-effective if a consultation is avoided.

AFI 32-7064 provides details on how to manage natural resources in such a way as to comply with federal, state, and local laws and regulations. This AFI calls for the protection and conservation of state-listed species when not in direct conflict with the

military mission. Eglin AFB applies for appropriate permits for actions that may affect state-listed species (such as monitoring and handling), and also cooperates with the Florida Fish and Wildlife Conservation Commission (FWC) to further the goals of the Florida State Wildlife Conservation Strategy.

The Bald Eagle Protection Act (16 USC 668–668d) prohibits the taking or possession of and commerce in bald eagles. Taking includes the pursuit, shooting, poisoning, wounding, killing, capture, collection, molesting, disturbance, or trapping of an eagle. The Act prohibits that anyone possess, sell, purchase, or transport a bald eagle, alive or dead, or any part, nest, or egg of these eagles at any time.

The Migratory Bird Treaty Act (16 USC 703-712; 1997-Supp) and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, protect migratory birds and their habitats and establish a permitting process for legal taking. A migratory bird is defined by the USFWS as any species or family of birds that lives, reproduces, or migrates within or across international borders at some point during their annual life cycle. Except as permitted, for normal and routine operations such as installation support functions, actions of the DoD may not result in pursuit, hunting, taking, capturing, killing, possession, or transportation of any migratory bird, bird part, nest, or egg thereof. The DoD must address these routine operations through the Memorandum of Understanding (MOU) developed in accordance with EO 13186 (DoD and USFWS, 2006). Under the 2003 National Defense Authorization Act, the Armed Forces are exempted from the incidental taking of migratory birds during military readiness activities, except in cases where an activity would likely cause a significant adverse effect on the population of a migratory bird species. As detailed in the final rule in the Federal Register (50 CFR 21), in this situation, the Armed Forces, in cooperation with the USFWS, must develop and implement conservation measures to mitigate or minimize the significant adverse impacts (Federal Register, 2007).

The Marine Mammal Protection Act of 1972 (MMPA) establishes a comprehensive federal plan to conserve marine mammals. The central feature of the MMPA is a moratorium on the "taking" of all marine mammals. This broad prohibition applies to all marine mammals, not just those deemed to be threatened or endangered. The term *take* is defined by the MMPA as to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal. Although the MMPA establishes a moratorium on the taking of marine mammals in U.S. waters by any person and by U.S. citizens in international waters, certain activities are exempted from the moratorium as outlined in Sections 101 and 104. The category pertinent to Eglin AFB is that of incidental take during nonfishery activities (Section 101). An authorization is required to participate in such a designated activity. Such authorization is known as a Letter of Authorization. If the take would be by harassment only, an Incidental Harassment Authorization may be issued.

Invasive nonnative species are species introduced from other countries or regions of the United States that threaten native plants and animals by altering the composition, structure, and function of native ecosystems. Invasive nonnative species impose large economic costs on natural resource managers, requiring intensive and extensive management to prevent undesirable ecosystem changes. Recognizing the ecological and economic impacts of invasive species, the President of the United States issued EO 13112, which states that each federal agency whose actions may affect the status of invasive species shall:

- Prevent the introduction of invasive species,
- Detect and respond rapidly to and control populations of such species in a cost effective and environmentally sound manner,
- Monitor invasive species populations accurately and reliably,
- Provide for restoration of native species and habitat conditions in ecosystems that have been invaded,
- Conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control, and
- Promote public education on invasive species.

EO 13112 states that no Federal agency shall authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive nonnative species in the United States or elsewhere.

3.13 CULTURAL RESOURCES

3.13.1 Definition

Cultural resources consist of prehistoric and historic sites, structures, artifacts, and any other physical or traditional evidence of human activity considered relevant to a particular culture or community for scientific, traditional, religious, or other reasons. As defined under 32 CFR 800 (l)(1), "Historic Property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria."

The alternative-specific Cultural Resources sections within Chapters 4, 5, 6, and 7 of this EIS describe known historic properties within the affected areas that are potentially eligible for the NRHP. This includes any archaeological resources considered eligible,

potentially eligible, or currently listed on the NRHP. This may also include historic structures, historic districts, any of the known historic cemeteries, or traditional cultural properties (TCPs). To date Eglin AFB has not performed studies to identify TCPs. Additional discussion of TCPs can be found in Appendix F, *Cultural Resources*.

3.13.2 Region of Influence and Existing Conditions

For the purpose of this EIS, cultural resources, with a description of their state of investigation and condition, are presented for analysis as they intersect with the Area of Potential Effect (APE) created by the undertaking. The ROI as defined in this document is equivalent to the APE designation utilized within the National Historic Preservation Act of 1966 (NHPA). As defined under 36 CFR 800.16(d), "the Area of Potential Effects is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The area of potential effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking." The APE for this project is assumed not to extend beyond the footprint of the project boundaries as defined under each alternative area.

NHPA obligations (as described herein and in Appendix F) for a federal agency are independent from the NEPA process and must be complied with even when environmental documentation is not required. When both are required, the Air Force coordinates NEPA compliance with their NHPA responsibilities to ensure that historic properties, as defined under 36 CFR 800.16(l)(1) are given adequate consideration. As per AFI 32-7065, Section 3.3.1, and 36 CFR 800.8(a), the Air Force has chosen to incorporate NHPA Section 106 review into the NEPA process, rather than substituting the NEPA process for a separate NHPA Section 106 review of alternatives (AFI 32-7065, Section 3.3.2, and 36 CFR 800[c]).

Properties identified in the APE by the Air Force are evaluated according to the NRHP criteria, in consultation with the State Historic Preservation Officer (SHPO) and other parties. Typically, if the SHPO and other parties and the Air Force agree in writing that a historic property is eligible or not eligible to the NRHP, that judgment is sufficient for Section 106 purposes (36 CFR 800.4[c][2]). Procedures and criteria for this can be found in 36 CFR 63, Determinations of Eligibility for Inclusion in the National Register of Historic Places and in Eglin's Integrated Cultural Resource Management Plan (Eglin AFB, 2004d).

Consultation and Section 106 Coordination Efforts

This section presents a summary of the status of project-specific consultations made under NHPA Section 106. A full description of these activities can be found in Appendix F, *Cultural Resources*.

As part of the Section 106 planning process, Eglin AFB consulted with the Alabama SHPO, the Florida SHPO, the National Trust for Historic Preservation, the Strategic Air Command (SAC) Memorial Project group, the Friends of Florida, and the City of Valparaiso. Also, four federally recognized tribes were consulted: the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, the Poarch Band of Creek Indians, Alabama, and the Muskogee (Creek) Nation of Oklahoma.

In functional integration with the NEPA scoping process for the project, the Air Force initiated discussion of cultural resources as they related to proposed BRAC activities in the summer of 2006 with the mailing of a Public Scoping meeting invitation to all potentially interested parties (details are provided in Appendices A, *Public Involvement*, and F, *Cultural Resources*). Formal initiation of Section 106 followed in September 2006 with notifications made to the Florida SHPO and the Advisory Council on Historic Preservation (ACHP). Discussions of potential adverse impacts to the SAC Alert District began in late 2006 and included consultation with the SAC Memorial Project Group.

The issue of JSF air operations was discussed at length with the Florida SHPO in late 2007. The four federally recognized tribal groups were consulted in the spring of 2008 regarding air operations. Consultation with the Alabama SHPO was initiated in February 2008, with focus on JSF flight operations over Alabama. An initial records search was made for buildings 50 years or older within the JSF 65+dB noise envelope, but formal inventory of such historic properties outside Eglin AFB fee title lands was not conducted.

A project specific programmatic agreement (found in Appendix F, *Cultural Resources*) was developed concurrent with the EIS and NEPA scoping process, and it accounts for all necessary and anticipated inventory of historic properties (36 CFR 800.16(l)(1)), assessment of adverse effects, and resolution of such effects. Specific actions for cultural resources planning and mitigation efforts remaining to be completed are specified in the project-specific programmatic agreement, and elsewhere in Appendix F, *Cultural Resources*, and the EIS. Those key actions remaining to be completed are:

1. Cantonment

   (a) Eglin AFB will resolve the anticipated adverse effects of demolition on buildings 1339, 1343, 1345, 1352, and 1353 in the following manner:

      (1) Update SHPO-approved site forms for each structure in all three areas of the SAC Alert Historic District.

      (2) Complete a SHPO-approved Resource Group Form for the district as a whole.

(3) Digitally photograph in color all elevations of each building planned for demolition using a digital camera of 5 megapixels or greater resolution. All photographs will meet the Florida Master Site File photographic documentation requirements issued by the SHPO.

(4) Compile an electronic copy of the floor plans for each building planned for demolition to be stored on a CD or other suitable archival quality media.

(5) Prepare a technical report containing the results of tasks (1) through (4), as well as a comprehensive history of the SAC Alert program and Eglin's role in the SAC mission.

(6) Prepare an educational booklet designed for the general public summarizing the history of the SAC Alert program and Eglin's role in the SAC mission.

(b) As stipulated in Section 8.C of the 2003 programmatic agreement, Eglin AFB will, prior to the approval of demolition and in consultation with the SHPO, identify and, where appropriate, salvage any character-defining historic interior or exterior features of the buildings to be demolished, when such salvage is reasonable, feasible, and prudent.

(c) Once tasks (1) through (3) above, as described in Stipulation IV.D.1 (a) of the 2003 programmatic agreement, have been completed, Eglin AFB may proceed with the development as needed. Tasks (4) through (6) shall be completed within 12 months of completing tasks (1) through (3).

(d) All treatment shall be carried out by a professional meeting the qualification standards in Stipulation V of the programmatic agreement.

(e) Draft copies of all reports and other documentation prepared pursuant to Stipulation IV.D.1 (a) of the programmatic agreement will be submitted to SHPO for a 30-day review. If SHPO does not respond within 30 days, Eglin AFB will assume SHPO has no objection to the documents as drafted. In completing the draft documents, Eglin AFB will take into account any comments it receives from SHPO within the 30-day review period. Final copies of all materials will be submitted to the SHPO and the Florida State Archives. Eglin AFB will make available to the public copies of the final report and the educational booklet upon request

2. Bombing Ranges

   (a) All archaeological sites that are either determined NRHP eligible or are potentially eligible to the NRHP shall, whenever possible, be avoided and preserved in place following the avoidance procedures in Stipulation III.E.1 (a) through (c).

   (b) To ensure that avoidance is achieved in a consistent and coordinated manner, Eglin AFB shall consult with JSF to determine which of the avoidance measures identified in Stipulation III.E.1 are best utilized to achieve avoidance. If some other measure better achieves avoidance for the purpose of JSF use of the bombing ranges, then Eglin AFB, in consultation with SHPO, shall utilize that measure. Eglin AFB shall provide JSF with copies of the maps identifying all avoided sites and buildings, submitted in a form useful to JSF, and will periodically update these maps as needed. A copy of the maps and any updates will also be provided to the SHPO with a description of the avoidance measures used for each historic property. Periodically, Eglin AFB shall brief appropriate JSF staff on the importance of protecting cultural resources, the sensitivity of cultural resources data, and the need to limit access to this data.

   (c) If avoidance is not possible or desirable, Eglin AFB will, as needed, make a determination of NRHP eligibility in accordance with Stipulation III.C. Any NRHP eligible archaeological site or historic building or structure identified within the bombing ranges that cannot be protected through avoidance will be adversely affected by the undertaking. Eglin AFB shall coordinate with JSF and follow the procedures in Stipulation III.E.2 through III.E.4, as applicable, to resolve the adverse effects.

3. Air Fields

   If, as a result of increased aircraft noise, Eglin AFB proposes to abandon buildings or structures that either contribute to the NRHP eligibility of the SAC Alert Historic District, the Eglin Field Historic District, the Warehouse Historic District, or the Marine Operations Historic District, or any one of the individually eligible historic buildings or structures, then prior to abandonment, Eglin AFB shall consult with SHPO regarding treatment of adverse effect and may enter into a Memorandum of Agreement for that purpose.

3.13.3 Analysis Methodology

Effects (i.e., impacts) to cultural resources are defined as "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the

National Register" (36 CFR 800.16(i)). For the purposes of this analysis, impacts are discussed as either adverse or not adverse. An adverse effect "is any physical intrusion to an individual structure, district, or other cultural resource or to its surrounding property boundary caused by the proposed action" (40 CFR 1508.8).

There are three types of effects when considering historic properties. These include "No historic properties affected," which applies when there are no historic properties present or there are historic properties present but the undertaking will have no effect upon them; "No adverse effect," which means that there is a direct or indirect effect to a historic property, but the effect does not diminish the qualities that make the property significant; and "Adverse effect," which "is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, and association" (36 CFR 800 5(a)(1)).

3.13.4 Laws and Regulations

Attention to cultural resources is important to Eglin AFB for its required efforts to comply with a host of federal laws, regulations, and Executive Orders. Both DoD Instruction 4715.3, *Environmental Conservation Program*, and AFI 32-7065, *Cultural Resources Management*, outline and specify procedures for Air Force cultural resource management programs. At Eglin AFB, the Integrated Cultural Resource Management Plan specifies Eglin-specific policies and procedures regarding the treatment of cultural resources (U.S. Air Force, 2004d). A brief description of the primary cultural resource compliance law in regard to this Proposed Action is the NHPA of 1966, as amended, follows. Additional background information for Eglin AFB and laws, federal regulations, and EOs pertinent or potentially pertinent to cultural resources and the Proposed Action concerning cultural resources are discussed in detail in Appendix F, *Cultural Resources*. Eglin AFB conducted the NHPA Section 106 coordination process, described below, in a way that combines meaningful coordination activities under these other laws.

Under NHPA, the Air Force is required to consider the effects of its undertakings on historic properties listed or eligible for listing in the NRHP, and to consult with interested parties regarding potential impacts. The NRHP is the nation's formal listing of cultural resources considered worthy of preservation. It is administered by the National Park Service and is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture.

The regulatory NHPA Section 106 compliance process consists of four primary stages. These include: initiation of the Section 106 process (36 CFR 800.3); identification of historic properties (36 CFR 800.4), which includes identifying historic properties potentially affected by undertakings; assessment of adverse effects (36 CFR 800.5), which determines whether the undertaking will affect historic properties and if effects to those properties might be adverse; and resolution of adverse effects (36 CFR 800.6) between affected and consulting parties such as the SHPO, the Advisory Council on Historic Preservation, Indian tribes and interested individuals. Additional stipulations are provided for in the NHPA should a failure to resolve adverse effects occur during this process (36 CFR 800.7). Refer to Appendix F for a complete discussion of the status of consultation and Section 106 compliance for the 2005 BRAC decision.

As this BRAC effort encompasses large amounts of land where various cantonment and training activities will take place, identification of historic properties will be a time-consuming and labor-intensive effort. As per 36 CFR 800.4(b)(2), Phased identification and evaluation:

> Where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts. The agency official may also defer final identification and evaluation of historic properties if it is specifically provided for in a memorandum of agreement executed pursuant to § 800.6, a programmatic agreement executed pursuant to § 800.14 (b), or the documents used by an agency official to comply with the National Environmental Policy Act pursuant to § 800.8.

The project-specific programmatic agreement provided in Appendix F, *Cultural Resources,* relates to this need for an alternate way to meet essential compliance under NHPA Section 106 prior to issuing this EIS' Record of Decision (ROD). At the same time, the programmatic agreement provides a venue to plan and commit to additional actions, such as archaeological site evaluations and mitigation of adverse effects that cannot be fully analyzed prior to completion of the EIS.

4. 7SFG(A) CANTONMENT – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes the affected environment and the environmental consequences associated with each alternative cantonment location for the 7SFG(A) at Eglin Air Force Base (AFB). Table 4-1 provides an overview of the resources potentially affected by this action and respective analysis conducted. Some resource areas were not evaluated; the rationale for elimination is also identified in Table 4-1.

Table 4-1. Resource Areas Analyzed for Environmental Consequences Associated With the 7SFG(A) Cantonment Alternatives

Resource Area	Section	Scope of Analysis
Airspace	N/A	Airspace was not analyzed because the use of aircraft would not be associated with construction of or daily activities at the 7SFG(A) cantonment.
Noise	4.2	Analysis focused on the potential impacts of construction noise on nearby areas.
Land Use	4.3	Analysis determined whether proposed changes in on-base land use are in accordance with installation long-term planning and whether the proposed activities would directly or indirectly cause changes in off-base land uses. Additionally, direct and indirect impacts to recreational use and hunting on Eglin AFB were evaluated. Affected areas are identified and impacts to user groups are discussed.
Socioeconomics	4.4	Analysis focused on the potential economic impacts of the increased population and economic activity caused by the incoming personnel and construction activities associated with each 7SFG(A) cantonment location. Indicators analyzed include employment, housing, schools, and the provision of public services.
Transportation	4.5	Analysis focused on the regional roadways segments within the ROI, identifying current and future (projected) deficient segments within the existing roadway network. Additionally, roadways designated as part of Florida's Strategic Intermodal System have also been identified.
Utilities	4.6	Analysis focused on the existing infrastructure, current use, and any predefined capacity or limitations as set forth in permits or regulations for potable water, wastewater, electrical, and natural gas.
Air Quality	4.7	Analysis focused on emissions that would be generated from construction, land clearing/grading activities, and the addition of personnel.

Continued on the next page…

Table 4-1. Resource Areas Analyzed for Environmental Consequences Associated With the 7SFG(A) Cantonment Alternatives, Cont'd

Resource Area	Section	Scope of Analysis
Safety	4.8	Analyses focused on issues that have a potential to affect safety, which were evaluated relative to the degree to which the activity would increase or decrease safety risks to military personnel, the public, and property.
Solid Waste	4.9	Analysis focused on identifying the types and quantities of solid wastes generated and requiring disposal from government actions. The calculated mass of wastes was then used to evaluate the potential increase in wastes being disposed at local landfills, considering current landfill life cycle and existing capacity. The potential impact to landfill life cycle and existing capacity could be minimized through the recycle/reuse of the material.
Hazardous Materials	4.10	Analysis focused on identifying the type of materials and wastes that would be associated with proposed activities. These data were evaluated against the base's capability for managing these materials/wastes. The analysis also evaluated impact of proposed activities on ERP sites.
Physical Resources	4.11	Analysis focused on impacts to surface water, wetlands, and floodplains associated with increased stormwater runoff, the creation of new impervious surfaces, and construction activities. Groundwater was not analyzed because construction activities would not affect underground water resources.
Biological Resources	4.12	Analysis focused on impacts to flora, fauna, sensitive species, associated habitats, and the potential for introduction and spread of invasive species from construction and daily cantonment operations.
Cultural Resources	4.13	Analysis focused on identified and potentially present cultural resources within the Area of Potential Effects that would be affected by the proposed activities. Any analysis required following the project's Record of Decision will be provided for by a project-specific programmatic agreement (Appendix F).

ERP = Environmental Restoration Program; APE = Area of Potential Effects

4.2 NOISE

4.2.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.2.1.1 Existing Conditions (Noise – 7SFG(A) Cantonment Alternative 1)

This section discusses the existing noise environment at the three sub-alternative locations considered under 7SFG(A) Cantonment Alternative 1 at Eglin Main: the Triangle, West Gate, and North Poquito.

Portions of the area referred to as the Triangle currently lie within the 65 to 70, 70 to 75, 75 to 80, and greater than 85-decibel (dB) day-night average sound level (DNL) noise

contour areas. Instantaneous noise levels are often much more intense than the time-averaged DNL noise level. The southern half of the area experiences fewer intense aircraft noise events.

Portions of the Eglin West Gate site lie within the 65 to 70 dB and 70 to 75 dB DNL contour areas. The southern half of this area is exposed to fewer intense aircraft noise events and, therefore, has a lower DNL.

No portion of the North Poquito site lies within the 65 dB DNL noise contour. However, the site is overflown by military aircraft, and individual noise events may be quite loud.

4.2.1.2 Environmental Consequences (Noise – 7SFG(A) Cantonment Alternative 1)

Construction noise was evaluated for the 63 proposed building projects from calendar year (CY) 2008 to CY 2011. A standard set of construction equipment was assumed to take part in all construction projects and to run for 40 percent of the workday. Resulting noise levels are listed in (Table 4-2).

Table 4-2. 7SFG(A) Cantonment Alternative 1 – Noise Level Expected From Each Construction Site

Distance to Receptor (feet)	DNL During Construction (dB)
100	79.8
200	73.8
300	70.3
400	67.8
500	65.8
600	64.2

dB = decibels; DNL = day-night average sound level

7SFG(A) Cantonment Alternative 1A: The Triangle

Construction noise is not expected to have any adverse effects on human receptors, as the immediate surrounding area is undeveloped or being used in ways not considered to be noise-sensitive.

7SFG(A) Cantonment Alternative 1B: Eglin West Gate

The noise generated by construction activities is expected to be audible at the nearby Eglin AFB accompanied housing area, located at approximately 1,000 feet from the proposed construction site. Noise in the residential area would be less than 65 dB DNL. While some residents may be annoyed by the construction noise, aircraft operations are the dominant noise source in this area, and impacts due to construction are expected to be minor and would last only for the duration of construction.

7SFG(A) Cantonment Alternative 1C: North Poquito

Construction noise would be audible in the Eglin AFB accompanied housing area located approximately 600 feet southeast of this site. Noise in the residential area would be less than 65 dB DNL. Impacts would be limited to temporary annoyance while construction was under way. As the site is located in an area outside of the 65 dB DNL noise contours, all 7SFG(A) facilities would be compatible without any special noise-attenuation measures.

4.2.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.2.2.1 Existing Conditions (Noise – 7SFG(A) Cantonment Alternative 2)

The five sites located near Duke Field considered under 7SFG(A) Cantonment Alternative 2 are: 2A—Southeast of Duke Field; 2B—Northwest of Duke Field; 2C—Northeast of Duke Field; 2D—East of Duke Field; and 2E—Eglin North Border Near Duke Field. All five of the sub-alternative sites are considered remote and undeveloped areas used occasionally for military training and seasonally for public recreational use. The current noise environment consists primarily of natural sounds such as wind and wildlife, with the occasional sounds from military training operations. All five sub-alternative sites are located near the Duke Field Runway. Under current conditions, all Alternative 2 sites lie outside of current 65 dB DNL noise contours. Baseline noise levels at Duke Field were estimated based on results of a 2002 Air Force Center for Environmental Excellence (AFCEE) noise data collection (Lester, 2006), as modified to account for effects of topography.

4.2.2.2 Environmental Consequences (Noise – 7SFG(A) Cantonment Alternative 2)

Construction noise was evaluated for the 33 proposed building projects. Using the same methodology used for 7SFG(A) Cantonment Alternative 1, noise was evaluated for one construction site and then applied to each of the sites to assess potential negative affects to sensitive receptors (see Table 4-2).

Due to the remote locations of the alternative's locations, human receptors are not expected to be adversely affected by the construction activities. Any receptors in the area would be exposed to elevated noise levels temporarily during construction. No adverse impacts are expected.

4.2.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.2.3.1 Existing Conditions (Noise – 7SFG(A) Cantonment Alternative 3)

The site selected as 7SFG(A) Cantonment Alternative 3 is remote and undeveloped. The area is used occasionally for military training and seasonally for public recreational

use. The site experiences military aircraft overflights but is not within the baseline Duke Field 65 dB DNL noise contour.

4.2.3.2 Environmental Consequences (Noise – 7SFG(A) Cantonment Alternative 3)

Noise impacts associated with 7SFG(A) Cantonment Alternative 3 would be similar to those under 7SFG(A) Cantonment Alternative 2. No adverse impacts due to construction noise are expected. As the site is not within the Duke Field 65 dB DNL noise contour, all proposed facilities would be compatible with current DNL noise levels.

4.2.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.2.4.1 Existing Conditions (Noise – 7SFG(A) Cantonment Alternative 4)

The site selected as 7SFG(A) Cantonment Alternative 4 is remote and undeveloped. The area is used occasionally for military training and seasonally for public recreational use. The current noise environment consists primarily of natural sounds and sounds associated with military training operations. The site is not within the baseline Duke Field 65 dB DNL noise contour but does experience loud military aircraft overflights.

4.2.4.2 Environmental Consequences (Noise – 7SFG(A) Cantonment Alternative 4)

Noise impacts associated with 7SFG(A) Cantonment Alternative 4 would be similar to those under 7SFG(A) Cantonment Alternative 2. No adverse impacts due to construction noise are expected and new facilities would be compatible with current DNL noise levels in this area.

4.2.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.2.5.1 Existing Conditions (Noise – 7SFG(A) Cantonment Alternative 5)

The site selected as 7SFG(A) Cantonment Alternative 5 is located in a remote area. Similar to the 7SFG(A) Cantonment Alternative 2, 3, and 4 sites, the existing sound environment is dominated by natural sounds and sounds associated with military training. No runways are located near this site, and the site is not within any DNL noise contours.

4.2.5.2 Environmental Consequences (Noise – 7SFG(A) Cantonment Alternative 5)

Noise impacts associated with 7SFG(A) Cantonment Alternative 5 would be similar to those under 7SFG(A) Cantonment Alternative 2. No adverse impacts due to construction noise are expected.

4.2.6 No Action Alternative

Under the No Action Alternative, the 7SFG(A) cantonment area would not be constructed. No construction noise would be generated at the sites proposed for the cantonment area.

Major changes to the noise environment would occur under this alternative because the 33rd Fighter Wing (33 FW) would draw down, and all operations associated with the 33 FW mission would cease. The drawdown of aircraft would take place during government fiscal year (FY) 2009 and would reduce annual sorties at Eglin AFB by 10,000. This 70 percent reduction in annual sorties would decrease average noise levels in the vicinity of all areas where 33 FW aircraft operate, including the areas proposed for the 7SFG(A) cantonment area.

In addition, under the No Action Alternative, C-130 aircraft belonging to the Air Force Reserve's 919th Special Operations Wing (919 SOW) would cease operations at Duke Field, decreasing noise levels in that area.

4.3 LAND USE

4.3.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.3.1.1 Existing Conditions (Land Use – 7SFG(A) Cantonment Alternative 1)

Military Land Use

7SFG(A) Cantonment Alternative 1 could potentially affect one of three contiguous areas located southwest of the Eglin Main Base area. The land uses within Eglin Main that would be impacted by 7SFG(A) Cantonment Alternative 1 include aircraft operations and maintenance, industrial, and open space as shown on Figure 4-1.

Adjacent land uses include the airfield; administrative (University of Florida's Research and Engineering Education Facility [REEF]); community or service (including the Air Force Armament Museum, Okaloosa Regional Airport, and Cherokee Elementary School, youth center, child care center, playground, etc., immediately south of Eglin Boulevard); medical (Eglin Hospital); and accompanied housing (Eglin Housing Area). Located further west are the range areas of the Eglin Reservation.

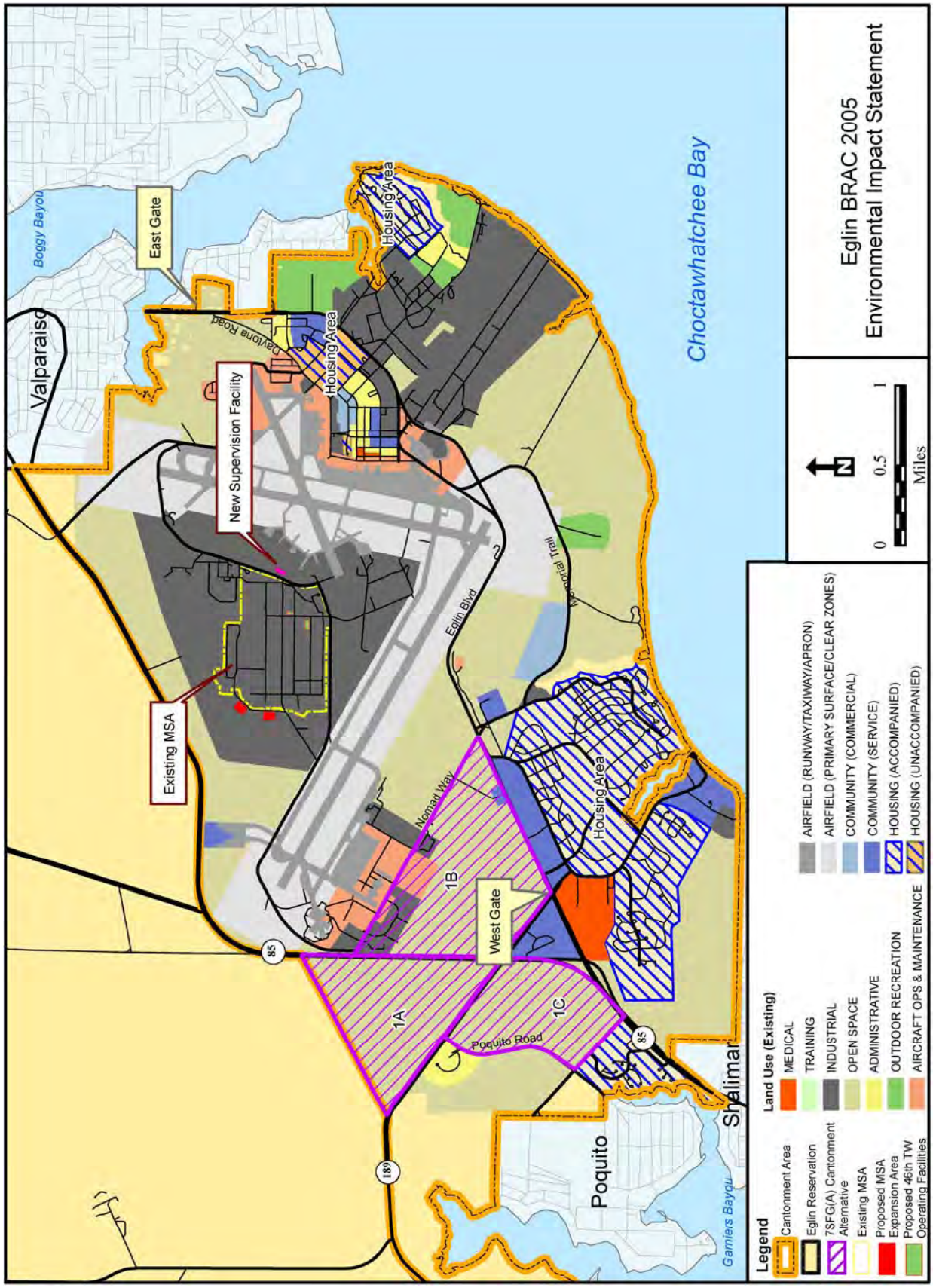

Figure 4-1. 7SFG(A) Alternative 1 – Existing Land Use Associated With Eglin Main Base

The Triangle – 7SFG(A) Cantonment Alternative 1A

The existing land use for the Triangle is defined as open space, and the site is currently largely undeveloped woodlands. The only existing development of note in the Triangle is a primary Gulf Power 115-kV overhead transmission line that traverses the site in a north-south orientation. Immediately adjacent land uses include industrial and aircraft operations and maintenance associated with the 33 FW area; the range areas of the Eglin Reservation; administrative; community or service (University of Florida REEF and Air Force Armament Museum); and open space.

West Gate – 7SFG(A) Cantonment Alternative 1B

Existing land use for the West Gate is defined as open space (Figure 4-1), and the site is mostly undeveloped, currently containing a dense native forest of slash pine, scrub oak, and live oak. A 20-inch sanitary forced main traverses the site diagonally from southeast to northwest. The northern portion of the area includes a small part of the industrial and aircraft operations and maintenance associated with 33 FW area. Other adjacent land uses include community or service, including the Air Force Armament Museum and Cherokee Elementary School, youth center, child care center, playground, etc., immediately south of Eglin Boulevard; medical (Eglin Hospital); and open space.

North Poquito – 7SFG(A) Cantonment Alternative 1C

Existing land use for the North Poquito area is open space (Figure 4-1), and the property is predominantly covered by native vegetation. Portions of the property's southwestern corner have been cleared. Adjacent land use includes administrative (University of Florida REEF); community or service (Air Force Armament Museum); housing (accompanied); and open space.

4.3.1.2 Environmental Consequences (Land Use – 7SFG(A) Cantonment Alternative 1)

7SFG(A) Cantonment Alternative 1A: The Triangle

Siting the 7SFG(A) cantonment area would require construction of new facilities within the Triangle area of Eglin Main. Land use in the impacted area would change from open space to industrial, administrative, housing (unaccompanied), and outdoor recreation. Some open space would remain primarily as a buffer around the new facilities. The 7SFG(A) Cantonment Alternative 1A would not have any impacts on the surrounding community land use, since the activities associated with the 7SFG(A) cantonment

would only occur within Eglin Main, and the Triangle area is segmented from non-Air Force-owned property via heavily traveled highways, thereby eliminating adjacent land use issues with the public.

For any of the sub-alternatives near Eglin Main Base, the 7SFG(A) would locate munitions within the fence of the existing munitions storage area (MSA) for the 46th Test Wing (46 TW), which is centrally located for access from either Eglin Main Base runway (Figure 2-2 in Chapter 2). No land use impacts would occur since the existing MSA would support both the 7SFG(A) and the Joint Strike Fighter (JSF) munitions storage requirements with modifications to the existing area.

7SFG(A) Cantonment Alternative 1B: Eglin West Gate

Land use impacts under 7SFG(A) Cantonment Alternative 1B would be similar to those described for 7SFG(A) Cantonment Alternative 1A. Locating the 7SFG(A) cantonment within the Eglin West Gate area would change the existing land use because of the construction of the required new facilities. Land use in the impacted area would change from open space to industrial, administrative, housing (unaccompanied), and outdoor recreation. Some open space would remain primarily as a buffer around the new facilities. Based on the notional layout of the cantonment, no encroachment on the 33 FW area along the northern boundary is anticipated. The 7SFG(A) Cantonment Alternative 1B would not have any land use impacts on the surrounding community land use since the activities associated with the 7SFG(A) cantonment would only occur within Eglin Main Base.

7SFG(A) Cantonment Alternative 1C: North Poquito

Locating the 7SFG(A) cantonment within the North Poquito area would change the existing land use from open space to a mix of industrial, administrative, housing (unaccompanied), and outdoor recreation. Some open space would remain primarily as a buffer around the new facilities. 7SFG(A) Cantonment Alternative 1C should not have any adverse impact on the adjacent University of Florida REEF property. The cantonment is also not expected to impact adjacent land uses to the south of the North Poquito area, which is mostly residential. Construction would occur well away from the Eglin boundary, and there would be enough of a vegetative buffer to minimize any potential land use conflicts associated with aesthetics and noise.

Summary

In summary, the 7SFG(A) Cantonment Alternatives 1A, 1B, and 1C would have direct land use impacts in each of the potentially affected areas. The impact would be a change in land use from open space to industrial, administrative, housing (unaccompanied), and outdoor recreation to support the construction of the new cantonment. 7SFG(A)

Cantonment Alternatives 1A and 1C would not have any impact on surrounding land use, but 7SFG(A) Cantonment Alternative 1B could potentially encroach on the 33 FW area along the northern boundary of the West Gate site. There would be no land use impacts on any off-base areas. The change in land use would not be adverse, since it would be compatible with the existing land uses that surround the Triangle, West Gate, and North Poquito areas. The change would also not significantly reduce the amount of open space remaining within Eglin Main Base.

4.3.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.3.2.1 Existing Conditions (Land Use – 7SFG(A) Cantonment Alternative 2)

Duke Field encompasses approximately 2,700 acres in the north central portion of Eglin AFB and is home to the 919 SOW (an Air Force Reserve Unit). Duke Field requires land uses similar to those at Eglin Main. For instance, Duke Field contains extensive airfield land use, which includes an 8,000-foot runway and the associated taxiways, aprons, and airfield operations and maintenance facilities. Other facilities include range laser amenities, base operations and supply, airmen housing, an all-ranks club, fire department, and outdoor recreation facilities. The difference in land use between Eglin Main and Duke Field is related to the history of Duke Field's development as well as the current state of operations and missions (U.S. Air Force, 2004e). The land area for each use is considerably less than that of Eglin Main Base. The land use classes occurring at Duke Field that would be impacted by 7SFG(A) Cantonment Alternative 2 include industrial, training, open space, and outdoor recreation as shown on Figure 4-2.

7SFG(A) Cantonment Alternative 2 consists of five sub-alternatives, each associated with establishing the 7SFG(A) cantonment area at a location within close proximity to Duke Field.

<u>Southeast of Duke Field – 7SFG(A) Cantonment Alternative 2A</u>

This area is remote and undeveloped; however, the land is occasionally used for military training exercises and is seasonally used for public recreation and hunting. Existing land use is shown primarily as open space and training (Drop Zone). The site is within Management Units 9 and 9A, which are open to public access/recreation year round but closed to motorized vehicle access except during designated hunting seasons. Only archery hunting is allowed within Management Unit 9A except for spring turkey season. An existing game check station is also located within the site at the intersection of Range Road (RR) 213 and RR 231.

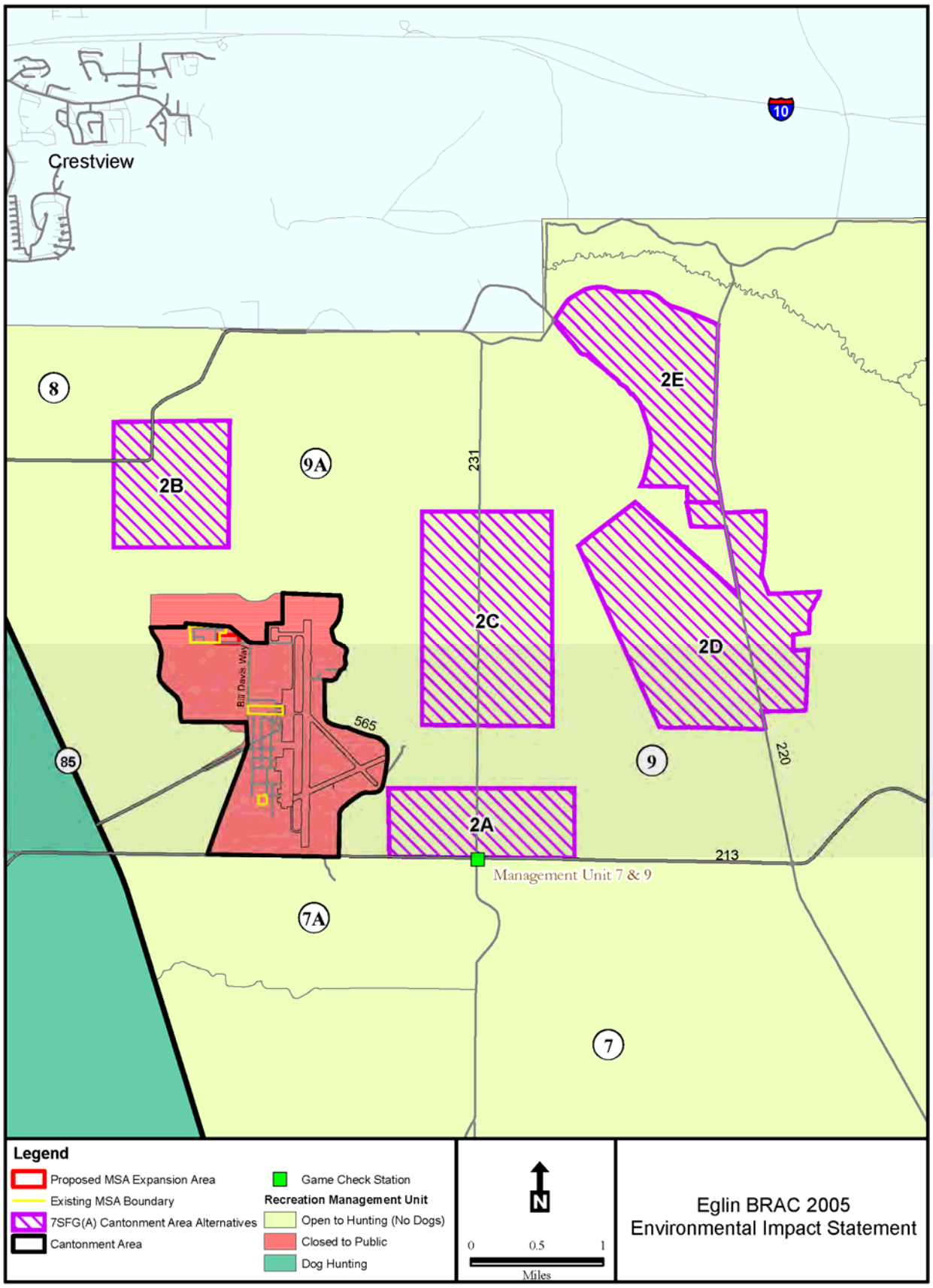

Figure 4-2. 7SFG(A) Cantonment Alternative 2 – Land Use Associated With Duke Field

Northwest of Duke Field – 7SFG(A) Cantonment Alternative 2B

This area is remote and undeveloped; however, the land is occasionally used for military training exercises and is seasonally used for public recreation and hunting. The site is within Management Unit 9A and a small portion of Management Unit 8A. Management Unit 9A is open to public access/recreation year round but closed to motorized vehicle access except during designated hunting seasons. Management Unit 8A is open to public access/recreation only on weekends and federal holidays during designated hunting seasons. The southern portion of the site is also located within the explosive quantity-distance (Q-D) arc of the existing munitions storage facilities and is currently classified as industrial land use.

Northeast of Duke Field – 7SFG(A) Cantonment Alternative 2C

The site for 7SFG(A) Cantonment Alternative 2C is remote and undeveloped; however, the land is occasionally used for military training exercises and is seasonally used for public recreation and hunting. The site is within Management Units 9 and 9A, which are open to public access/recreation year round but closed to motorized vehicle access except during designated hunting seasons. Only archery hunting is allowed within Management Unit 9A except for spring turkey season. Existing land use for this area is currently classified as open space.

East of Duke Field – 7SFG(A) Cantonment Alternative 2D

Existing land use for this area is currently classified as open space but has been used for outdoor recreation, hunting, and timber harvesting. The site is within Management Unit 9, which is open to public access/recreation year round but closed to motorized vehicle access except during designated hunting seasons.

Eglin North Border Near Duke Field – 7SFG(A) Cantonment Alternative 2E

The existing land use for this site is currently classified as open space. The area is used for outdoor recreation and hunting and has been used for timber harvesting. The site is located within Management Unit 9, which is open to public access/recreation year round but closed to motorized vehicle access except during designated hunting seasons. The site also contains a portion of the Florida National Scenic Trail and the camping area located at Jr. Walton Pond.

4.3.2.2 Environmental Consequences (Land Use – 7SFG(A) Cantonment Alternative 2)

7SFG(A) Cantonment Alternative 2A: Southeast of Duke Field

Siting the 7SFG(A) cantonment area would require construction of new facilities, which would have a direct impact on the existing land use. Land use in the impacted area

would change from primarily open space to industrial, administrative, housing (unaccompanied), and outdoor recreation. Some open space would remain, primarily as a buffer around the new facilities. Construction of the cantonment, including the associated access control point, substation, road improvement, and utility easement, would eliminate public access and outdoor recreation including hunting in the affected area. It is also possible that the existing Game Check Station would need to be relocated. No impacts would occur to Duke Field and its operation. Approximately 473 acres (250 acres in Management Unit 9 and 223 acres in 9A) would be removed from public access/recreational use for the cantonment area. The construction of an access control point along RR 213, a new substation near the intersection of Hwy 85 and RR 213, along with the road widening/improvement and utilities easement, would remove an additional 69 acres in Management Area 9A. This would decrease the total acreage available for public access and outdoor recreation on Management Unit 9 by about 2 percent and 4 percent on Management Unit 9A. The change in land use would not be adverse since it would be compatible with the existing land uses that surround the area. The change would also not significantly reduce the amount of area open for public access and outdoor recreation within the affected management units and the remaining land portion of the Eglin Range.

7SFG(A) Cantonment Alternative 2A would not have any direct or indirect land use impacts on surrounding community land use, since the activities associated with the 7SFG(A) cantonment would only occur within the immediate Duke Field area and a sufficient buffer is present between the proposed site and the closest off-base development.

7SFG(A) Cantonment Alternative 2B: Northwest of Duke Field

Locating the 7SFG(A) cantonment within the area northwest of Duke Field would cause the same direct land use impacts as described for 7SFG(A) Cantonment Alternative 2A because the change from the existing land use to the new land use would be the same. Also, with 7SFG(A) Cantonment Alternative 2A, there would be no direct or indirect impacts on the any surrounding community land use. Although a portion of the 7SFG(A) Cantonment Alternative 2B area is located within the explosive Q-D arc for the existing MSA, cantonment construction would be outside of the PTR and IBD Clear Zones. Approximately 535 acres (56 acres in Management Unit 8A and 479 acres in 9A) would be removed from public access/recreational use for the cantonment area. The construction of an access control point along RR 571, a new substation near the intersection of Hwy 85 and RR 213, along with the road widening/improvement and utilities easement along RR 213 and RR 571, would remove an additional 86 acres in Management Unit 9A. This would decrease the total acreage available for public access and outdoor recreation by about 1 percent on Management Unit 8A and 9 percent on Management Unit 9A. The change in land use would not be adverse since it would be compatible with the existing land uses that surround the area. The change would also

not significantly reduce the amount of area open for public access and outdoor recreation within the affected management units and the remaining land portion of the Eglin Range.

7SFG(A) Cantonment Alternative 2C: Northeast of Duke Field

Land use impacts under 7SFG(A) Cantonment Alternative 2C would be similar to those described for 7SFG(A) Cantonment Alternatives 2A and 2B, since construction of the cantonment would permanently change the existing land use from primarily open space to industrial, administrative, housing (unaccompanied), and outdoor recreation. 7SFG(A) Cantonment Alternative 2C would not have any land use impacts on surrounding community land use since the activities associated with the 7SFG(A) cantonment would only occur within the immediate Duke Field area. Approximately 1,022 acres (580 acres in Management Unit 9 and 442 acres in 9A) would be removed from public access/recreational use for the cantonment area. The construction of an access control point along RR 213, a new substation near the intersection of Hwy 85 and RR 213, along with the road widening/improvement and utilities easement along RR 213 and RR 231, would remove an additional 91 acres in Management Unit 9A. This would decrease the total acreage available for public access and outdoor recreation on Management Unit 9 by about 6 percent and 8 percent on Management Unit 9A. The change in land use would not be adverse since it would be compatible with the existing land uses that surround the area. The change would also not significantly reduce the amount of area open for public access and outdoor recreation within the affected management units and the remaining land portion of the Eglin Range.

7SFG(A) Cantonment Alternative 2D: East of Duke Field

Land use impacts under 7SFG(A) Cantonment Alternative 2D would be similar to those described for 7SFG(A) Cantonment Alternatives 2A, 2B, and 2C because the change from the existing land use to new land use for the cantonment area would be the same.

Like the other alternatives, there would also be no land use impacts on surrounding community land use. Approximately 1,281 acres in Management Unit 9 would be removed from public access/recreational use for the cantonment area. The construction of an access control point at the intersection of RR 213 and RR 220, a new substation near the intersection of Hwy 85 and RR 213, along with the road widening/ improvement and utilities easement along RR 213 and RR 220, would remove an additional 64 acres in Management Unit 9A and 82 acres in Management Unit 9. This would decrease the total acreage available for public access and outdoor recreation on Management Unit 9A by about 1 percent and 13 percent on Management Unit 9. The change in land use would not be adverse since it would be compatible with the existing land uses that surround the area. The change would also not significantly reduce the amount of area open for public access and outdoor recreation within the affected management unit and the remaining land portion of the Eglin Range.

7SFG(A) Cantonment Alternative 2E: Eglin North Border Near Duke Field

Locating the 7SFG(A) cantonment in this area would have the same land use impacts as the other alternatives since the change in land use would be the same. However, the 7SFG(A) Cantonment Alternative 2E site would also adversely impact a section of the Florida National Scenic Trail and the camping area at Jr. Walton Pond. To mitigate the impact to the trail, the impacted section would be moved from the center of the cantonment area to run along the northern border of the cantonment area. The campground would be closed if it could not be relocated. Although this location would be closer to the surrounding community there would still be no direct or indirect land use impacts since the activities associated with the 7SFG(A) cantonment would occur entirely within the Eglin Reservation boundary and a sufficient buffer exists between the proposed site and the nearest off-base development. Approximately 716 acres in Management Unit 9 would be removed from public access/recreational use for the cantonment area. The construction of an access control point at the intersection of RR 213 and RR 220, a new substation near the intersection of Hwy 85 and RR 213, along with the road widening/improvement and utilities easement along RR 213 and RR 220, would remove an additional 64 acres in Management Unit 9A and 120 acres in Management Unit 9. This would decrease the total acreage available for public access and outdoor recreation on Management Unit 9A by about 1 percent and 8 percent on Management Unit 9. The change in land use would not be adverse, since it would be compatible with the existing land uses that surround the area. The change would also not significantly reduce the amount of area open for public access and outdoor recreation within the affected management unit and the remaining land portion of the Eglin Range.

4.3.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.3.3.1 Existing Conditions (Land Use – 7SFG(A) Cantonment Alternative 3)

The proposed 7SFG(A) Cantonment Alternative 3 area (Figure 4-3) is remote and undeveloped; however, the land is occasionally used for military training exercises and is seasonally used for public recreation and hunting. Existing land use is primarily open space. The site is within Management Unit 6N, which is open to public access/recreation year round. Seasonal hunting is limited and requires a special permit. The area is also closed to motorized vehicle access except during designated hunting seasons.

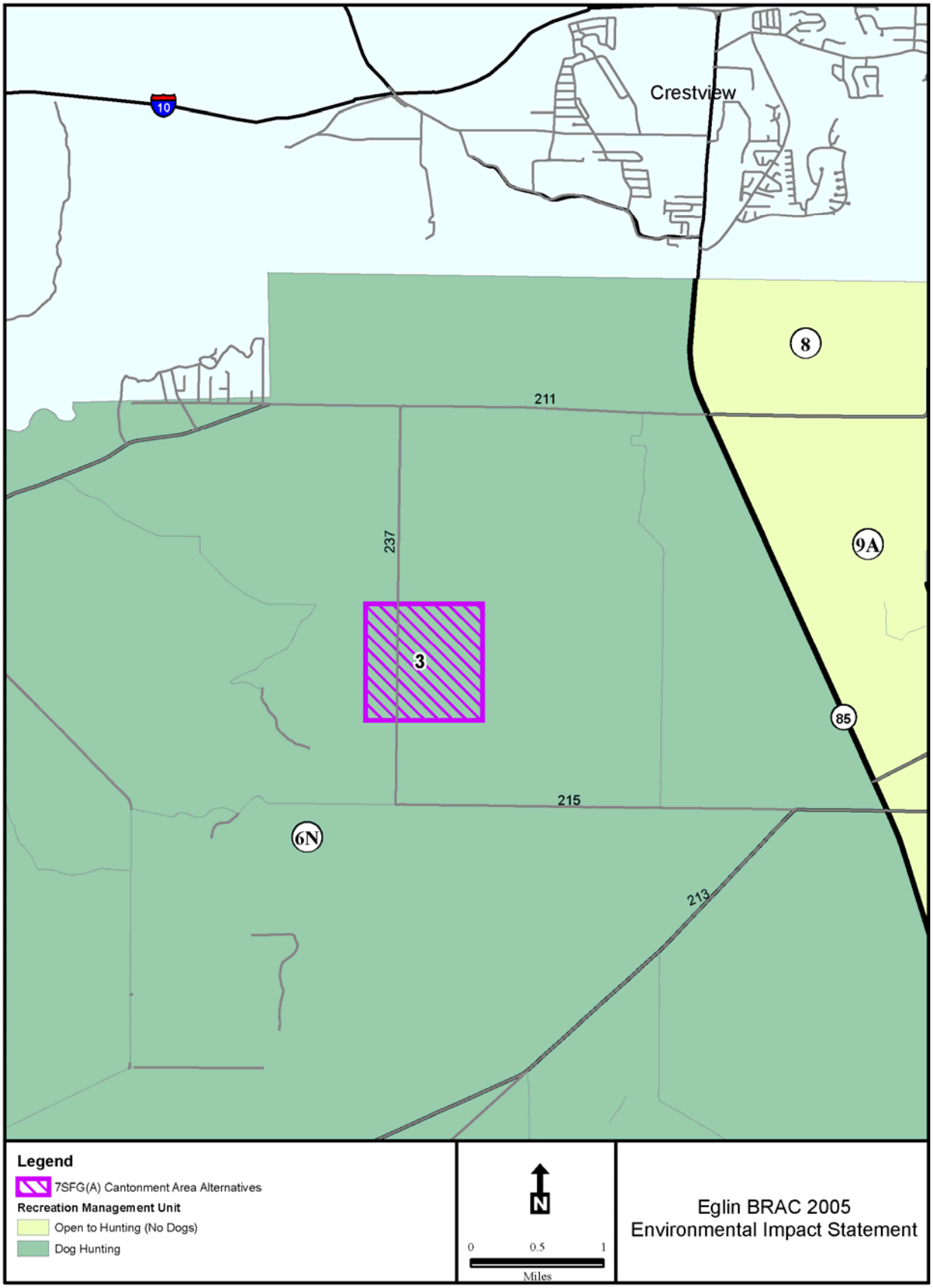

Figure 4-3. 7SFG(A) Cantonment Alternative 3 – Existing Land Use

4.3.3.2 Environmental Consequences (Land Use – 7SFG(A) Cantonment Alternative 3)

Land use impacts under 7SFG(A) Cantonment Alternative 3 would be similar to those described for 7SFG(A) Cantonment Alternative 2 because the change from the existing land use to new land use for the cantonment area would be the same. Public access and outdoor recreational activities would not be allowed within the cantonment area. There would be no impacts on surrounding community land use. Approximately 500 acres, in Management Unit 6N, would be removed from public access/recreational use for the cantonment area. The construction of an access control point along RR 215, a new substation near the intersection of Hwy 85 and RR 213, along with the road widening/improvement and utilities easement, would remove an additional 169 acres. This would decrease the total acreage available for public access and outdoor recreation on Management Unit 6N by about 2 percent. The change in land use would not be adverse since it would be compatible with the existing land uses that surround the area. The change would also not significantly reduce the amount of area open for public access and outdoor recreation within the affected management unit and the remaining land portion of the Eglin Range.

4.3.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.3.4.1 Existing Conditions (Land Use – 7SFG(A) Cantonment Alternative 4)

This site (Figure 4-4) is undeveloped and the existing land use is open space. The area is within Management Unit 10, which is open to public access and recreation year round, but motorized vehicles are prohibited. Seasonal hunting is also allowed.

4.3.4.2 Environmental Consequences (Land Use – 7SFG(A) Cantonment Alternative 4)

Impacts under 7SFG(A) Cantonment Alternative 4 would be similar to those described for 7SFG(A) Cantonment Alternatives 2 and 3. The total acreage removed from public access/recreational use would be approximately 500 acres in Management Unit 10. This would decrease the total acreage available for public access and outdoor recreation on Management Unit 10 by about 10 percent. The change in land use would not be adverse, since it would be compatible with the existing land uses that surround the area. The change would also not significantly reduce the amount of area open for public access and outdoor recreation within the affected management unit and the remaining land portion of the Eglin Range.

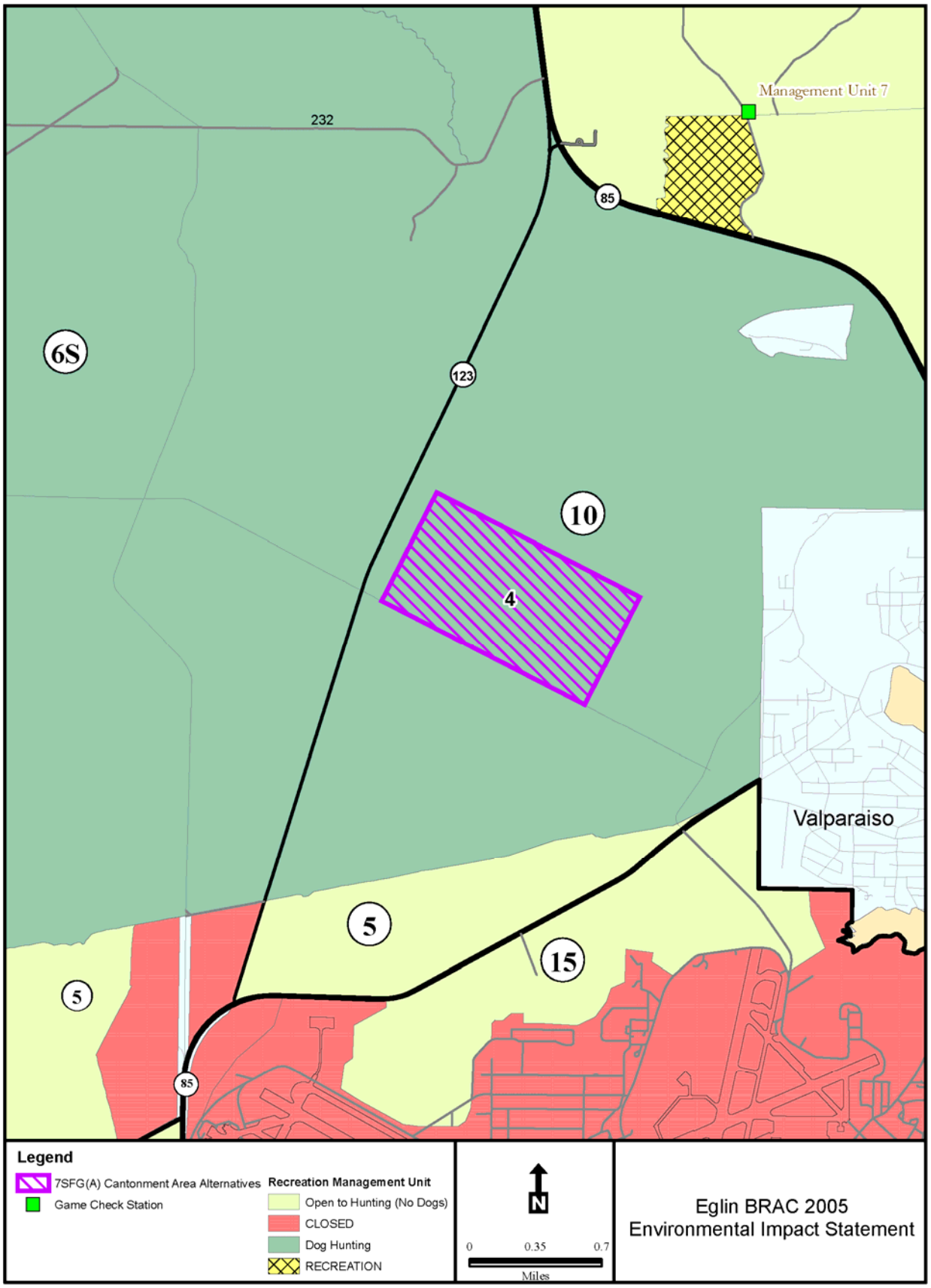

Figure 4-4. 7SFG(A) Cantonment Alternative 4 – Existing Land Use

4.3.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.3.5.1 Existing Conditions (Land Use – 7SFG(A) Cantonment Alternative 5)

This site (Figure 4-5) is remote and undeveloped with an open space land use classification. The area is located within Management Unit 13, which is open to public access/recreation year round. Hunting is only allowed during designated seasons.

4.3.5.2 Environmental Consequences (Land Use – 7SFG(A) Cantonment Alternative 5)

Impacts under 7SFG(A) Cantonment Alternative 5 would be similar to those described for 7SFG(A) Cantonment Alternatives 2, 3, and 4. Approximately 500 acres, in Management Unit 13, would be removed from public access/recreational use for the cantonment area. The construction of an access control point , new substation, along with the utilities easement and widening/improvement of a portion of RR 210, would remove an additional 27 acres. This would decrease the total acreage available for public access and outdoor recreation on Management Unit 13 by less than 1 percent. The change in land use would not be adverse, since it would be compatible with the existing land uses that surround the area. The change would also not significantly reduce the amount of area open for public access and outdoor recreation within the affected management unit and the remaining land portion of the Eglin Range.

4.3.6 No Action Alternative

None of the listed actions under the No Action Alternative (see Section 2.7 in Chapter 2) would have any direct or indirect land use impacts. The listed actions if implemented would occur in areas where the existing land use is already compatible with the actions. The potential loss of C-130 aircraft belonging to the Air Force Reserve's 919 SOW located at Duke Field could impact the level of use at Duke Field but would not result in any land use changes. No additional land use impacts would occur beyond those associated with other ongoing activities and approved actions.

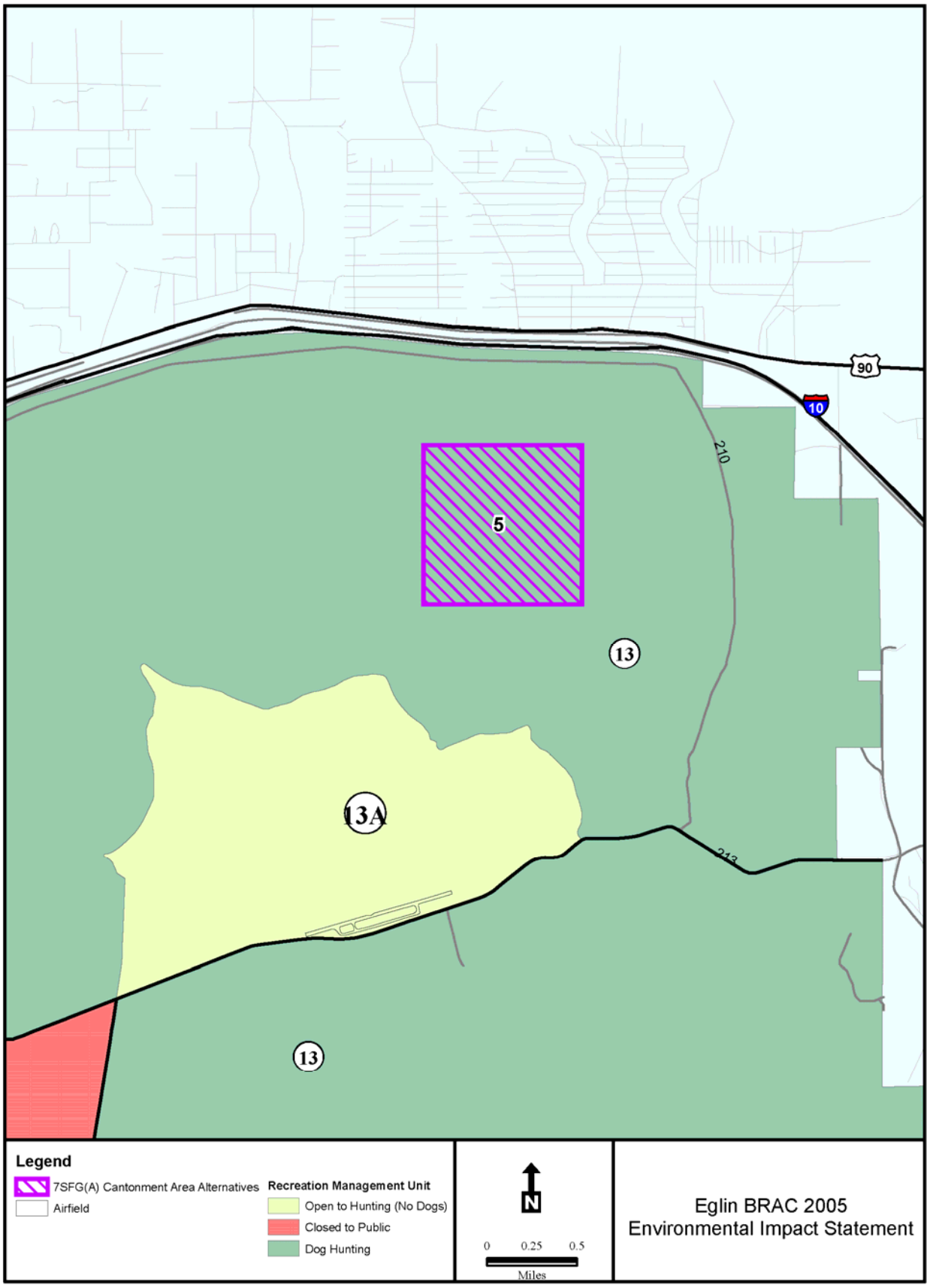

Figure 4-5. 7SFG(A) Cantonment Alternative 5 – Existing Land Use

4.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.4.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.4.1.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 1)

The existing conditions for 7SFG(A) Cantonment Alternative 1 are the same as those described in Section 3.4.2 (Socioeconomics) and Section 3.4.6 (Environmental Justice) in Chapter 3. The effects of the No Action Alternative in combination with the 7SFG(A) alternatives are discussed to determine the net change in the economy as a result of the Base Realignment and Closure (BRAC) activities. The total effects of the BRAC-related activities, including the incoming 7SFG(A) and JSF personnel with the drawdown of the 33 FW and the President's 2007 Budget, are described in Section 9.1.4, Cumulative Effects Analysis.

4.4.1.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 1)

Establishing the 7SFG(A) at Eglin AFB would bring additional people and create jobs in each county in the region of influence (ROI). These effects in turn would increase the demand for products and services in the ROI, including schools and public services. The effects of the 7SFG(A) was analyzed for each individual county in the ROI and then summarized at the regional level. Analysis of potential impacts includes the change in each socioeconomic resource as compared to the existing conditions in combination with the No Action Alternative and historical growth patterns of these resources. The effects of the No Action Alternative only are discussed in Section 4.4.6.

There would be beneficial increase to the individual counties in terms of additional jobs and incomes. Locating the 7SFG(A) to the region would generate a net total of $8.2 million in annual spending and an increase of 105 jobs. Table 4-3 summarizes the estimated net effects of the 7SFG(A) and the No Action Alternative at the ROI level for each socioeconomic resource of concern for all the associated alternatives.

The growth experienced by each county and the ROI overall would not exceed the growth typically experienced by the area as a part of normal migrations. The net effect of the increase in demand for services would be minimal, and the personnel associated with the 7SFG(A) would transition to the area between 2009 and 2011, which would allow time for the economy and local communities to respond to the additional demands of the incoming personnel. In addition, the additional population would contribute to the revenues gained by local governments and school districts to provide any additional public services such as law enforcement or schools.

Table 4-3. Socioeconomic Effects of the 7SFG(A) Realignment

Category	Cantonment Alternatives 1–5	No Action Alternative	Net Change	
	Total	Total	Total	% Change
Population				
Existing Conditions, 2005[a]	388,466	388,466	388,466	
Direct	6,067	-4,561	1,506	0.39%
Induced	2,516	-2,443	73	0.02%
Total	8,583	-7,004	1,579	0.41%
Employment				
Existing Conditions, 2004[b]	189,469	189,469	189,469	
Direct	2,200	-2,172	28	0.01%
Induced	1,287	-1,251	37	0.02%
Total	3,527	-3,423	105	0.06%
Housing				
Existing Conditions, 2000[c]	156,795	156,795	156,795	
Direct	2,200	-2,172	28	0.02%
Induced	1,287	-1,251	37	0.02%
Total	3,527	-3,423	105	0.07%
Students				
Existing Conditions, 2005[d]	61,955	61,955	61,955	
Direct	1,521	-821	700	1.13%
Induced	435	-422	13	0.02%
Total	1,957	-1,243	713	1.15%
School Revenue				
Existing Conditions, 2005[e]	$413,847,831	$413,847,831	$413,847,831	
Direct	$10,144,790	-$8,689,533	$1,455,257	0.35%
Induced	$4,602,302	-$4,468,349	$133,954	0.03%
Total	$14,747,092	-$13,157,882	$1,589,211	0.38%
Law Enforcement				
Existing Conditions, 2005[f]	670	670	670	
Total	37	N/A	N/A	N/A
Fire Protection				
Existing Conditions, 2006[g]	657	657	657	
Total	13	N/A	N/A	N/A
Medical				
Existing Conditions, 2006[h]	11,446	11,446	11,446	
Total	249	N/A	N/A	N/A

a. Office of Economic and Demographic Research, The Florida Legislature, 2005
b. U.S. Bureau of Economic Analysis, 2006
c. U.S. Census Bureau, 2000a, 2000b, 2000c
d. Florida Department of Education, 2005a
e. Florida Department of Education, 2005b
f. Florida Department of Law Enforcement, 2005
g. Department of Homeland Security, U.S. Fire Administration, 2006
h. Orcutt, 2006

The realignment of the 7SFG(A) would add 2,200 military personnel to Eglin AFB by 2011. Assuming that 66 percent of the personnel are married and that 52 percent have varying number of children, a total of 6,067 people would enter the ROI due do the 7SFG(A) realignment (Vavrin, 2007). The United States (U.S.) Army provided these personnel demographics. Approximately 5,597 (92 percent) of the additional population would reside in Okaloosa County while 373 (6 percent) would be located in Santa Rosa County and 97 (2 percent) would be located in Walton County based on the location of the residences of the current personnel as provided by Eglin AFB. The effect of the 7SFG(A) personnel combined with the drawdown of the 33 FW and the drawdown from the President's Budget for 2007 would be a net increase of 1,579 personnel, an increase of 0.41 percent as compared to the 2005 population.

Housing

The Air Force is in the process of conducting several internal studies to determine the housing requirements of the incoming personnel and their families as a result of BRAC. A housing requirements and market analysis report has been completed using current BRAC manpower authorizations and military family housing inventory. A separate National Environmental Policy Act (NEPA) environmental impact analysis is under development to determine the potential impacts from housing needs of the personnel stationed at Eglin AFB. This Environmental Impact Statement (EIS) addresses housing impacts in a general sense and in the context of cumulative impacts.

Assuming that each additional job created by the 7SFG(A) represents a single household requiring a single housing unit, the demand for 8,583 additional housing units would occur. The additional housing units would mean an increase of 2.2 percent in the number of housing units if the additional population relied on new construction alone. However, in 2000, approximately 19 percent of the housing, or over 30,000 housing units, in the ROI were vacant. This number most likely overestimates the number of housing units that would be available for the additional population because the U.S. Census Bureau includes seasonal and second homes in the calculation of vacant housing units. Also, personnel leaving the region as a result of the 33 FW and the President's 2007 Budget drawdowns would vacate additional housing units, providing the 7SFG(A) with more available housing. With the additional residential construction occurring in the region, particularly in northern Okaloosa County, and the gradual transition of the 7SFG(A) into the area, it is unlikely that the housing would be difficult to find.

Affordability of housing is a concern to many of the local residents. Until recently, housing prices in the ROI were increasing at fast rates and homeowners insurance, in particular, has become more costly. However, as noted previously, the housing market in the region has begun to slow as compared to the recent high level of activity driven by low interest rates and new mortgage opportunities that allowed more households to purchase homes. There is a potential surplus inventory in the housing market indicated

by slowing price growth and a decrease in housing sales. Typically, excess inventory in the housing market would allow military members larger choice in housing units. Also, some homeowners who are unable to sell their houses could choose to rent them out instead, increasing the inventory in the rental market. The excess inventory could potentially apply downward pressure on housing prices, making housing more affordable for military members.

In the ROI, however, the magnitude of the increased demand from the personnel entering the region as a result of BRAC may also stimulate the housing market to the extent that housing prices would stabilize. The military members regularly receive allowances as a part of their income to compensate for these factors. In particular, the basic housing allowance for military members living off-base is based on cost-of-living factors. According to DoD policy, these allowances are updated annually and are determined to be sufficient for military members to gain adequate housing. Also per DoD policy, the military gives priority for on-base housing to military members whose incomes including allowances are below 50 percent of the local median incomes.

Schools

Number of Students

Of the additional people entering the area as a result of the 7SFG(A) realignment, there would be approximately 2,415 children. The evaluation assumes that 63 percent of these children are school aged. Because of the distribution of the population, most of the students would likely be in the Okaloosa County School District. Therefore, this alternative would add 1,403 students to the Okaloosa County School District. In Santa Rosa County School District, this alternative would add 93 students, as well as 24 students to the Walton County School District. With an estimated 1,243 students leaving the region because of the 33 FW and President's 2007 Budget drawdowns, the net addition of students to the ROI would be 713, increasing the student population 1.15 percent.

By applying the state-designated maximum average class sizes to the net additional number of students and estimating the age distribution of the incoming students based on U.S. Census data for each county, it is estimated that in the ROI, an additional 10 classes would be needed for children in prekindergarten through third grade; 9 classes for students in fourth grade through eighth grade; and 8 classes for students in ninth grade through twelfth grade. Most of the additional classes would be required in Okaloosa County School District.

School District Revenues

Estimation of the increase in revenues and expenditures for each school district in the ROI uses the revenues and expenditures per student from the 2003 school year, the

latest data available. Revenues from the 7SFG(A) would increase by $14.7 million. These revenues would be offset by the decrease in revenues from the loss of students as result of the 33 FW and President's 2007 Budget drawdowns. The net change in revenues would be an increase of nearly $1.6 million, an increase of 0.38 percent. The net increase in expenditures would also correspond with the increase in revenue.

Economic Activity

There are no indirect effects resulting from the buildup of the 7SFG(A) personnel, as the assumption is that their operations procurements would be based on Air Force-wide procurement contracts and would not be made within the local region. The effects of the 7SFG(A) realignment on the region would stem from the household expenditures of the incoming personnel instead of business-to-business interactions.

Locating the 7SFG(A) to the region would inject $278 million in annual spending and support 3,527 permanent jobs for every year that the 7SFG(A) is stationed at Eglin AFB, including military and civilian personnel. These effects were estimated using the Impact Analysis for Planning (IMPLAN) economic forecasting model based on the total construction expenditures and number of personnel associated with the 7SFG(A). The drawdown of personnel associated with the 33 FW would offset a portion of the annual spending and permanent jobs to bring a total net increase of $8.2 million in annual spending and 105 permanent jobs.

Public Services

With additional people entering the ROI, the demand for public services is expected to increase. The main effect would be in Okaloosa County where most of the incoming personnel and the induced population would live. However, the collection of additional revenues would also occur from the incoming population to provide funding for public services and the 33 FW and the President's 2007 Budget drawdowns would result in a corresponding decrease in the demand for public services. Therefore, the demand for public services would not widely vary from the current demand.

Law Enforcement

The estimated need for additional police officers and sheriff deputies assumes maintaining the existing ratio of police officers and sheriff deputies to 1,000 people, as the population increases as a result of the additional personnel coming to Eglin AFB.

The additional law enforcement officers required by 7SFG(A) personnel entering the area would be 37 officers assigned to various communities throughout the ROI. The greatest demand for additional officers would be in Okaloosa County, where an additional 33 officers would be required to maintain the current ratio of officers per 1,000 people. In Santa Rosa County, only two additional officers would be required.

Walton County would not require any additional law enforcement. These additional law enforcement officers would not be required with the corresponding decrease in personnel from the 33 FW. Therefore, it is feasible that the local police departments could maintain their current level of employment and provide the same level of service to the communities including the 7SFG(A)-related population.

Fire Protection

The estimation of additional resources needed for fire protection used the same method as for law enforcement, i.e., by estimating the ratio of fire services to population. As with law enforcement, the additional fire protection services would be concentrated in Okaloosa County. As a result of the population impact of 7SFG(A) personnel, the ROI would require 13 additional firefighters dispersed in various communities. Okaloosa County would require one additional fire station in order to maintain the current ratio of fire stations to population. Okaloosa County would also require an additional seven firefighters, of which five would be career firefighters and two would be volunteer firefighters. Santa Rosa County and Walton County would not require additional fire stations or firefighters as a result of the personnel realignment. As with law enforcement, the decrease in population from the 33 FW drawdown would allow for the fire departments and firefighters to provide their current level of service and still sufficiently meet the demand from the local communities, including the additional 7SFG(A) population.

Medical Services

The personnel entering the area as a result of the 7SFG(A) realignment would also require an increase in the number of licensed health care professionals. Using the same method used to estimate additional law enforcement and fire protection services by estimating the ratio of licensed health care professionals per capita, an estimated 132 health care professionals would be required in Okaloosa County. In Santa Rosa County, 13 medical professionals would be required and Walton County would require an additional 2 medical professionals. However, the number of medical professionals expected to enter the ROI as a result of the 7SFG(A) is not expected to change, considering the decrease in population as a result of the 33 FW drawdown. Therefore, the current level of service would most likely be adequate to meet the demand of the local communities, including the additional 7SFG(A) population.

Construction

Locating the 7SFG(A) at Eglin AFB would require construction of new facilities. Estimated spending for these construction projects is $384.6 million, which would occur between FY 2008 and FY 2011. The number of jobs created and the amount of additional spending in the economy as a result of the 7SFG(A) would not be affected by

the 33 FW and President's 2007 Budget drawdowns as these two actions do not have any associated construction projects that would be concurrent with the 7SFG(A)-related construction. Therefore, only the effects of the 7SFG(A) construction are evaluated.

The injection of the construction spending into the economy would increase the number of jobs available in the construction sector. In 2004, there were approximately 15,400 construction jobs in the three-county ROI. The direct effects of the construction involved in establishing the 7SFG(A) at Eglin AFB would support approximately 1,304 jobs per year over the term of the construction for a total of 5,217 jobs (Table 4-4). Calculation of these effects used the IMPLAN Economic Impact model based on total construction expenditures.

Table 4-4. Estimated Temporary Effects of 7SFG(A) Cantonment Construction

Category	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Total Spending (Output)	$384,600,000	$97,975,854	$131,189,272	$613,765,144
Incomes Generated	$175,027,872	$41,775,365	$41,948,757	$258,751,989
Jobs Supported	5,217.0	1,155.6	1,626.5	7,999.0

Source: Haas Center for Business Research and Economic Development, 2006

The effects estimated from the construction for the 7SFG(A) would be only temporary, lasting for the term of the construction projects. Local construction workers would fill a large portion of the jobs supported by the construction actions, while only construction workers with highly specialized skills would migrate to the area. The evaluation assumes any construction workers that would migrate from outside of the region would stay for only the term of the construction before migrating to another region where their skill sets are in demand. In addition, one construction worker would be able to work multiple jobs over the course of the construction, moving to one job after completing the previous job.

Effects on school districts, as well as the provision of public services would be minimal as a result of the construction. The majority of the construction workers would be local, and construction workers that would migrate to the region would be unlikely to be accompanied by family members given the short time frame involved.

The construction projects would also involve business-to-business interactions resulting in over $97 million in indirect spending effects and 289 jobs per year or 1,156 total jobs supported as a result. The induced effects of the construction would be over $131 million in total spending and 406 jobs per year, or 1,626 total jobs supported. The indirect and induced effects would occur throughout the economy while the direct effects would be limited to the construction sector. In total, the construction for the 7SFG(A) would provide $613 million in total spending and support 1,999 jobs per year, or 7,999 temporary jobs over the term of the construction for all industries.

Environmental Justice

Construction activities, as well as the personnel realignment, associated with 7SFG(A) Cantonment Alternatives 1 and 2 would not disproportionately impact minority or low-income communities of concern. Environmental justice concerns that could potentially be associated with the proposed activities include issues related to noise, safety, air pollutants, and hazardous materials.

Analyses discussed in Sections 4.2, Noise; 4.7, Air Quality; 4.8, Safety; and 4.10, Hazardous Materials, found that no adverse effects related to these environmental issues would occur under any of the alternatives. As a result, no disproportionate or adverse impacts to minority or low-income populations in the ROI are anticipated to occur.

Special Risks to Children

Construction activities as well as the personnel realignment associated with 7SFG(A) Cantonment Alternative 1 would not yield any special health or safety risks to children. The risks potentially associated with the proposed activities are exposure to asbestos, lead-based paint (LBP) exposure, safety concerns, and noise from construction. Given that children have physiological and behavioral characteristics that make them more vulnerable than adults to damage from environmental effects, evaluation of potential environmental exposures associated with the alternatives requires special consideration.

Safety concerns with regard to children are associated with demolition and construction activities, including potential asbestos/LBP exposure, and potential accidents at construction sites. Sections 4.8, Safety, and 4.10, Hazardous Materials, discuss potential exposure to these materials during demolition and construction. Safety precautions to protect children in areas surrounding the work sites would include adequate measures to restrict access, minimization of hazards associated with the construction sites/activities, and proper handling and disposal of hazardous materials. Such mitigation measures would serve to offset the potential for impacts to any age group, including children.

Noise associated with the proposed activities would relate to demolition and construction activities. Children, being more sensitive to noise than adults and therefore more likely to develop potentially severe hearing loss, are of particular concern with regard to noise impacts. Results presented in Section 4.2.1.2 indicate that anticipated sound levels under the alternatives would be intermittent and short in duration, not contributing any appreciable effect to the existing acoustic environment in the affected region.

4.4.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

7SFG(A) Cantonment Alternative 2 involves locating the 7SFG(A) cantonment area near Duke Field. The increase in personnel and the induced effects would cause only nominal impacts to employment, provision of public services, and expenditures and revenues for the county governments as well as the school district budgets.

4.4.2.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 2)

The existing conditions for 7SFG(A) Cantonment Alternative 2 are the same as the existing conditions described in Section 3.4.2 (Socioeconomics) and Section 3.4.6 (Environmental Justice) in Chapter 3.

4.4.2.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 2)

The effects associated with the 7SFG(A) personnel would be the same as those effects of the 7SFG(A) personnel in 7SFG(A) Cantonment Alternative 1. The location of the cantonment area likely would not influence the residence location of the personnel. The effects of the additional population in each county would be the same those described in Section 4.4.1.2 for 7SFG(A) Cantonment Alternative 1.

4.4.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.4.3.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 3)

The existing conditions for this alternative are identified in Chapter 3 (Section 3.4.2 and Section 3.4.6).

4.4.3.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 3)

The number of personnel and additional population entering the ROI as a result of the 7SFG(A) drives the potential socioeconomic impacts. The location of the cantonment area would not change the number of personnel entering the area. Therefore, effects of the additional personnel would be the same as those under 7SFG(A) Cantonment Alternative 1.

4.4.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.4.4.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 4)

The existing conditions for this alternative are identified in Chapter 3 (Section 3.4.2 and Section 3.4.6.

4.4.4.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 4)

The number of personnel and additional population entering the ROI as a result of the 7SFG(A) drives the potential socioeconomic impacts. The location of the cantonment area would not change the number of personnel entering the area. Therefore, effects of the additional personnel would be the same as those estimated for 7SFG(A) Cantonment Alternative 1.

4.4.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.4.5.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 5)

The existing conditions for this alternative are identified in Chapter 3 (Section 3.4.2 and Section 3.4.6). The proposed cantonment area in 7SFG(A) Cantonment Alternative 5 is located in Walton County.

4.4.5.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Cantonment Alternative 5)

The proposed cantonment area for 7SFG(A) Cantonment Alternative 5 is located in the northeast section of the Eglin Reservation, approximately 10 miles from the city of DeFuniak Springs in Walton County. The proposed cantonment area is also approximately 35 miles from Eglin Main Base in Okaloosa County. Despite the current residence locations of the personnel stationed at Eglin AFB, it is likely that a larger share of the personnel associated with the 7SFG(A) would choose to live in Walton County, as compared with 7SFG(A) Cantonment Alternatives 1 through 4, to be closer to the cantonment area. However, Walton County is a more rural county than Okaloosa County, and many of the services available for military personnel, such as the commissary, base exchange, and child development centers, would be located on Eglin Main Base. Thus, it is likely that the majority of the personnel would still choose to reside in Okaloosa County. Therefore, while the number of personnel entering the ROI is the same, the distribution of the personnel would most likely shift so that more

personnel would reside in Walton County as compared with the previous alternatives. The analysis of the potential impacts assumes that 80 percent (1,760 personnel) of the 7SFG(A) personnel would reside in Okaloosa County and 20 percent (440 personnel) would reside in Walton County. Given the distance between Santa Rosa County and the proposed cantonment area, it is unlikely that many personnel would reside in that county. The total number of people entering Walton County as a result of locating the cantonment area in Walton County would be approximately 1,750; 6,858 people would enter Okaloosa County, including the 7SFG(A) personnel, their dependents, and the induced population (Table 4-3).

However, as with 7SFG(A) Cantonment Alternatives 1 through 4, the effects of the incoming 7SFG(A) population would be partially offset by the decrease in personnel from the 33 FW and President's 2007 Budget drawdowns. The increase in the population, employment, and demand for services from the 7SFG(A) would then be consistent with the historical growth established for the ROI.

4.4.6 No Action Alternative

Analysis of the No Action Alternative examined the effects of predictable actions to occur at Eglin AFB regardless of the BRAC actions. The primary actions considered in the socioeconomic analysis were effects of establishing the proposed Veterans Administration (VA) Community-Based Outpatient Clinic (CBOC), which would require an increase of 35 personnel. Also considered were the drawdown of the 33 FW, which would result in a loss of 1,638 personnel between FY 2009 and FY 2010, and the drawdown of personnel due to the President's 2007 Budget, which would result in a loss of 569 personnel between FY 2007 and FY 2011. Other predictable actions to occur at Eglin AFB include the relocation of 1,400 personnel from the Air Force Reserve 919 SOW to Hurlburt Field and the relocation of 84 personnel from the 9th Special Operations Squadron to Hurlburt Field. The economic impact analysis did not consider these actions, however, because Hurlburt Field is located with the ROI for Eglin AFB, and the evaluation assumed that the relocating military personnel would choose to remain at their current residence and would continue to have an economic impact on the surrounding region.

Several construction projects are in progress or could be in the near future. Among these construction projects are the relocation of the explosive ordnance disposal (EOD) complex, recreational field improvements, construction of a precision measurement equipment facility, the expansion of the Alabama Army National Guard (ALARNG) of the Henry Cobb Tank Range, and the Mill Creek restoration project. Construction

spending from these projects would have a beneficial effect on the economy by creating jobs and incomes. However, these effects would be temporary, lasting for the term of the construction, and would not represent an appreciable change in the regional economy.

Therefore, the combined effect of the predictable actions at Eglin AFB would be a loss of 2,172 military personnel. The decrease in personnel would affect the surrounding region through a decrease in population, employment, and revenues and expenditures for the counties and the school districts. Identification of the potential impacts compares the effects of the personnel drawdown to the current economic conditions as described for the 7SFG(A) Cantonment Alternative 1 in Section 4.4.1.1. The analysis used the IMPLAN Economic Impact model to assess the employment effect of the personnel drawdown and then estimate additional socioeconomic effects.

The number of military personnel that would leave the region would be inconsequential compared with the average growth of the region and the time period of the drawdowns would allow the local economy time to adjust to the population loss. Table 4-3 lists the effects of the No Action Alternative on the ROI.

Population

Effects on population from the predictable actions to occur at Eglin AFB were estimated by assuming that 50 percent of the personnel are married and 30 percent have no more than two children. The population loss estimate assumed 92 percent of the outgoing personnel would be from Okaloosa County, 6 percent from Santa Rosa County, and 2 percent from Walton County.

The direct effects of the predictable actions at Eglin AFB without the BRAC actions would be a population loss of 4,561 (1.2 percent). Okaloosa County would experience the largest population loss of 4,208 (2.2 percent). The evaluation also assumed that the population related to the induced effects would leave the region, in order to estimate the maximum effect of the outgoing personnel. The induced effects on population would be a loss of 2,443 people (0.6 percent). In Okaloosa County, the induced effects on population would be a loss of 2,245 people (1.2 percent) (Table 4-3).

Housing

The loss of population due to the direct and induced effects of the predictable actions would create vacancies within the housing market. The increase in vacancies would allow for military or civilian households remaining in the region to move to a larger,

more affordable, or more desirable housing unit. In addition, depending on the condition of the housing market at the time, it would be possible that the increase in vacancies would lead to a softening in the housing market, where prices would decrease and housing units would be more available.

Eglin AFB is currently undergoing a Military Housing Privatization Initiative. This initiative used the Housing Requirements and Market Analysis (HRMA) to determine the availability of private sector housing for military members in order to assess the number of housing units that would be required on-base. An estimated 2,406 military-owned housing units on Eglin AFB and Hurlburt Field would be conveyed to a private developer that would then demolish, renovate, or construct the conveyed units over a five-year period. The developer would then continue to manage the housing units for military members with the restriction that rent would be set at the housing allowance provided to the members. At the end state of the project, 2,294 privatized housing units would be in use.

These housing units would not be available to the general public and therefore are not strictly considered private sector housing. These units would not have an effect on the region's housing supply or prices. However, during the construction phases of the privatized housing, military households would be required to find off-base housing until the privatized units are available. Some military households may choose to remain in off-base housing, but military households that prefer on-base housing are expected to transition out of off-base housing once the privatized housing units are complete. This transitioning of the military households is not expected to have an appreciable effect on the housing market in the region; however, military demand for rental housing may increase as a result of those households that to transition into the privatized housing units.

Schools

Number of Students

By using the same demographics as the JSF Initial Joint Training Site (IJTS) for the outgoing personnel associated with the predictable actions, the evaluation estimated there would be a total 1,303 dependent children and that all of the children would be school aged. The direct effects of the predictable actions on the number of students in the region then would be a decrease of 1,243 students (2.0 percent). Okaloosa County School District would experience the largest decrease in student population of 1,145 students (3.7 percent) (Table 4-3).

School District Finances

The decrease in the student population and the overall decrease in population due to the predictable actions would also have an effect on the revenues and expenditures of the school districts. The direct effects of the decrease in student population on revenues in the Okaloosa County School District would be a decrease of over $8 million (3.9 percent), and the induced effects on revenues would be a decrease of over $4.1 million (2.0 percent) as compared with the revenues collected in 2003. In the Santa Rosa County School District, the direct effects on revenues would be a decrease of nearly $510,000 (0.3 percent), and the induced effects on revenues would be a decrease of over $285,000 (0.2 percent). The effects on the expenditures of the school districts would be the same as the effects on the revenues.

Economic Activity

The relocation of the military personnel under the No Action Alternative would be a loss of spending within the region. The loss of spending would then translate into lost incomes and lost jobs. The direct effects of the outgoing personnel would be a decrease in total spending of over $169 million and the number of jobs lost would be the same as the net number of personnel leaving the region, or 2,172 personnel. The induced effects would be a decrease in total spending of nearly $100.9 million, and the number of jobs lost would be approximately 1,250 (Table 4-3). These potential losses were estimated using the IMPLAN Economic Impact model.

Public Services

The regional population loss under the No Action Alternative would reduce the amount of revenues and expenditures received by the individual counties, as well as possibly reduce the level of services demanded. The majority of the effects would be experienced in Okaloosa County. While the effects of the personnel drawdown may not directly result in a decrease of the personnel providing public services, the population loss would decrease the tax base of the counties and decrease the amount of revenues the counties could collect to fund the provision of these public services However, the individual counties would lose a total of approximately $5 million in revenues and $5 million in expenditures. This represents a decrease of 1.6 percent in revenues and expenditures.

Environmental Justice

Construction activities as well as the personnel realignment under the No Action Alternative would not disproportionately impact minority or low-income communities

of concern. Environmental justice concerns that could potentially be associated with the proposed activities include issues related to noise, safety, pollutants, and hazardous materials.

Analyses discussed in Sections 4.2, Noise; 4.7, Air Quality; 4.8 Safety; and 4.10, Hazardous Materials, found that no adverse impacts related to these environmental issues would occur under any of the alternatives. As a result, no disproportionate or adverse impacts to minority or low-income populations in the ROI are anticipated to occur.

Special Risks to Children

Construction activities as well as the personnel realignment under the No Action Alternative would not yield any special health or safety risks to children. The risks potentially associated with the proposed activities are exposure to asbestos, LBP exposure, safety concerns, and noise from construction. Given that children have physiological and behavioral characteristics that make them more vulnerable than adults to damage from environmental effects, evaluation of potential environmental exposures associated with the alternatives requires special consideration.

Safety concerns with regard to children are associated with demolition and construction activities, including potential asbestos/LBP exposure, and potential accidents at construction sites. Potential exposure to these materials during demolition and construction are discussed in Sections 4.8, Safety, and 4.10, Hazardous Materials. Safety precautions to protect children in areas surrounding the work sites would include adequate measures to restrict access, minimization of hazards associated with the construction sites/activities, and proper handling and disposal of hazardous materials. Such mitigation measures would serve to offset the potential for impacts to any age group, including children.

Noise associated with the proposed activities would be related to demolition and construction activities. Children, being more sensitive to noise than adults and therefore more likely to develop potentially severe hearing loss, are of particular concern with regard to noise impacts. Results presented in Section 4.2, Noise, indicate that anticipated sound levels under any of the alternatives associated with the demolition and construction activities for the 7SFG(A) cantonment areas would be intermittent and short in duration, not contributing any appreciable effect to the existing acoustic environment in the affected region.

4.5 TRANSPORTATION

4.5.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.5.1.1 Existing Conditions (Transportation – 7SFG(A) Cantonment Alternative 1)

7SFG(A) Cantonment Alternative 1 encompasses three slightly different locations within the general area near Eglin Main Base (the Triangle, Eglin West Gate, and North Poquito [7SFG(A) Cantonment Alternatives 1A, 1B, and 1C, respectively]). The existing conditions for the Eglin Main Base region are described in Chapter 3 (Section 3.5.2, Region of Influence and Existing Conditions). As discussed in Chapter 3 (Section 3.5.2) several of the roadways anticipated to be impacted by the Proposed Action are currently operating in a deficient condition. Of particular concern are State Road (SR) 85 (also known as Hwy 85), SR 189, and SR 123. Currently scheduled improvements will not address all the current deficiencies, regardless of the alternative actions.

4.5.1.2 Environmental Consequences (Transportation – 7SFG(A) Cantonment Alternative 1)

The analysis included generating the 2016 peak-hour, peak-direction traffic volumes under 7SFG(A) Cantonment Alternatives 1A, 1B, and 1C. These future volumes were compared to the peak-hour, peak-direction roadway capacities based on number of lanes, facility type, and area type, to determine which roadways are projected to operate worse than the adopted Level of Service (LOS) standard under the alternative actions.

Analysis revealed that the transportation impacts associated with 7SFG(A) Cantonment Alternatives 1A (The Triangle) and 1C (North Poquito) are projected to be commensurate, as access to the regional roadway network is projected to occur at the same point on SR 189. Site access improvements associated with each alternative would need to be identified when the exact location of gates and driveways is determined.

7SFG(A) Cantonment Alternative 1B is different from 1A and 1C in that the location of the 7SFG(A) is projected to be on Eglin Main Base off Eglin Boulevard. Under 7SFG(A) Cantonment Alternative 1B, traffic associated with the 7SFG(A) must enter the base to reach the cantonment area. Table 4-5 lists the current peak–hour, peak-direction LOS for each study area roadway and the projected LOS under 7SFG(A) Cantonment Alternatives 1A/1C and 1B. Appendix B, *Transportation*, shows both the daily and peak-hour, peak-direction LOS for all alternatives.

This analysis identified any roadway segment that currently operates deficiently or worse than the adopted local government LOS standard. Table 4-5 includes a volume-to-capacity (v/c) ratio; this number indicates how well the roadway operates relative to the adopted standard. The 2016 roadway LOS is shown in Figure 4-6 for 7SFG(A) Cantonment Alternatives 1A/1C and in Figure 4-7 for 7SFG(A) Cantonment Alternative 1B.

Under 7SFG(A) Cantonment Alternatives 1A/1C, 16 roadway segments are projected to operate deficiently with respect to the adopted LOS standard; 17 segments are projected to operate deficiently under 7SFG(A) Cantonment Alternative 1B.

The analysis also identified which of the area roadways are projected to be "significantly impacted" by project-related trips (i.e., where project trips are projected to exceed 5 percent of the capacity of the roadway at the adopted LOS standard) and which of the significantly impacted roadways are projected to also be "adversely impacted" (i.e., where the peak–hour, peak-direction capacity at the adopted LOS standard is projected to be exceeded). According to the analysis, nine roadways could be significantly impacted under 7SFG(A) Cantonment Alternatives 1A/1C, and 17 roadways could be significantly impacted under 7SFG(A) Cantonment Alternative 1B. Of the nine significantly impacted roadways under 7SFG(A) Cantonment Alternatives 1A/1C, seven could be adversely impacted. Under 7SFG(A) Cantonment Alternative 1B, seven of the 17 significantly impacted roadway segments could be adversely impacted. SR 397 (on base) from Museum Drive/Nomad Way to SR 189/West Gate is one of the significantly and adversely impacted segments under 7SFG(A) Cantonment Alternative 1B.

Furthermore, of the 16 roadway segments that could be deficient under 7SFG(A) Cantonment Alternatives 1A/1C, nine are currently deficient. The same is true of the 17 roadways that could operate deficiently under 7SFG(A) Cantonment Alternative 1B: nine of them operate deficiently now.

In terms of off-base impacts, 7SFG(A) Cantonment Alternatives 1A, 1B, and 1C are nearly identical. Under 7SFG(A) Cantonment Alternatives 1A/1C, two segments (SR 189 from SR 188 to SR 393 and SR 393 from SR 189 to SR 30) could be significantly and adversely impacted. 7SFG(A) Cantonment Alternative 1B could also significantly and adversely impact two segments, SR 85 from Eglin Boulevard to Twelfth Avenue and SR 397 from Museum Drive to SR 189.

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
3rd Street																						
Between Van Matre Ave & SR 397 (Eglin Blvd/John Sims Pkwy)	2 (one way)	0.27	E	2,064	250	C	0.12	No	300	C	0.15	No	No	0%	No	300	C	0.15	No	No	0%	No
4th Street																						
Between Van Matre Ave & Magnolia St	1 (one way)	0.29	E	972	200	C	0.21	No	250	C	0.26	No	No	0%	No	250	C	0.26	No	No	0%	No
5th Street																						
Between Van Matre Ave & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.30	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No	200	C	0.25	No	No	0%	No
7th Street																						
Between Daytona Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.38	E	712	250	C	0.35	No	250	C	0.35	No	No	0%	No	250	C	0.35	No	No	1%	No
8th Street																						
Between Daytona Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.37	E	712	300	C	0.42	No	350	C	0.49	No	No	0%	No	350	C	0.49	No	No	0%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Biscayne Rd	2	0.41	E	810	100	C	0.12	No	100	C	0.12	No	No	0%	No	100	C	0.12	No	No	0%	No
Barrancas Avenue																						
Between Choctawhatchee Rd & F Ave[++]	2	0.44	E	972	100	C	0.10	No	100	C	0.10	No	No	0%	No	100	C	0.10	No	No	0%	No
Between F Ave & 2nd St/Eglin Blvd	2 (one way)	0.13	E	972	250	C	0.26	No	350	C	0.36	No	No	0%	No	300	C	0.31	No	No	0%	No
Boatner Road																						
Between Hatchee Rd & Hospital	2	0.23	E	648	500	D*	0.77	No	500	D*	0.77	No	No	0%	No	500	D*	0.77	No	No	0%	No
Between Hospital & Ash Dr	2	0.20	E	648	350	C	0.54	No	350	C	0.54	No	No	0%	No	350	C	0.54	No	No	0%	No
Chinquapin Drive																						
Between Minor Dr & Memorial Tr[+]	2	0.26	E	770	650	C	0.84	No	650	D*	0.84	No	No	1%	No	650	D*	0.84	No	No	2%	No
Between Memorial Tr & Wakulla Rd	2	0.33	E	770	100	C	0.13	No	150	C	0.19	No	No	0%	No	150	C	0.19	No	No	0%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Choctawhatchee Road																						
Between 7th St & Barrancas Ave	2	0.36	E	810	200	C	0.25	No	250	C	0.31	No	No	0%	No	250	C	0.31	No	No	0%	No
Cypress Road																						
Between Lido Rd & Kissimmee Rd	2	0.18	E	810	100	C	0.12	No	100	C	0.12	No	No	0%	No	100	C	0.12	No	No	1%	No
Daytona Road[2]																						
Between 10th St & 8th St	2	0.27	E	810	90	C	0.11	No	100	C	0.12	No	No	0%	No	100	C	0.12	No	No	0%	No
Between 8th St & 7th St	2/4	0.25	E	810	200	C	0.25	No	250	C	0.31	No	No	0%	No	250	C	0.31	No	No	0%	No
General Robert M Bond Boulevard																						
Between SR 85 & SR 189 (Lewis Turner Blvd)	2 (one way)	1.20	D	1,140	850	D*	0.75	No	1,000	D*	0.88	No	No	4%	No	1,000	D*	0.88	No	No	0%	No
Hatchee Road																						
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Choctaw Rd	2	0.81	E	770	100	C	0.13	No	150	C	0.19	No	No	0%	No	150	C	0.19	No	No	0%	No
Between Choctaw Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.82	E	770	70	C	0.09	No	70	C	0.09	No	No	0%	No	70	C	0.09	No	No	0%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Inverness Road																						
Between Cypress Rd & De Leon Rd	2	0.10	E	810	150	C	0.19	No	150	C	0.19	No	No	0%	No	150	C	0.19	No	No	0%	No
Kissimmee Road																						
Between Biscayne Rd & Cypress Rd	2	0.11	E	810	150	C	0.19	No	150	C	0.19	No	No	0%	No	150	C	0.19	No	No	0%	No
Magnolia Street																						
Between SR 397 (Eglin Blvd/John Sims Pkwy) & F Ave	2	0.13	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No	200	C	0.25	No	No	0%	No
May Road																						
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Gaffney Rd	2	0.15	E	770	20	C	0.03	No	20	C	0.03	No	No	0%	No	20	C	0.03	No	No	0%	No
Memorial Trail																						
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Commissary/ Exchange	2	1.58	E	688	300	C	0.44	No	300	C	0.44	No	No	0%	No	300	C	0.44	No	No	0%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Commissary/ Exchange & Chinquapin Dr	2	0.41	E	770	350	C	0.45	No	350	C	0.45	No	No	0%	No	350	C	0.45	No	No	1%	No
Museum Drive																						
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Minor Dr	2	0.09	E	616	450	D*	0.73	No	500	E*	0.81	No	No	1%	No	550	E*	0.89	No	No	2%	No
Nomad Way																						
Between SR 85 & Pumphouse	2	1.23	E	688	250	C	0.36	No	300	C	0.44	No	No	0%	No	300	C	0.44	No	No	1%	No
Between Pumphouse and SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.85	E	688	250	C	0.36	No	300	C	0.44	No	No	0%	No	300	C	0.44	No	No	1%	No
North Gate Road																						
Between SR 85 & Perimeter Rd	2	0.71	E	770	40	C	0.05	No	40	C	0.05	No	No	0%	No	50	C	0.06	No	No	0%	No
Perimeter Road																						
Between Daytona Rd & Taxiway S	2	0.38	E	770	200	C	0.26	No	200	C	0.26	No	No	0%	No	200	C	0.26	No	No	0%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Taxiway S & North Gate Rd	2	0.61	E	770	70	C	0.09	No	80	C	0.10	No	No	0%	No	80	C	0.10	No	No	0%	No
Between North Gate Rd & ACC Munitions (west end)	2	0.93	E	770	50	C	0.06	No	50	C	0.06	No	No	0%	No	50	C	0.06	No	No	0%	No
Between ACC Munitions (west end) & ACC Munitions (south end)	2	0.37	E	770	40	C	0.05	No	50	C	0.06	No	No	0%	No	50	C	0.06	No	No	0%	No
Between ACC Munitions (south end) & Taxiway C	2	1.64	E	770	80	C	0.10	No	100	C	0.13	No	No	0%	No	100	C	0.13	No	No	1%	No
Between Taxiway C & Nomad Way	2	0.42	E	770	60	C	0.08	No	70	C	0.09	No	No	1%	No	70	C	0.09	No	No	1%	No
State Road 20																						
Between SR 85 & SR 285 (N Partin Dr)	6	0.78	D	2,790	2,700	C	0.97	No	3,100	F	1.11	Yes	No	3%	No	3,100	F	1.11	Yes	No	4%	No
Between SR 285 (N Partin Dr) & Rocky Bayou Bridge	4	2.60	D	1,860	1,700	C	0.91	No	2,000	F	1.08	Yes	No	3%	No	2,000	F	1.08	Yes	No	3%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Rocky Bayou Bridge & SR 293 (White Point Rd)	4	2.10	D	1,860	1,800	C	0.97	No	2,100	F	1.13	Yes	No	1%	No	2,100	F	1.13	Yes	No	1%	No
Between SR 293 (White Point Rd) & Walton County Line	2	1.62	D	950	600	C	0.63	No	750	D*	0.79	No	No	0%	No	750	D*	0.79	No	No	0%	No
State Road 30 (US 98)																						
Between SR 85 & SR 393 (Mary Esther Boulevard)	4	3.02	D	1,860	1,800	D*	0.97	No	2,100	F	1.13	Yes	No	0%	No	2,100	F	1.13	Yes	No	0%	No
Between SR 393 (Mary Esther Boulevard) & Hurlburt Field Gate	4	2.70	D	1,860	2,100	F	1.13	Yes	2,500	F	1.34	Yes	No	2%	No	2,500	F	1.34	Yes	No	2%	No
State Road 85																						
Between CR 190 (College Blvd) & SR 20	4	0.89	D	1,860	1,000	B	0.54	No	1,200	B	0.65	No	No	0%	No	1,200	B	0.65	No	No	0%	No
Between SR 20 & SR 397 (John Sims Pkwy)	6	0.68	D	2,710	2,900	F	1.07	Yes	3,400	F	1.25	Yes	No	4%	No	3,400	F	1.25	Yes	No	5%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between SR 397 (John Sims Pkwy) & North Gate	4	1.26	D	1,810	1,000	B	0.55	No	1,300	B	0.72	No	Yes	5%	No	1,300	B	0.72	No	No	2%	No
Between North Gate Rd & SR 123	4	2.66	D	2,980	1,400	B	0.47	No	1,700	C	0.57	No	No	3%	No	1,700	C	0.57	No	No	1%	No
Between SR 123 & ACC Gate at Nomad Way	4	1.05	D	1,860	2,400	F	1.29	Yes	2,800	F	1.51	Yes	Yes	15%	Yes	2,700	F	1.45	Yes	Yes	11%	Yes
Between ACC Gate at Nomad Way & SR 189 (Lewis Turner Blvd)	4	0.94	D	1,810	2,100	F	1.16	Yes	2,600	F	1.44	Yes	Yes	9%	Yes	2,500	F	1.38	Yes	Yes	7%	Yes
Between SR 189 (Lewis Turner Blvd) & SR 189/SR 397 (Eglin Blvd)	4	0.50	D	1,860	900	B	0.48	No	1,200	B	0.65	No	No	3%	No	1,100	B	0.59	No	No	0%	No
Between SR 189/SR 397 (Eglin Blvd) & 12th Ave	4	1.36	***	1,810	2,000	F	1.10	Yes	2,300	F	1.27	Yes	No	3%	No	2,300	F	1.27	Yes	Yes	7%	Yes
Between 12th Ave & SR 188 (Racetrack Rd)	6	1.58	***	2,710	2,000	C	0.74	No	2,300	D	0.85	No	No	1%	No	2,300	D	0.85	No	No	3%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between SR 188 (Racetrack Rd) & SR 30 (US 98)	6	2.96	***	2,790	2,200	D	0.79	No	3,000	F	1.08	Yes	No	2%	No	3,000	F	1.08	Yes	No	3%	No
State Road 123																						
Between SR 85 & SR 85N	2	5.00	D	870	1,000	E	1.15	Yes	1,300	F	1.49	Yes	Yes	11%	Yes	1,300	F	1.49	Yes	Yes	13%	Yes
State Road 188 (Racetrack Road)																						
Between SR 189 (Beal Pkwy) & SR 85	4	2.60	D	1,860	1,700	C	0.91	No	1,900	F	1.02	Yes	No	0%	No	1,900	F	1.02	Yes	No	1%	No
State Road 189																						
Between SR 197 (Eglin Blvd/John Sims Pkwy) & SR 85	4	0.51	E	1,810	700	B	0.39	No	850	B	0.47	No	No	2%	No	1,200	B	0.66	No	Yes	20%	No
Between SR 85 & General Bond Blvd	4	1.26	E	1,810	1,300	B	0.72	No	1,400	B	0.77	No	Yes	16%	No	1,400	B	0.77	No	Yes	12%	No
Between General Bond Blvd & Mooney Rd	4	2.31	E	1,860	2,800	F	1.51	Yes	3,300	F	1.77	Yes	Yes	22%	Yes	3,300	F	1.77	Yes	Yes	12%	Yes
Between Mooney Rd & SR 188 (Racetrack Rd)	4	2.10	D	1,710	1,500	D*	0.88	No	2,100	F	1.23	Yes	Yes	12%	Yes	2,000	F	1.17	Yes	Yes	8%	Yes

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between SR 188 (Racetrack Rd) & SR 393 (Mary Esther Blvd)	4	1.50	D	1,796	2,100	F	1.17	Yes	2,400	F	1.34	Yes	Yes	5%	Yes	2,400	F	1.34	Yes	No	4%	No
Between SR 393 (Mary Esther Blvd) & Yacht Club Dr	4	1.50	D	1,953	1,100	B	0.56	No	1,300	B	0.67	No	No	1%	No	1,300	B	0.67	No	No	0%	No
State Road 285																						
Between Swift Creek & SR 20	4	1.00	E	1,800	400	C	0.22	No	450	C	0.25	No	No	1%	No	450	C	0.25	No	No	1%	No
State Road 393 (Mary Esther Boulevard)																						
Between SR 189 (Beal Pkwy) & SR 30 (US 98)	4	1.84	D	1,586	1,800	F	1.14	Yes	2,400	F	1.51	Yes	Yes	5%	Yes	2,400	F	1.51	Yes	No	4%	No
State Road 397 (Eglin Boulevard/John Sims Parkway)																						
Between SR 85 & SR 190	4	0.90	D	1,860	1,500	B	0.81	No	1,700	C	0.91	No	No	0%	No	1,600	C	0.86	No	No	4%	No
Between SR 190 & East Gate	4	1.37	D	1,860	650	B	0.35	No	1,200	B	0.65	No	No	0%	No	1,300	B	0.70	No	No	5%	No
Between East Gate & 8th St	4	0.43	D	1,710	1,100	C	0.64	No	1,300	C	0.76	No	No	0%	No	1,400	D*	0.82	No	Yes	8%	No
Between 8th St & 7th St	4	0.27	D	1,710	1,000	C	0.58	No	1,200	C	0.70	No	No	0%	No	1,300	C	0.76	No	Yes	9%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between 7th St & 5th St	4	0.39	D	1,860	700	B	0.38	No	800	B	0.43	No	No	1%	No	900	B	0.48	No	Yes	7%	No
Between 5th St & Memorial Tr (northbound/ eastbound)	3 (one way)	0.70	D	3,348	1,100	B	0.33	No	1,100	B	0.33	No	No	0%	No	1,300	B	0.39	No	Yes	11%	No
Between 5th St & Memorial Tr (southbound/ westbound)**	3 (one way)	0.71	D	3,348	1,100	B	0.33	No	1,200	B	0.36	No	No	1%	No	1,300	B	0.39	No	No	5%	No
Between Memorial Tr & Eglin Blvd South End Split (eastbound)	2 (one way)	0.47	D	2,172	700	B	0.32	No	800	B	0.37	No	No	1%	No	900	B	0.41	No	Yes	6%	No
Between Memorial Tr & Eglin Blvd South End Split (westbound)	2 (one way)	0.54	D	2,172	1,100	B	0.51	No	1,200	B	0.55	No	No	1%	No	1,400	B	0.64	No	Yes	9%	No
Between Eglin Blvd South End Split & Museum Dr/ Nomad Way	4	1.42	D	1,810	1,300	B	0.72	No	1,400	B	0.77	No	No	1%	No	1,500	C	0.83	No	Yes	11%	No

Table 4-5. 7SFG(A) Cantonment Alternatives 1A/1C and 1B – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1a/1c 7SFG(A) at Triangle/Poquito							2016 Alt 1b 7SFG(A) at West Gate (Eglin)						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Museum Dr/ Nomad Way & SR 189 (Lewis Turner Blvd)/ West Gate	4	1.10	D	1,810	700	B	0.39	No	1,600	C	0.88	No	No	2%	No	2,200	F	1.22	Yes	Yes	22%	Yes
Between SR 189 (Lewis Turner Blvd)/ West Gate & SR 85	4	0.47	D	1,860	850	B	0.46	No	950	B	0.51	No	No	0%	No	1,200	B	0.65	No	Yes	10%	No

* Level of service does not exceed the standard.
** This section of Eglin Boulevard runs as F Avenue and 2nd Street.
*** Constrained: not able to be widened.
\+ Annual Average Daily Traffic (AADT) has been generated from turning movement counts.
++ Count data estimated based on 1996 Eglin Transportation Plan
1. v/c ratio was calculated from peak hour peak direction adopted level of service standard
2. Roadway analyzed as a two lane facility.
3. Significance is based on project trips for the alternative/action divided by the peak hour peak direction capacity of the adopted level of service standard.
^ Increase number of lanes from existing conditions.

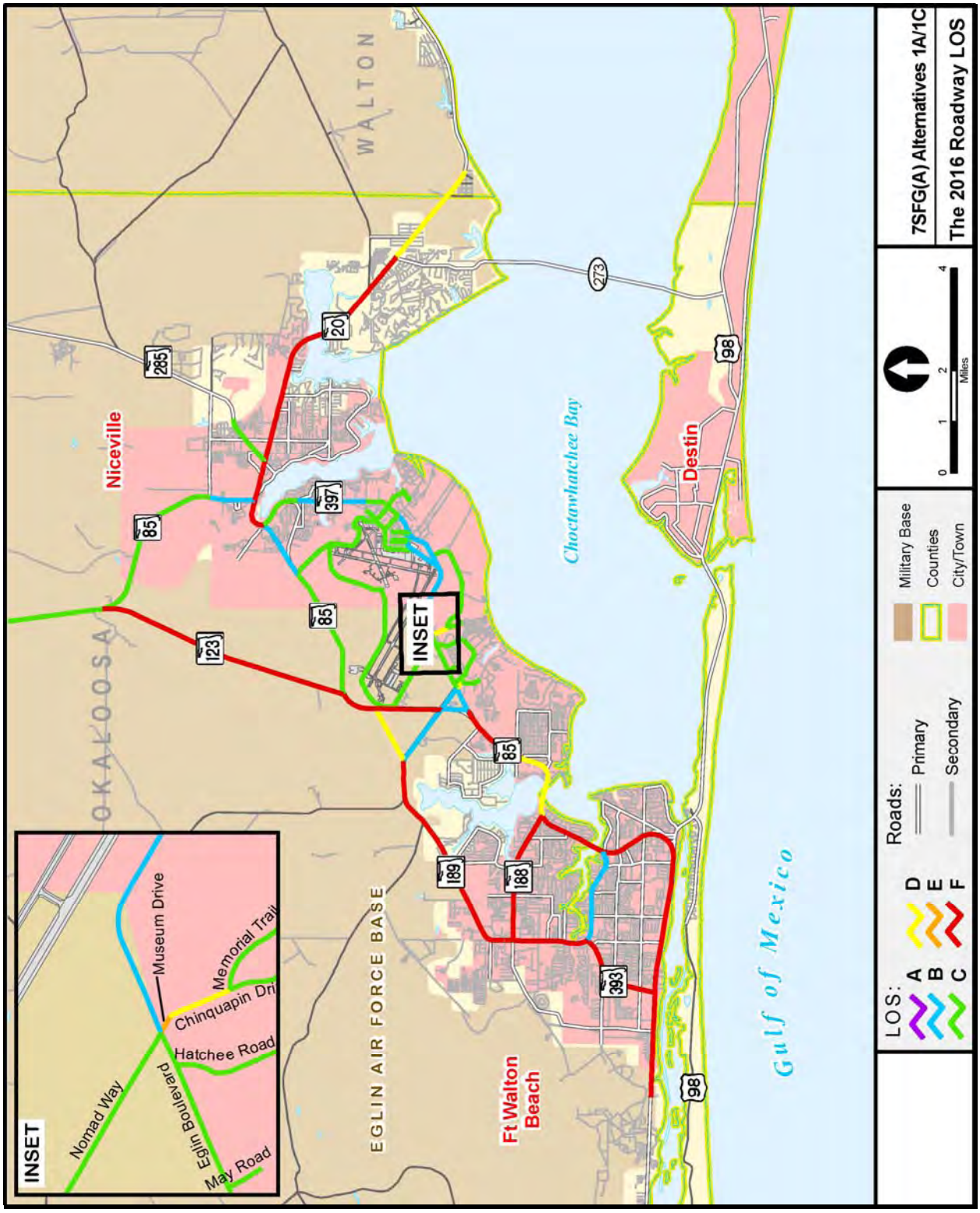

Figure 4-6. 7SFG(A) Cantonment Alternatives 1A/1C – 2016 Roadway LOS

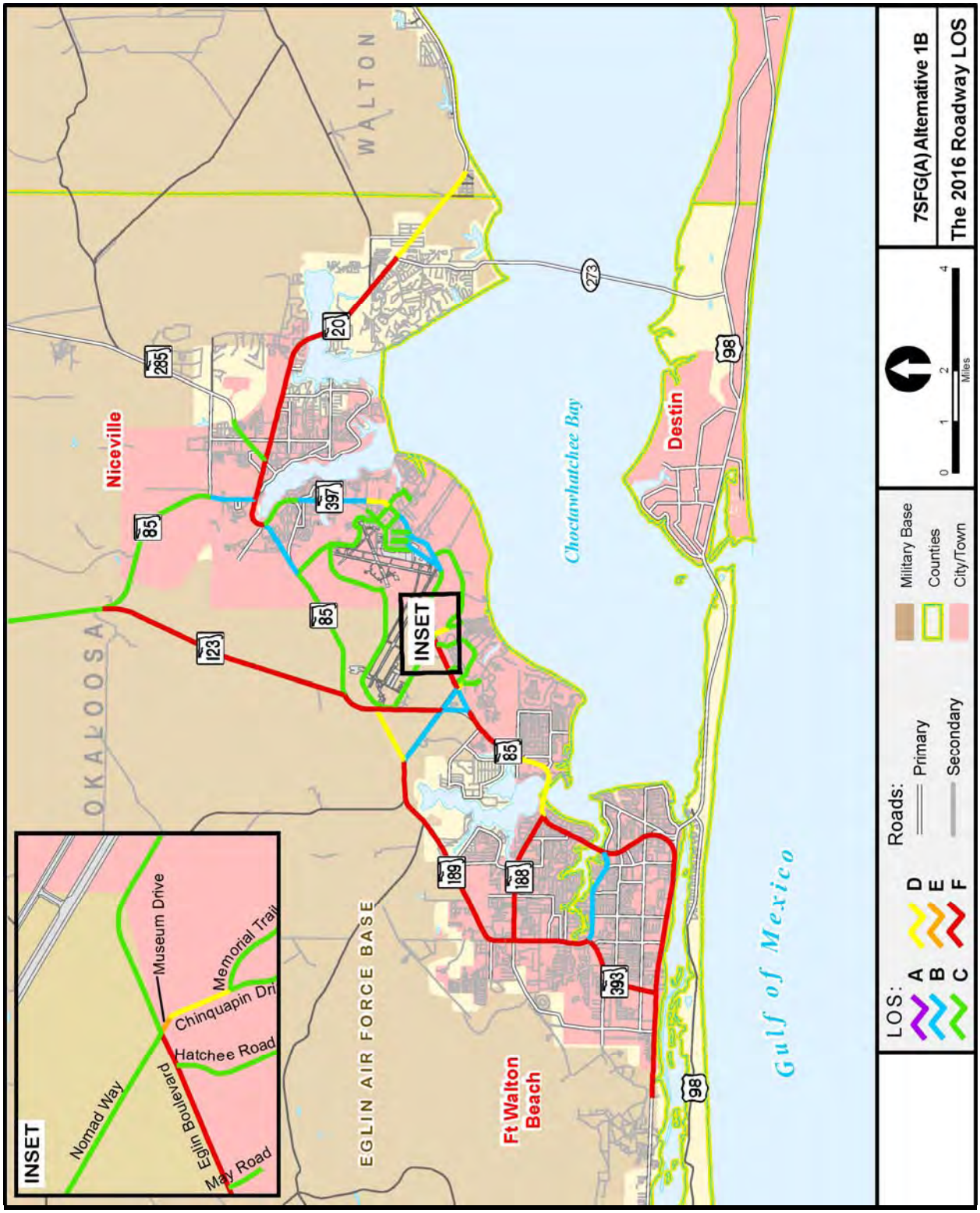

Figure 4-7. 7SFG(A) Cantonment Alternative 1B – 2016 Roadway LOS

4.5.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.5.2.1 Existing Conditions (Transportation – 7SFG(A) Cantonment Alternative 2)

All the locations under 7SFG(A) Cantonment Alternative 2 are near Duke Field east of SR 85. The 7SFG(A) could be accessed at a point off SR 85, near or at the current access to Duke Field. The existing conditions for the Duke Field region are described in Chapter 3 (Section 3.5.2, Region of Influence and Existing Conditions).

As discussed in Section 3.5.2, four roadway segments along SR 85 are currently operating deficiently. Because the Proposed Action could directly impact these segments, the deficiency on SR 85 is of particular concern. Currently scheduled improvements will not completely address the existing deficiency; thus, mitigation measures could be necessary.

4.5.2.2 Environmental Consequences (Transportation – 7SFG(A) Cantonment Alternative 2)

A general description of the transportation demand modeling process, trip generation, and inputs utilized for transportation impact analysis is provided in Chapter 3 (Section 3.5.3, Analysis Methodology). More detailed discussion and documentation on the development of the model are included in the Appendix B, *Transportation*.

Under 7SFG(A) Cantonment Alternative 2, the 7SFG(A) is proposed to be located near Duke Field east of SR 85. The 7SFG(A) cantonment area could be accessed at a point off SR 85, near or at the current access to Duke Field. For purposes of the roadway analysis, 7SFG(A) Cantonment Alternatives 2A, 2B and 2C are identical, as the access to the regional roadway network occurs at generally the same point on SR 85. Site access improvements associated with each of these alternatives would need to be identified when the exact location of gates and driveways is determined. Table 4-6 contains the results of the peak-hour, peak-direction roadway analysis for 7SFG(A) Cantonment Alternative 2. The future year existing and peak-hour, peak-direction traffic, as well as LOS, are detailed in this table.

The analysis identified any roadway segment that operates deficiently or worse than the adopted local government LOS standard. Table 4-6 includes a v/c ratio; this number indicates how well the roadway operates relative to the adopted standard. The 2016 roadway LOS is shown graphically in Figure 4-8 for 7SFG(A) Cantonment Alternative 2.

Table 4-6. 7SFG(A) Cantonment Alternative 2 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 7SFG(A) at Duke Field						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
State Road 8 (Interstate-10 [I-10])															
Between Antioch Road & SR 85	4	2.16	C	2,890	1,200	A	0.42	No	1,800	B	0.62	No	No	2%	No
Between SR 85 & Walton/Okaloosa County Line	4	4.71	C	2,890	1,100	A	0.38	No	1,600	B	0.55	No	No	2%	No
State Road 10 (U.S. Highway 90 [US 90])															
Between Fairchild Road & SR 85	4	3.50	D	2,980	750	A	0.25	No	850	A	0.29	No	No	0%	No
Between SR 85 & Antioch Road	4	0.65	D	2,980	1,900	C	0.64	No	2,000	C	0.67	No	No	1%	No
State Road 85															
Between Old Bethel Rd & SR 10 (US 90)	4	2.40	D	1,810	1,400	B	0.77	No	1,600	C	0.88	No	No	4%	No
Between SR 10 (US 90) & SR 8 (I-10)	4	2.17	D	1,620	1,700	E	1.05	Yes	2,500	F	1.54	Yes	Yes	21%	Yes
Between SR 8 (I-10) & PJ Adams Pkwy	4	0.95	C	1,730	2,200	F	1.27	Yes	3,100	F	1.79	Yes	Yes	28%	Yes
Between PJ Adams Pkwy & Duke Field	4	5.21	C	2,500	2,000	C	0.80	No	2,900	D	1.16	Yes	Yes	41%	Yes
Between Duke Field & CR 190 (College Blvd)	4	8.72	C	2,500	2,000	C	0.80	No	2,200	C	0.88	No	No	3%	No

1. v/c ratio was calculated from peak hour peak direction adopted level of service standard
2. Significance is based on project trips for the alternative/action divided by the peak-hour (Pk Hr) peak-direction (Pk Dir) capacity of the adopted level of service standard.

According to the analysis, under 7SFG(A) Cantonment Alternative 2, three roadway segments are projected to operate deficiently with respect to the adopted LOS standard for the peak-hour, peak-direction analysis. The analysis also identified which of the area roadways are projected to be significantly impacted by project-related trips (i.e., where project trips exceed 5 percent of the capacity of the roadway at the adopted LOS standard) and which of the significantly impacted roadways are projected to also be adversely impacted (i.e., where the peak-hour capacity at the adopted LOS standard is projected to be exceeded). Three significantly impacted roadways were identified for 7SFG(A) Cantonment Alternative 2. All three significantly impacted roadways are projected to also be adversely impacted.

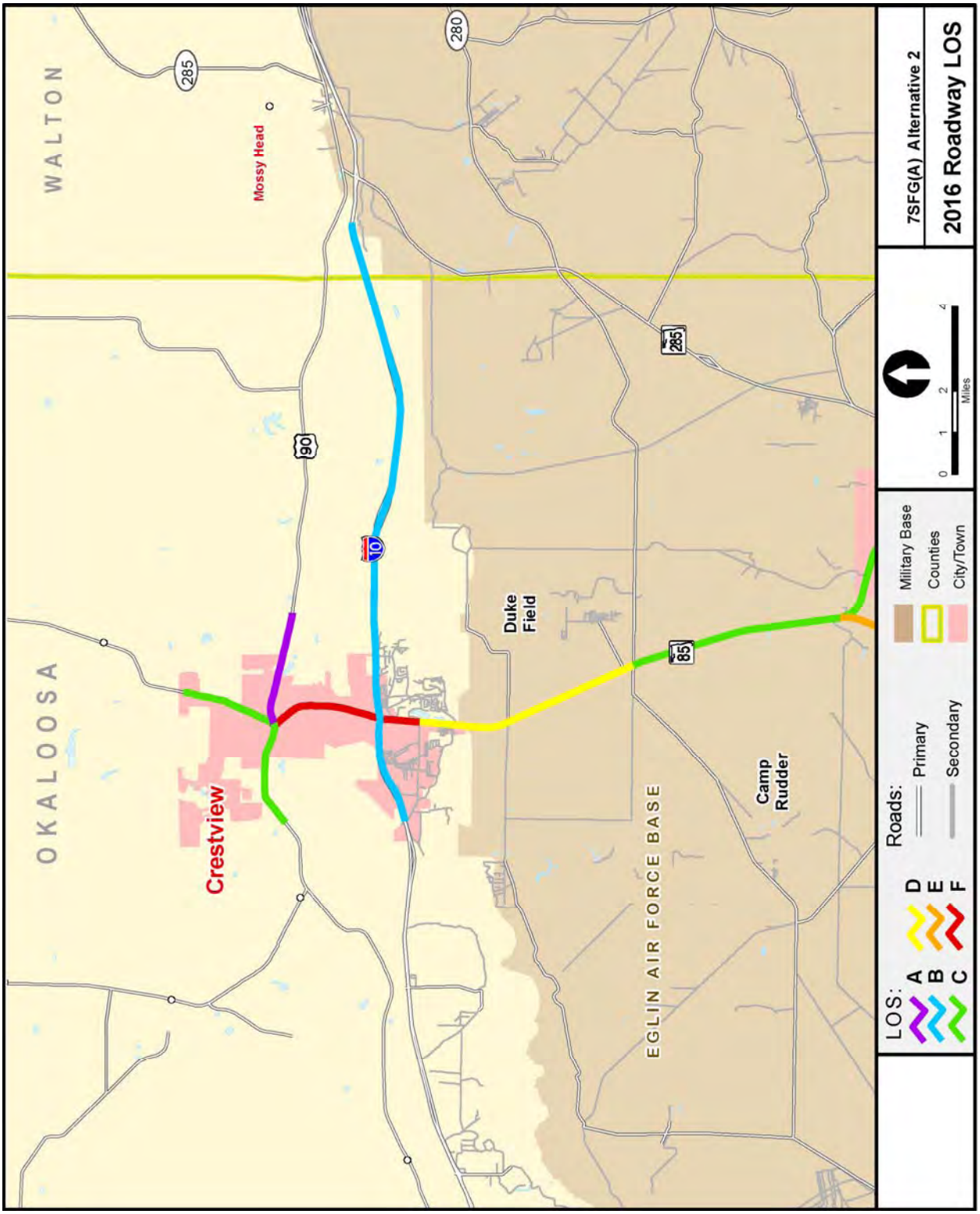

Figure 4-8. 7SFG(A) Cantonment Alternative 2 – 2016 Roadway LOS

Section 4.5.7 addresses improvements that could be needed to address the LOS deficiencies.

Based on the analysis, three roadway segments could be deficient with respect to the adopted LOS standard. These three segments include portions of SR 85. Furthermore, all three segments currently operate in a deficient condition. These segments along SR 85 are directly adjacent to the proposed access point and provide the connection from the cantonment area/Duke Field to Interstate 10 (I-10).

4.5.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.5.3.1 Existing Conditions (Transportation – 7SFG(A) Cantonment Alternative 3)

Under 7SFG(A) Cantonment Alternative 3, the 7SFG(A) is proposed to be located near Duke Field, west of SR 85. The 7SFG(A) could be accessed from a new signalized intersection or overpass interchange at the existing Duke Field entrance at SR 85. The new access road could extend southwest from the intersection to RR 215 and then turn north onto RR 237. For purposes of this analysis, this alternative is assumed to be the same as 7SFG(A) Range Alternative 2, with the exception that it is west of SR 85 instead of east. Under 7SFG(A) Cantonment Alternative 3, turning movements at this intersection are projected to shift from east to west and vice versa.

The existing conditions for the Duke Field region are described in Section 3.5.2, Region of Influence and Existing Conditions.

4.5.3.2 Environmental Consequences (Transportation – 7SFG(A) Cantonment Alternative 3)

The location of the 7SFG(A) west of SR 85 across from Duke Field is projected to generate substantially the same transportation impacts as under 7SFG(A) Cantonment Alternative 2. Trips to and from the cantonment area are assumed to originate from and go to the same places as those assumed for 7SFG(A) Cantonment Alternative 2. The only substantial change from under 7SFG(A) Cantonment Alternative 3 is projected to be at the intersection of the cantonment area access with SR 85. Turning movements at this intersection are projected to shift from east to west and vice versa.

Analysis results for 7SFG(A) Cantonment Alternative 3 are the same as those for 7SFG(A) Cantonment Alternative 2, as previously discussed in Section 4.5.2.2.

The analysis shows that, under 7SFG(A) Cantonment Alternative 3, three segments are projected to operate deficiently with respect to the adopted LOS standard. These three segments include portions of SR 85. Furthermore, all three segments currently operate in a deficient condition. These sections of SR 85 are directly adjacent to the proposed access point and provide the connection from the cantonment area/Duke Field to I-10.

4.5.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.5.4.1 Existing Conditions (Transportation – 7SFG(A) Cantonment Alternative 4)

Under 7SFG(A) Cantonment Alternative 4, the 7SFG(A) is proposed to be located north of Eglin Main Base. The 7SFG(A) cantonment area is proposed to be accessed from SR 123.

The transportation analysis for 7SFG(A) Cantonment Alternative 4 was conducted in the same manner as that for 7SFG(A) Cantonment Alternatives 1A/1C and 1B for Eglin Main Base. The existing conditions for transportation resources are the same as those described in the discussion for the Eglin Main Base region (Section 3.5.2, Region of Influence and Existing Conditions).

4.5.4.2 Environmental Consequences (Transportation – 7SFG(A) Cantonment Alternative 4)

A general description of the transportation demand modeling process, trip generation, and inputs utilized for transportation impact analysis is provided in Section 3.5.3, Analysis Methodology. More detailed discussion and documentation on the development of the model are included in the Appendix B, *Transportation*.

Under 7SFG(A) Cantonment Alternative 4, the 7SFG(A) could be accessed from SR 123. Site access improvements associated with the alternative would need to be identified when the exact location of gates and driveways is determined. Table 4-7 contains the results of the roadway analysis for 7SFG(A) Cantonment Alternative 4 and lists the current peak-hour, peak-direction LOS for each study area roadway and the projected LOS under 7SFG(A) Cantonment Alternative 4. Appendix B, *Transportation*, shows both the daily and peak-hour, peak-direction LOS for all alternatives.

Table 4-7. 7SFG(A) Cantonment Alternative 4 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 4 7SFG(A) North of Main						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant& Adverse
3rd Street															
Between Van Matre Ave & SR 397 (Eglin Blvd/ John Sims Pkwy)	2 (one way)	0.27	E	2,064	250	C	0.12	No	250	C	0.12	No	No	0%	No
4th Street															
Between Van Matre Ave & Magnolia St	1 (one way)	0.29	E	972	200	C	0.21	No	250	C	0.26	No	No	0%	No
5th Street															
Between Van Matre Ave & SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.30	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
7th Street															
Between Daytona Rd & SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.38	E	712	250	C	0.35	No	250	C	0.35	No	No	0%	No
8th Street															
Between Daytona Rd & SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.37	E	712	300	C	0.42	No	300	C	0.42	No	No	0%	No
Between SR 397 (Eglin Blvd/ John Sims Pkwy) & Biscayne Rd	2	0.41	E	810	100	C	0.12	No	100	C	0.12	No	No	0%	No
Barrancas Avenue															
Between Choctawhatchee Rd & F Ave++	2	0.44	E	972	100	C	0.10	No	100	C	0.10	No	No	0%	No

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Table 4-7. 7SFG(A) Cantonment Alternative 4 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 4 7SFG(A) North of Main						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant& Adverse
Between F Ave & 2nd St/ Eglin Blvd	2 (one way)	0.13	E	972	250	C	0.26	No	300	C	0.31	No	No	0%	No
Boatner Road															
Between Hatchee Rd & Hospital	2	0.23	E	648	500	D*	0.77	No	500	D*	0.77	No	No	0%	No
Between Hospital & Ash Dr	2	0.20	E	648	350	C	0.54	No	350	C	0.54	No	No	0%	No
Chinquapin Drive															
Between Minor Dr & Memorial Tr+	2	0.26	E	770	650	C	0.84	No	650	D*	0.84	No	No	1%	No
Between Memorial Tr & Wakulla Rd	2	0.33	E	770	100	C	0.13	No	150	C	0.19	No	No	0%	No
Choctawhatchee Road															
Between 7th St & Barrancas Ave	2	0.36	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
Cypress Road															
Between Lido Rd & Kissimmee Rd	2	0.18	E	810	100	C	0.12	No	100	C	0.12	No	No	0%	No
Daytona Road[2]															
Between 10th St & 8th St	2	0.27	E	810	90	C	0.11	No	90	C	0.11	No	No	0%	No
Between 8th St & 7th St	2/4	0.25	E	810	200	C	0.25	No	200	C	0.25	No	No	1%	No
General Robert M Bond Boulevard															
Between SR 85 & SR 189 (Lewis Turner Blvd)	2 (one way)	1.20	D	1,140	850	D*	0.75	No	1,100	D*	0.96	No	Yes	11%	No
Hatchee Road															
Between SR 397 (Eglin Blvd/ John Sims Pkwy) & Choctaw Rd	2	0.81	E	770	100	C	0.13	No	150	C	0.19	No	No	0%	No

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Table 4-7. 7SFG(A) Cantonment Alternative 4 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 4 7SFG(A) North of Main						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant& Adverse
Between Choctaw Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.82	E	770	70	C	0.09	No	70	C	0.09	No	No	0%	No
Inverness Road															
Between Cypress Rd & De Leon Rd	2	0.10	E	810	150	C	0.19	No	150	C	0.19	No	No	0%	No
Kissimmee Road															
Between Biscayne Rd & Cypress Rd	2	0.11	E	810	150	C	0.19	No	150	C	0.19	No	No	0%	No
Magnolia Street															
Between SR 397 (Eglin Blvd/ John Sims Pkwy) & F Ave	2	0.13	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
May Road															
Between SR 397 (Eglin Blvd/ John Sims Pkwy) & Gaffney Rd	2	0.15	E	770	20	C	0.03	No	20	C	0.03	No	No	0%	No
Memorial Trail															
Between SR 397 (Eglin Blvd/ John Sims Pkwy) & Commissary/ Exchange	2	1.58	E	688	300	C	0.44	No	300	C	0.44	No	No	0%	No
Between Commissary/ Exchange & Chinquapin Dr	2	0.41	E	770	350	C	0.45	No	350	C	0.45	No	No	0%	No
Museum Drive															
Between SR 397 (Eglin Blvd/ John Sims Pkwy) & Minor Dr	2	0.09	E	616	450	D*	0.73	No	450	D*	0.73	No	No	0%	No

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Table 4-7. 7SFG(A) Cantonment Alternative 4 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 4 7SFG(A) North of Main						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant& Adverse
Nomad Way															
Between SR 85 & Pumphouse	2	1.23	E	688	250	C	0.36	No	250	C	0.36	No	No	2%	No
Between Pumphouse and SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.85	E	688	250	C	0.36	No	250	C	0.36	No	No	2%	No
North Gate Road															
Between SR 85 & Perimeter Rd	2	0.71	E	770	40	C	0.05	No	100	C	0.13	No	No	4%	No
Perimeter Road															
Between Daytona Rd & Taxiway S	2	0.38	E	770	200	C	0.26	No	200	C	0.26	No	No	4%	No
Between Taxiway S & North Gate Rd	2	0.61	E	770	70	C	0.09	No	80	C	0.10	No	No	3%	No
Between North Gate Rd & ACC Munitions (west end)	2	0.93	E	770	50	C	0.06	No	60	C	0.08	No	No	0%	No
Between ACC Munitions (west end) & ACC Munitions (south end)	2	0.37	E	770	40	C	0.05	No	50	C	0.06	No	No	0%	No
Between ACC Munitions (south end) & Taxiway C	2	1.64	E	770	80	C	0.10	No	100	C	0.13	No	No	0%	No
Between Taxiway C & Nomad Way	2	0.42	E	770	60	C	0.08	No	60	C	0.08	No	No	0%	No
State Road 20															
Between SR 85 & SR 285 (N Partin Dr)	6	0.78	D	2,790	2,700	C	0.97	No	2,900	F	1.04	Yes	No	4%	No

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Table 4-7. 7SFG(A) Cantonment Alternative 4 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 4 7SFG(A) North of Main						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant& Adverse
Between SR 285 (N Partin Dr) & Rocky Bayou Bridge	4	2.60	D	1,860	1,700	C	0.91	No	2,000	F	1.08	Yes	No	4%	No
Between Rocky Bayou Bridge & SR 293 (White Point Rd)	4	2.10	D	1,860	1,800	C	0.97	No	2,100	F	1.13	Yes	No	2%	No
Between SR 293 (White Point Rd) & Walton County Line	2	1.62	D	950	600	C	0.63	No	800	D*	0.84	No	No	0%	No
State Road 30 (US 98)															
Between SR 85 & SR 393 (Mary Esther Boulevard)	4	3.02	D	1,860	1,800	D*	0.97	No	2,100	F	1.13	Yes	No	0%	No
Between SR 393 (Mary Esther Boulevard) & Hurlburt Field Gate	4	2.70	D	1,860	2,100	F	1.13	Yes	2,500	F	1.34	Yes	No	2%	No
State Road 85															
Between CR 190 (College Blvd) & SR 20	4	0.89	D	1,860	1,000	B	0.54	No	1,400	B	0.75	No	Yes	8%	No
Between SR 20 & SR 397 (John Sims Pkwy)	6	0.68	D	2,710	2,900	F	1.07	Yes	3,300	F	1.22	Yes	No	0%	No
Between SR 397 (John Sims Pkwy) & North Gate	4	1.26	D	1,810	1,000	B	0.55	No	1,800	D*	0.99	No	No	1%	No
Between North Gate Rd & SR 123	4	2.66	D	2,980	1,400	B	0.47	No	1,700	C	0.57	No	No	1%	No
Between SR 123 & ACC Gate at Nomad Way	4	1.05	D	1,860	2,400	F	1.29	Yes	2,800	F	1.51	Yes	Yes	25%	Yes

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Table 4-7. 7SFG(A) Cantonment Alternative 4 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 4 7SFG(A) North of Main						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant& Adverse
Between ACC Gate at Nomad Way & SR 189 (Lewis Turner Blvd)	4	0.94	D	1,810	2,100	F	1.16	Yes	2,500	F	1.38	Yes	Yes	11%	Yes
Between SR 189 (Lewis Turner Blvd) & SR 189/SR 397 (Eglin Blvd)	4	0.50	D	1,860	900	B	0.48	No	1,600	C	0.86	No	No	4%	No
Between SR 189/SR 397 (Eglin Blvd) & 12th Ave	4	1.36	***	1,810	2,000	F	1.10	Yes	2,200	F	1.22	Yes	No	4%	No
Between 12th Ave & SR 188 (Racetrack Rd)	6	1.58	***	2,710	2,000	C	0.74	No	2,300	D	0.85	No	No	2%	No
Between SR 188 (Racetrack Rd) & SR 30 (US 98)	6	2.96	***	2,790	2,200	D	0.79	No	3,000	F	1.08	Yes	No	2%	No
State Road 123															
Between SR 85 & SR 85N	2	5.00	D	870	1,000	E	1.15	Yes	1,500	F	1.72	Yes	Yes	57%	Yes
State Road 188 (Racetrack Road)															
Between SR 189 (Beal Pkwy) & SR 85	4	2.60	D	1,860	1,700	C	0.91	No	1,800	D*	0.97	No	No	0%	No
State Road 189															
Between SR 197 (Eglin Blvd/ John Sims Pkwy) & SR 85	4	0.51	E	1,810	700	B	0.39	No	850	B	0.47	No	No	0%	No
Between SR 85 & General Bond Blvd	4	1.26	E	1,810	1,300	B	0.72	No	2,500	F	1.38	Yes	Yes	6%	Yes
Between General Bond Blvd & Mooney Rd	4	2.31	E	1,860	2,800	F	1.51	Yes	3,300	F	1.77	Yes	Yes	12%	Yes

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Table 4-7. 7SFG(A) Cantonment Alternative 4 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 4 7SFG(A) North of Main						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant& Adverse
Between Mooney Rd & SR 188 (Racetrack Rd)	4	2.10	D	1,710	1,500	D*	0.88	No	2,000	F	1.17	Yes	Yes	8%	Yes
Between SR 188 (Racetrack Rd) & SR 393 (Mary Esther Blvd)	4	1.50	D	1,796	2,100	F	1.17	Yes	2,400	F	1.34	Yes	No	3%	No
Between SR 393 (Mary Esther Blvd) & Yacht Club Dr	4	1.50	D	1,953	1,100	B	0.56	No	1,300	B	0.67	No	No	0%	No
State Road 285															
Between SR 10 (US 90) & Okaloosa/ Walton County Line	2	6.76	C	620	450	C	0.73	No	900	E	1.45	Yes	No	0%	No
State Road 393 (Mary Esther Boulevard)															
Between SR 189 (Beak Pkwy) & SR 30 (US 98)	4	1.84	D	1,586	1,800	F	1.14	Yes	2,400	F	1.51	Yes	No	3%	No
State Road 397 (Eglin Boulevard/John Sims Parkway)															
Between SR 85 & SR 190	4	0.90	D	1,860	1,500	B	0.81	No	1,600	C	0.86	No	No	0%	No
Between SR 190 & East Gate	4	1.37	D	1,860	650	B	0.35	No	1,400	B	0.75	No	No	0%	No
Between East Gate & 8th St	4	0.43	D	1,710	1,100	C	0.64	No	1,300	C	0.76	No	No	0%	No
Between 8th St & 7th St	4	0.27	D	1,710	1,000	C	0.58	No	1,200	C	0.70	No	No	0%	No
Between 7th St & 5th St	4	0.39	D	1,860	700	B	0.38	No	800	B	0.43	No	No	0%	No
Between 5th St & Memorial Tr (northbound/ eastbound)	3 (one way)	0.70	D	3,348	1,100	B	0.33	No	1,100	B	0.33	No	No	0%	No

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Table 4-7. 7SFG(A) Cantonment Alternative 4 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 4 7SFG(A) North of Main						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant& Adverse
Between 5th St & Memorial Tr (southbound/ westbound)**	3 (one way)	0.71	D	3,348	1,100	B	0.33	No	1,200	B	0.36	No	No	0%	No
Between Memorial Tr & Eglin Blvd South End Split (eastbound)	2 (one way)	0.47	D	2,172	700	B	0.32	No	850	B	0.39	No	No	0%	No
Between Memorial Tr & Eglin Blvd South End Split (westbound)	2 (one way)	0.54	D	2,172	1,100	B	0.51	No	1,200	B	0.55	No	No	0%	No
Between Eglin Blvd South End Split & Museum Dr/Nomad Way	4	1.42	D	1,810	1,300	B	0.72	No	1,300	B	0.72	No	No	0%	No
Between Museum Dr/ Nomad Way & SR 189 (Lewis Turner Blvd)/ West Gate	4	1.10	D	1,810	700	B	0.39	No	1,300	B	0.72	No	No	0%	No
Between SR 189 (Lewis Turner Blvd)/West Gate & SR 85	4	0.47	D	1,860	850	B	0.46	No	950	B	0.51	No	No	0%	No

* Level of service does not exceed the standard.
** This section of Eglin Boulevard runs as F Avenue and 2nd Street.
*** Constrained: Not able to be widened.
\+ AADT has been generated from turning movement counts.
++ Count data estimated based on 1996 Eglin Transportation Plan
1. v/c ratio was calculated from peak hour peak direction adopted level of service standard
2. Roadway analyzed as a two lane facility.
3. Significance is based on project trips for the alternative/action divided by the peak hour peak direction capacity of the adopted level of service standard.

The analysis identified any roadway segment that currently operates deficiently or worse than the adopted LOS standard. Table 4-7 includes a v/c ratio, which indicates how well the roadway operates relative to the adopted standard. The 2016 roadway LOS for 7SFG(A) Cantonment Alternative 4 is shown in Figure 4-9.

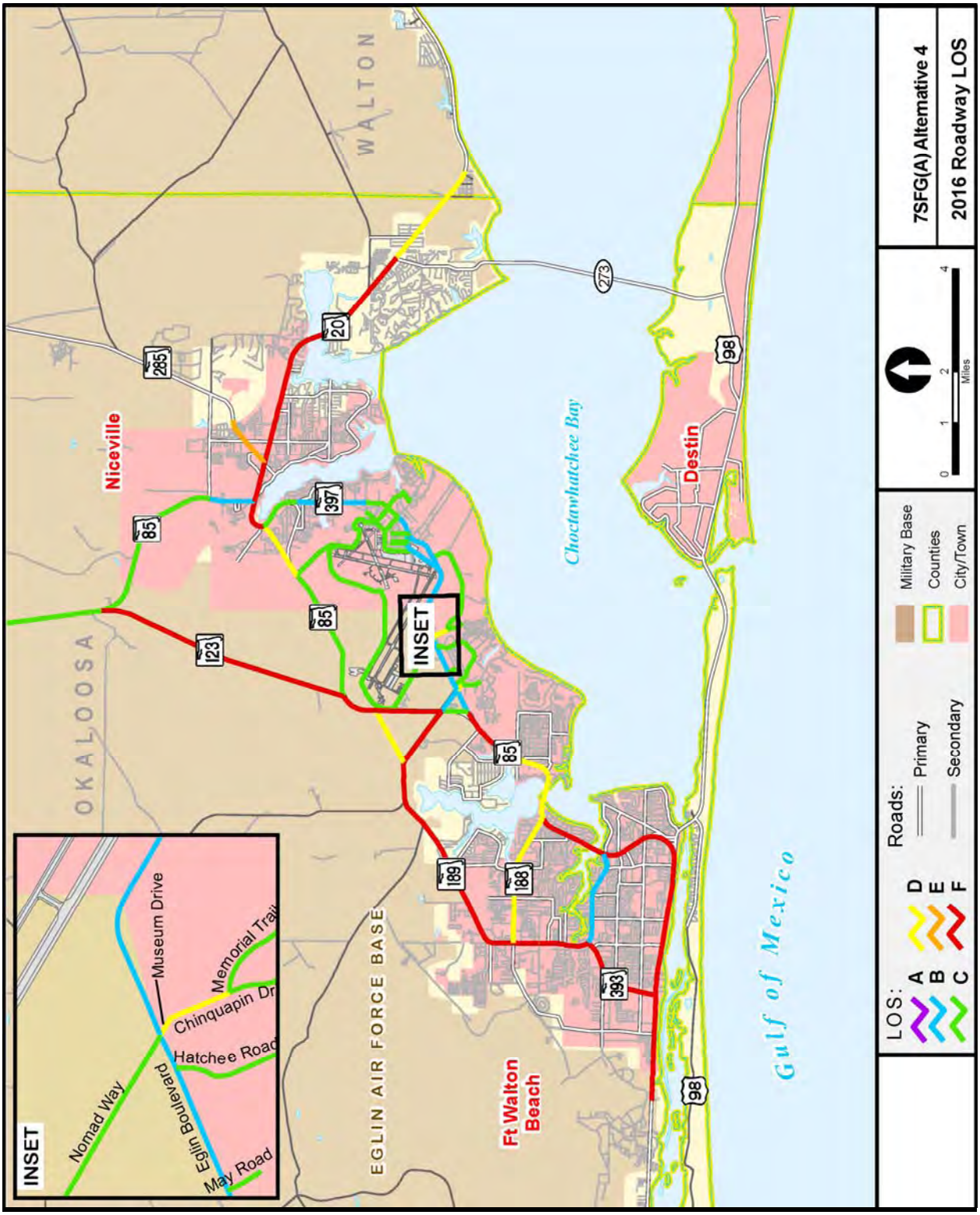

Figure 4-9. 7SFG(A) Cantonment Alternative 4 – 2016 Roadway LOS

Results indicate that, under 7SFG(A) Cantonment Alternative 4, 17 roadway segments are projected to operate deficiently with respect to the adopted LOS standard for the peak-hour, peak-direction analysis. The analysis also identified which of the area roadways are projected to be significantly impacted by project-related trips (i.e., where project trips exceed 5 percent of the capacity of the roadway at the adopted LOS standard) and which of the significantly impacted roadways are projected to also be adversely impacted (i.e., where the peak-hour capacity at the adopted LOS standard is projected to be exceeded). The analysis identified eight roadway segments that are projected to be significantly impacted roadway segments. Of those eight, six are projected to also be adversely impacted.

In terms of off-base impacts, 7SFG(A) Cantonment Alternative 4 is very similar to 7SFG(A) Cantonment Alternatives 1A, 1B, and 1C. Under 7SFG(A) Cantonment Alternative 4, 17 roadway segments could operate deficiently with respect to the adopted LOS standard, 16 of these at LOS F. Of the 17, nine are currently deficient. In addition, the analysis identified eight segments that could be significantly impacted under the alternative. Six of the eight significantly impacted could also be adversely impacted.

When compared to 7SFG(A) Cantonment Alternatives 1A, B and C, the resulting number of roadway segments that could require improvement vary by one. Alternative 1A/1C could result in 16 deficient roadway segments, Alternative 1B could result in 17 deficient segments, and 7SFG(A) Cantonment Alternative 4 could result in 17 deficient roadway segments. The resulting LOS for Alternative 4 is shown in Figure 4-9.

4.5.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.5.5.1 Existing Conditions (Transportation – 7SFG(A) Cantonment Alternative 5)

Under 7SFG(A) Cantonment Alternative 5, the 7SFG(A) is proposed to be located near DeFuniak Springs in Walton County. The 7SFG(A) cantonment area is proposed to be accessed from SR 285. Existing conditions are presented in Chapter 3 (Section 3.5.2, Region of Influence and Existing Conditions).

As discussed in Section 3.5.2, three roadway segments anticipated to be impacted by the Proposed Action are currently operating in a deficient condition. There are no currently scheduled improvements for this study area.

4.5.5.2 Environmental Consequences (Transportation – 7SFG(A) Cantonment Alternative 5)

A general description of the transportation demand modeling process, trip generation, and inputs utilized for transportation impact analysis is provided in Chapter 3 (Section 3.5.3, Analysis Methodology). More detailed discussion and documentation on the development of the model are included in the Appendix B, *Transportation*.

Under 7SFG(A) Cantonment Alternative 5, the 7SFG(A) is proposed to be located near DeFuniak Springs in Walton County. The 7SFG(A) could be accessed off SR 285. Site access improvements associated with this alternative would need to be identified when the exact locations of gates and driveways are determined. Table 4-8 contains the results of the peak-hour, peak-direction roadway analysis for 7SFG(A) Cantonment Alternative 5. The table lists the current peak-hour, peak-direction LOS for each study area roadway and the projected LOS under 7SFG(A) Cantonment Alternative 5.

This analysis identified any roadway segment that operates deficiently or worse than the adopted local government LOS standard. Table 4-8 includes a v/c ratio, which indicates how well the roadway operates relative to the adopted standard. The 2016 roadway LOS is shown in Figure 4-10 for 7SFG(A) Cantonment Alternative 5.

Analysis results indicate that, under 7SFG(A) Cantonment Alternative 5, five roadway segments are projected to operate deficiently with respect to the adopted LOS standard of C. Three of the five deficient segments are projected to operate at LOS F. The analysis also identified which of the area roadways are projected to be significantly impacted by project-related trips (i.e., where project trips exceed 5 percent of the capacity of the roadway at the adopted LOS standard) and which of the significantly impacted roadway segments are projected to also be adversely impacted (i.e., where the peak-hour capacity at the adopted LOS standard is exceeded). Two of the roadways that are projected to be significantly and adversely impacted occur along SR 285.

The results of the analysis show that, under 7SFG(A) Cantonment Alternative 5, five segments could be deficient with respect to the adopted LOS standard, including portions of US 90, US 331, and SR 285. Project traffic is projected to significantly impact the SR 285 segments. Furthermore, portions of US 90 and US 331 are currently deficient.

Table 4-8. 7SFG(A) Cantonment Alternative 5 – 2016 Peak-Hour, Peak-Direction Level of Service Analysis

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 5 7SFG(A) at DeFuniak						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[2]	% Significant	Significant& Adverse
State Road 8 (I-10)															
Between Walton/Okaloosa County Line & SR 83 (US 331)	4	17.90	C	2,890	1,200	A	0.42	No	1,800	B	0.62	No	No	1%	No
State Road 10 (US 90)															
Between SR 83 (US 331) & SR 187 (US 331)	4	1.88	C	1,810	1,500	C	0.83	No	1,700	C	0.94	No	No	0%	No
Between SR 187 (US 331) & SR 285	2	11.40	C	620	700	D	1.13	Yes	950	E	1.53	Yes	No	1%	No
State Road 83 (US 331)															
Between SR 10 (US 90) & SR 8 (I-10)	4	2.50	C	1,730	400	B	0.23	No	1,400	B	0.81	No	No	0%	No
Between SR 8 (I-10) & Freeport City Limits	2	11.40	C	620	1,800	F	2.90	Yes	2,000	F	3.23	Yes	No	1%	No
Between Freeport City Limits & SR 20	2	2.00	C	620	1,200	E	1.94	Yes	1,400	F	2.26	Yes	No	0%	No
State Road 285															
Between SR 10 (US 90) & Okaloosa/Walton County Line	2	6.76	C	620	450	C	0.73	No	1,800	F	2.90	Yes	Yes	42%	Yes
Between Okaloosa/Walton County Line & Swift Creek	2	8.76	C	620	450	C	0.73	No	900	E	1.45	Yes	Yes	7%	Yes

1. v/c ratio was calculated from peak hour peak direction adopted level of service standard

2. Significance is based on project trips for the alternative/action divided by the peak hour peak direction capacity of the adopted level of service standard.

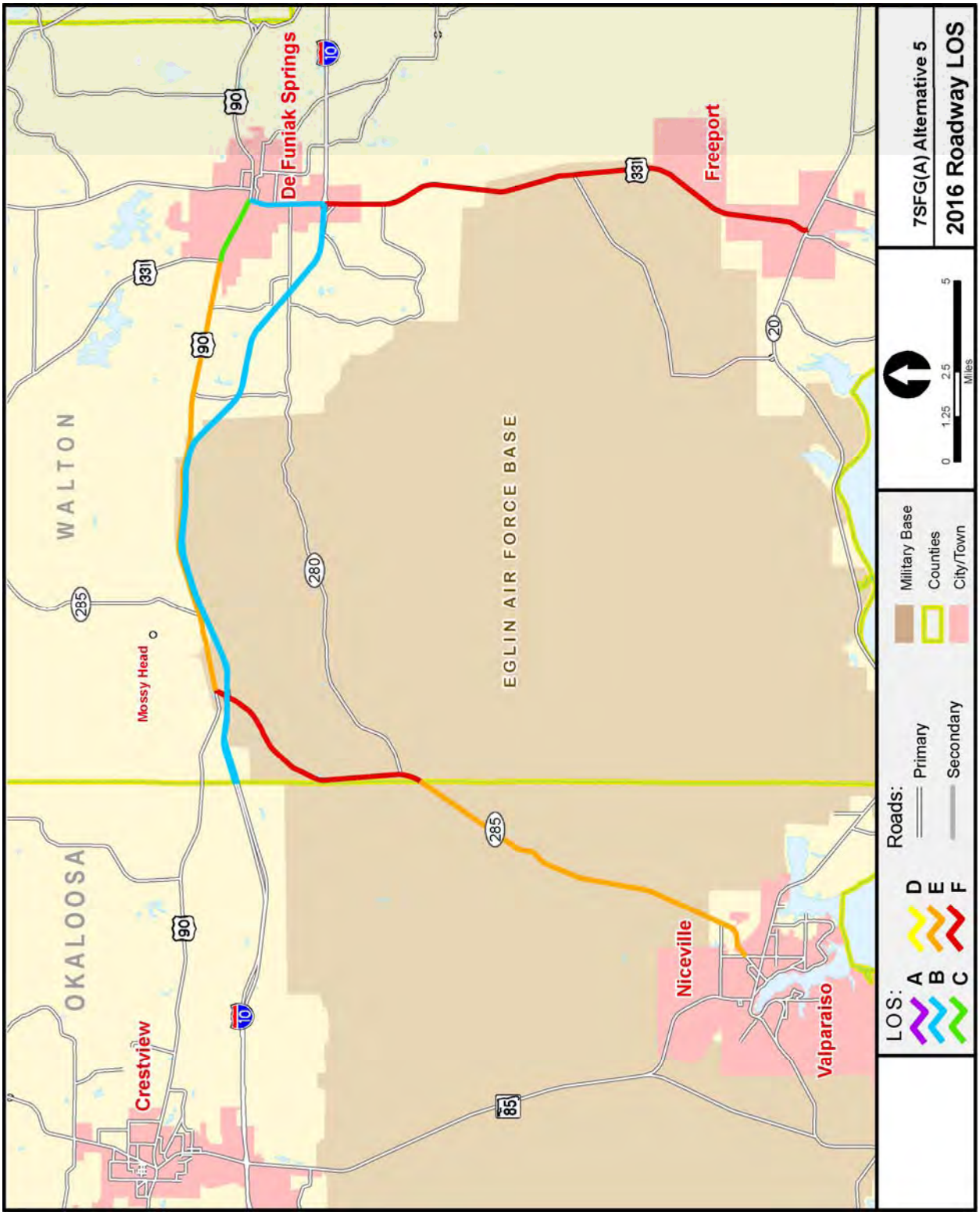

Figure 4-10. 7SFG(A) Cantonment Alternative 5 – 2016 Roadway LOS

4.5.6 No Action Alternative

The No Action Alternative was developed by reviewing the predictable non-BRAC actions. These actions included the location of the VA CBOC adjacent to the Eglin Regional Hospital, the drawdown of the 33 FW, and the drawdown of base personnel based on budget reductions. Based on the current total personnel assigned to Eglin AFB of 17,451, this loss of 2,207 personnel by 2018 from the drawdown of the 33 FW and the budget reductions represents a reduction of approximately 12.6 percent. The VA CBOC is anticipated to require the employment of 35 full-time equivalent positions; thus, the total change in personnel by 2018 is a loss of 2,172.

In terms of transportation, these three items had sufficient information to include in the transportation model used to project future traffic volumes. The no action transportation alternative included the three predictable future actions above.

The existing conditions for transportation resources are the same as those described in the previous discussion for the five 7SFG(A) Cantonment Alternatives (Section 3.5.2, Region of Influence and Existing Conditions).

As discussed in the existing conditions analysis sections, 13 roadway segments are currently operating in a deficient condition. Additionally, there are no currently programmed improvements for these facilities. Appendix B, *Transportation*, shows the existing LOS as well as future LOS for all of study area roadways for the six alternatives (five build alternatives and the No Action Alternative).

A general description of the transportation demand modeling process, trip generation and inputs utilized for transportation impact analysis is provided in Chapter 3 (Section 3.5.3, Analysis Methodology). More detailed discussion and documentation on the development of the model are included in the Appendix B, *Transportation*. Table 4-9 contains the results of the roadway analysis for the No Action Alternative. Appendix B, *Transportation*, shows both the daily and peak-hour, peak-direction LOS for all alternatives. The analysis identified any roadway segment that operates deficiently or worse than the adopted local government LOS standard. Table 4-9 includes a v/c ratio, which indicates how well the roadway operates relative to the adopted standard. The 2016 roadway LOS is shown in Figure 4-11 for the No Action Alternative.

Results indicated that, under the No Action Alternative, 22 roadway segments could operate deficiently with respect to the adopted LOS standard in the peak-hour, peak-direction analysis.

Table 4-9. No Action Alternative – 2016 Peak-Hour, Peak-Direction Level of Service Analysis

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 No Action			
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?
3rd Street												
Between Van Matre Ave & SR 397 (Eglin Blvd/John Sims Pkwy)	2 (one way)	0.27	E	2,064	250	C	0.12	No	250	C	0.12	No
4th Street												
Between Van Matre Ave & Magnolia St	1 (one way)	0.29	E	972	200	C	0.21	No	250	C	0.26	No
5th Street												
Between Van Matre Ave & SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.30	E	810	200	C	0.25	No	200	C	0.25	No
7th Street												
Between Daytona Rd & SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.38	E	712	250	C	0.35	No	250	C	0.35	No
8th Street												
Between Daytona Rd & SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.37	E	712	300	C	0.42	No	300	C	0.42	No
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Biscayne Rd	2	0.41	E	810	100	C	0.12	No	100	C	0.12	No
Barrancas Avenue												
Between Choctawhatchee Rd & F Ave++	2	0.44	E	972	100	C	0.10	No	100	C	0.10	No
Between F Ave & 2nd St/Eglin Blvd	2 (one way)	0.13	E	972	250	C	0.26	No	250	C	0.26	No
Boatner Road												
Between Hatchee Rd & Hospital	2	0.23	E	648	500	D*	0.77	No	500	D*	0.77	No
Between Hospital & Ash Dr	2	0.20	E	648	350	C	0.54	No	350	C	0.54	No
Chinquapin Drive												
Between Minor Dr & Memorial Tr+	2	0.26	E	770	650	C	0.84	No	650	D*	0.84	No
Between Memorial Tr & Wakulla Rd	2	0.33	E	770	100	C	0.13	No	100	C	0.13	No
Choctawhatchee Road												
Between 7th St & Barrancas Ave	2	0.36	E	810	200	C	0.25	No	150	C	0.19	No

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Table 4-9. No Action Alternative – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 No Action			
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?
Cypress Road												
Between Lido Rd & Kissimmee Rd	2	0.18	E	810	100	C	0.12	No	100	C	0.12	No
Daytona Road[2]												
Between 10th St & 8th St	2	0.27	E	810	90	C	0.11	No	70	C	0.09	No
Between 8th St & 7th St	2/4	0.25	E	810	200	C	0.25	No	200	C	0.25	No
General Robert M Bond Boulevard												
Between SR 85 & SR 189 (Lewis Turner Blvd)	2 (one way)	1.20	D	1,140	850	D*	0.75	No	1,000	D*	0.88	No
Hatchee Road												
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Choctaw Rd	2	0.81	E	770	100	C	0.13	No	90	C	0.12	No
Between Choctaw Rd & SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.82	E	770	70	C	0.09	No	70	C	0.09	No
Inverness Road												
Between Cypress Rd & De Leon Rd	2	0.10	E	810	150	C	0.19	No	150	C	0.19	No
Memorial Trail												
Between Biscayne Rd & Cypress Rd	2	0.11	E	810	150	C	0.19	No	150	C	0.19	No
May Road												
Between SR 397 (Eglin Blvd/John Sims Pkwy) & F Ave	2	0.13	E	810	200	C	0.25	No	200	C	0.25	No
Magnolia Street												
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Gaffney Rd	2	0.15	E	770	20	C	0.03	No	20	C	0.03	No
Kissimmee Road												
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Commissary/Exchange	2	1.58	E	688	300	C	0.44	No	300	C	0.44	No
Between Commissary/Exchange & Chinquapin Dr	2	0.41	E	770	350	C	0.45	No	350	C	0.45	No
Museum Drive												
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Minor Dr	2	0.09	E	616	450	D*	0.73	No	450	D*	0.73	No

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Table 4-9. No Action Alternative – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 No Action			
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?
Nomad Way												
Between SR 85 & Pumphouse	2	1.23	E	688	250	C	0.36	No	150	C	0.22	No
Between Pumphouse and SR 397 (Eglin Blvd/ John Sims Pkwy)	2	0.85	E	688	250	C	0.36	No	150	B	0.22	No
North Gate Road												
Between SR 85 & Perimeter Rd	2	0.71	E	770	40	C	0.05	No	40	C	0.05	No
Perimeter Road												
Between Daytona Rd & Taxiway S	2	0.38	E	770	200	C	0.26	No	200	C	0.26	No
Between Taxiway S & North Gate Rd	2	0.61	E	770	70	C	0.09	No	70	C	0.09	No
Between North Gate Rd & ACC Munitions (west end)	2	0.93	E	770	50	C	0.06	No	50	C	0.06	No
Between ACC Munitions (west end) & ACC Munitions (south end)	2	0.37	E	770	40	C	0.05	No	50	C	0.06	No
Between ACC Munitions (south end) & Taxiway C	2	1.64	E	770	80	C	0.10	No	80	C	0.10	No
Between Taxiway C & Nomad Way	2	0.42	E	770	60	C	0.08	No	60	C	0.08	No
State Road 8 (I-10)												
Between Antioch Road & SR 85	4	2.16	C	2,890	1,200	A	0.42	No	1,800	B	0.62	No
Between SR 85 & Walton/Okaloosa County Line	4	4.71	C	2,890	1,100	A	0.38	No	1,500	B	0.52	No
Between Walton/Okaloosa County Line & SR 83 (US 331)	4	17.90	C	2,890	1,200	A	0.42	No	1,800	B	0.62	No
State Road 10 (US 90)												
Between SR 83 (US 331) & SR 187 (US 331)	4	1.88	C	1,810	1,500	C	0.83	No	1,600	C	0.88	No
Between SR 187 (US 331) & SR 285	2	11.40	C	620	700	D	1.13	Yes	700	D	1.13	Yes
Between Fairchild Road & SR 85	4	3.50	D	2,980	750	A	0.25	No	850	A	0.29	No
Between SR 85 & Antioch Road	4	0.65	D	2,980	1,900	C	0.64	No	1,900	C	0.64	No

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Table 4-9. No Action Alternative – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 No Action			
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?
State Road 20												
Between SR 85 & SR 285 (N Partin Dr)	6	0.78	D	2,790	2,700	C	0.97	No	3,000	F	1.08	Yes
Between SR 285 (N Partin Dr) & Rocky Bayou Bridge	4	2.60	D	1,860	1,700	C	0.91	No	1,900	F	1.02	Yes
Between Rocky Bayou Bridge & SR 293 (White Point Rd)	4	2.10	D	1,860	1,800	C	0.97	No	2,000	F	1.08	Yes
Between SR 293 (White Point Rd) & Walton County Line	2	1.62	D	950	600	C	0.63	No	700	D*	0.74	No
State Road 30 (US 98)												
Between SR 85 & SR 393 (Mary Esther Boulevard)	4	3.02	D	1,860	1,800	D*	0.97	No	2,100	F	1.13	Yes
Between SR 393 (Mary Esther Boulevard) & Hurlburt Field Gate	4	2.70	D	1,860	2,100	F	1.13	Yes	2,400	F	1.29	Yes
State Road 83 (US 331)												
Between SR 10 (US 90) & SR 8 (I-10)	4	2.50	C	1,730	400	B	0.23	No	400	B	0.23	No
Between SR 8 (I-10) & Freeport City Limits	2	11.40	C	620	1,800	F	2.90	Yes	1,800	F	2.90	Yes
Between Freeport City Limits & SR 20	2	2.00	C	620	1,200	E	1.94	Yes	1,200	E	1.94	Yes
State Road 85												
Between Old Bethel Rd & SR 10 (US 90)	4	2.40	D	1,810	1,400	B	0.77	No	1,600	C	0.88	No
Between SR 10 (US 90) & SR 8 (I-10)	4	2.17	D	1,620	1,700	E	1.05	Yes	2,400	F	1.48	Yes
Between SR 8 (I-10) & PJ Adams Pkwy	4	0.95	C	1,730	2,200	F	1.27	Yes	2,700	F	1.56	Yes
Between PJ Adams Rd & Duke Field	4	5.21	C	2,500	2,000	C	0.80	No	2,300	C	0.92	No
Between Duke Field & CR 190 (College Blvd)	4	8.72	C	2,500	2,000	C	0.80	No	2,200	C	0.88	No
Between CR 190 (College Blvd) & SR 20	4	0.89	D	1,860	1,000	B	0.54	No	1,200	B	0.65	No
Between SR 20 & SR 397 (John Sims Pkwy)	6	0.68	D	2,710	2,900	F	1.07	Yes	3,200	F	1.18	Yes
Between SR 397 (John Sims Pkwy) & North Gate	4	1.26	D	1,810	1,000	B	0.55	No	1,200	B	0.66	No

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Table 4-9. No Action Alternative – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 No Action			
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?
Between North Gate Rd & SR 123	4	2.66	D	2,980	1,400	B	0.47	No	1,700	C	0.57	No
Between SR 123 & ACC Gate at Nomad Way	4	1.05	D	1,860	2,400	F	1.29	Yes	2,600	F	1.40	Yes
Between ACC Gate at Nomad Way & SR 189 (Lewis Turner Blvd)	4	0.94	D	1,810	2,100	F	1.16	Yes	2,400	F	1.33	Yes
Between SR 189 (Lewis Turner Blvd) & SR 189/ SR 397 (Eglin Blvd)	4	0.50	D	1,860	900	B	0.48	No	1,100	B	0.59	No
Between SR 189/SR 397 (Eglin Blvd) & 12th Ave	4	1.36	***	1,810	2,000	F	1.10	Yes	2,200	F	1.22	Yes
Between 12th Ave & SR 188 (Racetrack Rd)	6	1.58	***	2,710	2,000	C	0.74	No	2,200	D	0.81	No
Between SR 188 (Racetrack Rd) & SR 30 (US 98)	6	2.96	***	2,790	2,200	D	0.79	No	2,900	F	1.04	Yes
State Road 123												
Between SR 85 & SR 85N	2	5.00	D	870	1,000	E	1.15	Yes	1,100	E	1.26	Yes
State Road 188 (Racetrack Road)												
Between SR 189 (Beal Pkwy) & SR 85	4	2.60	D	1,860	1,700	C	0.91	No	1,900	F	1.02	Yes
State Road 189												
Between SR 197 (Eglin Blvd/John Sims Pkwy) & SR 85	4	0.51	E	1,810	700	B	0.39	No	750	B	0.41	No
Between SR 85 & General Bond Blvd	4	1.26	E	1,810	1,300	B	0.72	No	1,300	B	0.72	No
Between General Bond Blvd & Mooney Rd	4	2.31	E	1,860	2,800	F	1.51	Yes	3,000	F	1.61	Yes
Between Mooney Rd & SR 188 (Racetrack Rd)	4	2.10	D	1,710	1,500	D*	0.88	No	1,900	F	1.11	Yes
Between SR 188 (Racetrack Rd) & SR 393 (Mary Esther Blvd)	4	1.50	D	1,796	2,100	F	1.17	Yes	2,400	F	1.34	Yes
Between SR 393 (Mary Esther Blvd) & Yacht Club Dr	4	1.50	D	1,953	1,100	B	0.56	No	1,300	B	0.67	No
State Road 285												
Between SR 10 (US 90) & Okaloosa/Walton Cty Line	2	6.76	C	620	450	C	0.73	No	800	D	1.29	Yes
Between Okaloosa/Walton County Line & Swift Creek	2	8.76	C	620	450	C	0.73	No	800	D	1.26	Yes

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Table 4-9. No Action Alternative – 2016 Peak-Hour, Peak-Direction Level of Service Analysis, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 No Action			
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?
Between Swift Creek & SR 20	4	1.00	E	1,800	400	C	0.22	No	450	C	0.25	No
State Road 393 (Mary Esther Boulevard)												
Between SR 189 (Beal Pkwy) & SR 30 (US 98)	4	1.84	D	1,586	1,800	F	1.14	Yes	2,400	F	1.51	Yes
State Road 397 (Eglin Boulevard/John Sims Parkway)												
Between SR 85 & SR 190	4	0.90	D	1,860	1,500	B	0.81	No	1,700	C	0.91	No
Between SR 190 & East Gate	4	1.37	D	1,860	650	B	0.35	No	1,100	B	0.59	No
Between East Gate & 8th St	4	0.43	D	1,710	1,100	C	0.64	No	1,100	C	0.64	No
Between 8th St & 7th St	4	0.27	D	1,710	1,000	C	0.58	No	900	C	0.53	No
Between 7th St & 5th St	4	0.39	D	1,860	700	B	0.38	No	650	B	0.35	No
Between 5th St & Memorial Tr (northbound/ eastbound)	3 (one way)	0.70	D	3,348	1,100	B	0.33	No	1,000	B	0.30	No
Between 5th St & Memorial Tr (southbound/ westbound)**	3 (one way)	0.71	D	3,348	1,100	B	0.33	No	1,000	B	0.30	No
Between Memorial Tr & Eglin Blvd South End Split (eastbound)	2 (one way)	0.47	D	2,172	700	B	0.32	No	650	B	0.30	No
Between Memorial Tr & Eglin Blvd South End Split (westbound)	2 (one way)	0.54	D	2,172	1,100	B	0.51	No	1,000	B	0.46	No
Between Eglin Blvd South End Split & Museum Dr/Nomad Way	4	1.42	D	1,810	1,300	B	0.72	No	1,200	B	0.66	No
Between Museum Dr/Nomad Way & SR 189 (Lewis Turner Blvd)/ West Gate	4	1.10	D	1,810	700	B	0.39	No	600	B	0.33	No
Between SR 189 (Lewis Turner Blvd)/ West Gate & SR 85	4	0.47	D	1,860	850	B	0.46	No	850	B	0.46	No

* Level of service does not exceed the standard.
** This section of Eglin Boulevard runs as F Avenue and 2nd Street.
*** Constrained: Not able to be widened.
\+ AADT has been generated from turning movement counts.
++ Count data estimated based on 1996 Eglin Transportation Plan
1. v/c ratio was calculated from peak hour peak direction adopted level of service standard
2. Roadway analyzed as a two lane facility.

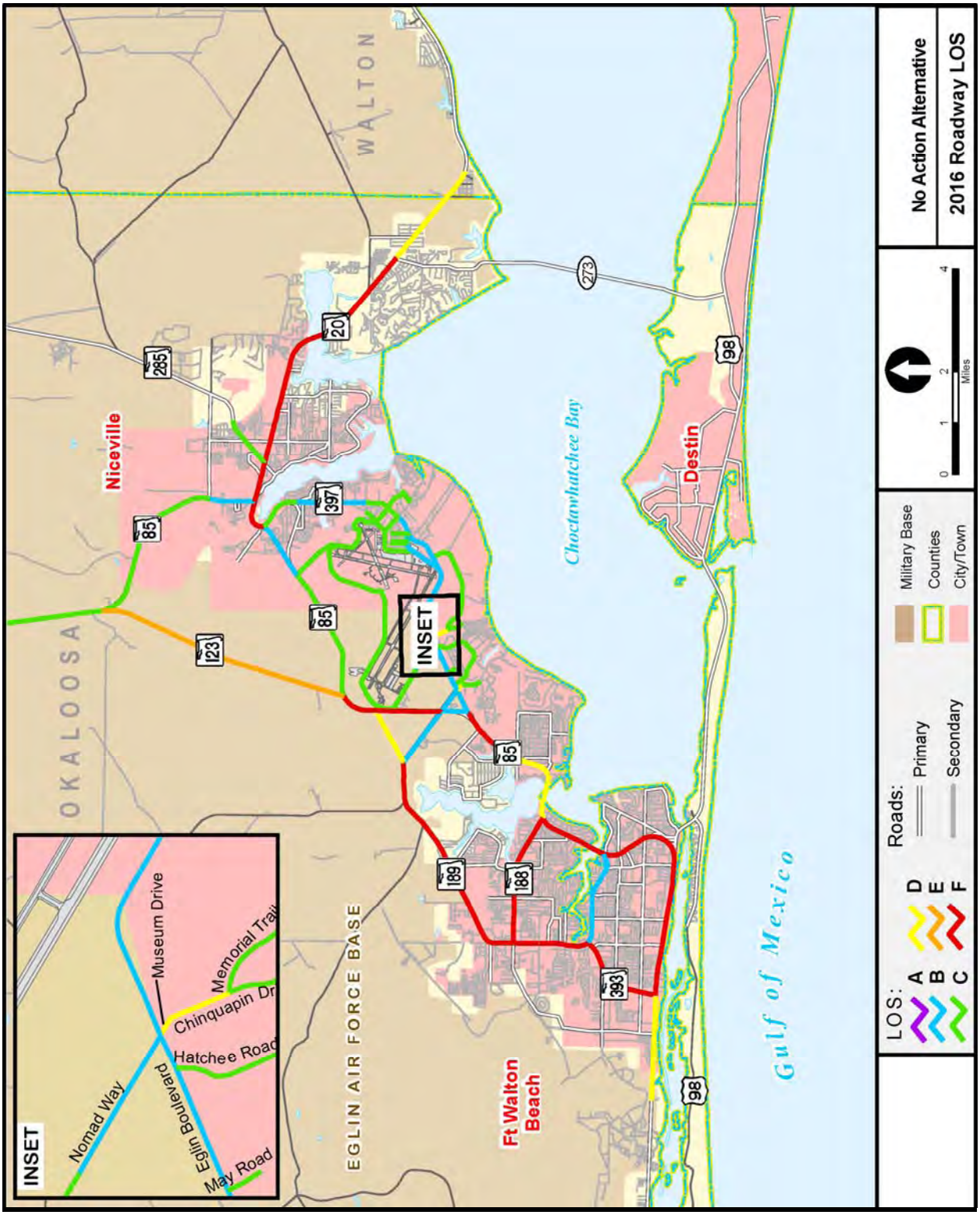

Figure 4-11. No Action Alternative – 2016 Roadway LOS

The results of the analysis show that 23 roadway segments are projected to operate deficiently including portions of SR 10 (US 90), SR 20, SR 30 (US 98), SR 83 (US 331), SR 85, SR 123, SR 188 (Racetrack Road), SR 189, SR 285 and SR 393 (Mary Esther Boulevard). Of these 23, 14 are deficient today.

4.5.7 Summary of Improvements

The results of the analysis of the alternatives associated with the 7SFG(A) cantonment areas identified a number of the regional roadways as deficient in regard to their adopted LOS. Many of the deficiencies are common to several of the alternatives, including the no action alternative. Results of the analysis associated with the no action alternative were used to identify those roadways projected to be deficient regardless of the alternative actions. In addition, several of these deficient roadways are also identified as deficient today. The following table also indicates if the improvement is needed today. Where the v/c ratio is generally between 1.0 and 1.07, the suggested improvements are CMS (congestion management system) and TSM (transportation system management) projects, which are typically smaller intersection and operational improvements that could allow the corridor to operate acceptably within the planning horizon.

Three segments of SR 85, between Eglin Boulevard and US 98 are identified as constrained. This designation indicates that for either environmental or policy reasons, the local government has determined that it is not feasible to widen this facility. Capacities for these constrained roadways are based on the FDOT 2002 Q/LOS Handbook Generalized Tables. A more in depth discussion about these tables is provided in Chapter 3 (Section 3.5.3, Analysis Methodology). Where mitigation is identified as needed for this facility it should include the consideration of CMS/TSM improvements to this corridor, as well as exploration of widening of alternate corridors or new facilities. As this corridor traverses a largely built out and environmentally constrained area, the identification of new or alternate corridors is unlikely.

As indicated in the following table (Table 4-10) the demand on several roadways equates to the need for a more-than-six-lane facility. However, an improvement beyond six lanes may not be feasible for many reasons, including right-of-way availability, safety concerns, cost, etc. Other improvements that should be considered include CMS and TSM projects, a corridor management plan that looks at access along the corridor, and transit improvements. These types of improvements are potential options to preserve capacity in the corridor. In addition, the study of potential alternate corridors or improvements to parallel corridors is recommended.

The 7SFG(A) alternatives revealed one needed improvement located on base. SR 397 from Museum Drive/Nomad Way to SR 189/West Gate needs to be widened to 6 lanes under Alternative 1B and is significantly impacted by the project trips. SR 397 does operate better than the adopted LOS standard today and in the No Action Alternative. Several needed improvements off base are also shown in the table.

Table 4-10. 7SFG(A) Cantonment – Needed Road Improvements

Roadway	From	To	Alternative	Improvement	Deficient in 2006?	Deficient in No Action?	Significant & Adverse?
SR 20	SR 85	SR 285 (Partin Drive)	1a/1c, 1b	Needs Capacity*	No	Yes	No
SR 20	SR 85	SR 285 (Partin Drive)	4	CMS/TSM	No	Yes	No
SR 20	SR 285 (Partin Drive)	Rocky Bayou Bridge	1a/1c, 1b, 4	Widen to 6 lanes	No	Yes	No
SR 20	Rocky Bayou Bridge	SR 293 (White Point Road)	1a/1c, 1b, 4	Widen to 6 lanes	No	Yes	No
SR 30 (US 98)	SR 85	SR 393 (Mary Esther Blvd)	1a/1c, 1b, 4	Widen to 6 lanes	No	Yes	No
SR 30 (US 98)	SR 393 (Mary Esther Blvd)	Hurlburt Field Gate	1a/1c, 1b, 4	Widen to 6 lanes	Yes	Yes	No
SR 85	SR 20	SR 397 (John Sims Pkwy)	1a/1c, 1b, 4	Needs Capacity*	Yes	Yes	No
SR 85	SR 123	ACC Gate at Nomad Way	1a/1c, 1b, 4	Widen to 6 lanes	Yes	Yes	**Yes**
SR 85	ACC Gate at Nomad Way	SR 189 (Lewis Turner Blvd)	1a/1c, 1b, 4	Widen to 6 lanes	Yes	Yes	**Yes**
SR 85	SR 189/SR 397 (Eglin Blvd)	12th Avenue	1a/1c, 1b, 4	Constrained*	Yes	Yes	**Yes, 1b**
SR 85	SR 188 (Racetrack Road)	SR 30 (US 98)	1a/1c, 1b, 4	Constrained*	No	Yes	No
SR 123	SR 85N	SR 85	1a/1c, 1b, 4	Widen to 4 lanes	Yes	Yes	**Yes**
SR 188 (Racetrack Rd)	SR 189 (Beal Parkway)	SR 85	1a/1c, 1b	CMS/TSM	No	Yes	No
SR 189	SR 85	Gen. Bond Boulevard	4	Widen to 6 lanes	No	No	**Yes**
SR 189	Gen. Bond Boulevard	Mooney Road	1a/1c, 1b, 4	Widen to 6 lanes	Yes	Yes	**Yes**
SR 189	Mooney Road	SR 188 (Racetrack Road)	1a/1c, 1b, 4	Widen to 6 lanes	No	Yes	**Yes**
SR 189	SR 188 (Racetrack Road)	SR 393 (Mary Esther Blvd)	1a/1c, 1b	Widen to 6 lanes	Yes	Yes	**Yes, 1a/1c**
SR 285	SR 10 (US 90)	Okaloosa/Walton County Line	4	Widen to 4 lanes	No	Yes	No
SR 393 (Mary Esther Blvd)	SR 189 (Beal Parkway)	SR 30 (US 98)	1a/1c, 1b, 4	Widen to 6 lanes	Yes	Yes	**Yes, 1a/1c**
SR 397	Museum Drive/Nomad Way	SR 189/West Gate	1b	Widen to 6 lanes	No	No	**Yes**
SR 85	SR 10 (US 90)	SR 8 (I-10)	2, 3	Widen to 6 lanes	Yes	Yes	**Yes**
SR 85	SR 8 (I-10)	PJ Adams Parkway	2, 3	Widen to 6 lanes	Yes	Yes	**Yes**
SR 85	PJ Adams Parkway	Duke Field	2, 3	Widen to 6 lanes	Yes	Yes	**Yes**
SR 10 (US 90)	SR 187 (US 331)	SR 285	5	Widen to 4 lanes	Yes	Yes	No
SR 83 (US 331)	SR 8 (US 10)	Freeport City Limits	5	Widen to 4 lanes	Yes	Yes	No
SR 83 (US 331)	Freeport City Limits	SR 20	5	Widen to 4 lanes	Yes	Yes	No
SR 85	SR 10 (US 90)	SR 8 (I-10)	5	Widen to 6 lanes	Yes	Yes	**Yes**
SR 85	SR 8 (I-10)	PJ Adams Parkway	5	Widen to 6 lanes	Yes	Yes	**Yes**

CMS/TSM projects are suggested where the volume to capacity ratio is between 1.00 and 1.07
* Needs additional lanes/parallel corridor improvement or CMS/TSM to satisfy demand but cannot be widened further.

As shown in Table 4-11, several of the deficient roadway segments identified as needing improvement in the No Action Alternative are also deficient today. These roadways include SR 10 from SR 187 to SR 285, SR 83 from SR 8 to SR 20, SR 85 from SR 10 to PJ Adams Parkway, additional portions of SR 85 from SR 20 to Twelfth Avenue, SR 123 from SR 85 to SR 85, portions of SR 189 from General Bond Boulevard to SR 393, US 98 (SR 30) from SR 393 to Hurlburt Field Gate, and SR 393 from SR 189 to SR 30.

Table 4-11. No Action Alternative – Needed Road Improvements

Roadway	From	To	Improvement	Deficient in 2006?
SR 10 (US 90)	SR 187 (US 331)	SR 285	Widen to 4 lanes	**Yes**
SR 20	SR 85	SR 285	Needs Capacity	No
SR 20	SR 285	Rocky Bayou Bridge	CMS/TSM	No
SR 20	Rocky Bayou Bridge	White Point Road	Widen to 6 lanes	No
SR 30 (US 98)	SR 85	SR 393 (Mary Esther Boulevard)	Widen to 6 lanes	No
SR 30 (US 98)	SR 393 (Mary Esther Boulevard)	Hurlburt Field Gate	Widen to 6 lanes	**Yes**
SR 83 (US 331)	SR 8 (US 10)	Freeport City Limits	Widen to 4 lanes	**Yes**
SR 83 (US 331)	Freeport City Limits	SR 20	Widen to 4 lanes	**Yes**
SR 85**	SR 10 (US 90)	SR 8 (I-10)	Widen to 6 lanes	**Yes**
SR 85**	SR 8 (I-10)	PJ Adams Parkway	Widen to 6 lanes	**Yes**
SR 85*	SR 20	SR 397	Needs Capacity**	**Yes**
SR 85	SR 123	ACC Gate at Nomad Way	Widen to 6 lanes	**Yes**
SR 85	ACC Gate at Nomad Way	SR 189 (Lewis Turner Blvd)	Widen to 6 lanes	**Yes**
SR 85	SR 189 (Lewis Turner Blvd	12th Avenue	Constrained**	**Yes**
SR 123	SR 85	SR 85	Widen to 4 lanes	**Yes**
SR 188 (Racetrack Rd)	Beal Parkway	SR 85	CMS/TSM	No
SR 189	General Bond Boulevard	Mooney Road	Widen to 6 lanes	**Yes**
SR 189	Mooney Road	SR 188 (Racetrack Road)	Widen to 6 lanes	No
SR 189	SR 188 (Racetrack Road)	SR 393 (Mary Esther Boulevard)	Widen to 6 lanes	**Yes**
SR 285	SR 10 (US 90)	Okaloosa/Walton County Line	Widen to 4 lanes	No
SR 285	Okaloosa/Walton County Line	Swift Creek	Widen to 4 lanes	No
SR 393 (Mary Esther Boulevard)	SR 189	SR 30 (US 98)	Widen to 6 lanes	**Yes**

CMS/TSM projects are suggested where the volume to capacity ratio is between 1.00 and 1.07.
* Change functional classification from transitioning to urbanized.
** Needs additional lanes/parallel corridor improvement or CMS/TSM to satisfy demand but cannot be widened further.

4.6 UTILITIES

4.6.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.6.1.1 Existing Conditions (Utilities – 7SFG(A) Cantonment Alternative 1)

For purposes of evaluating utilities, the three areas included in this alternative are considered part of Eglin's Main Base cantonment. The following discussion focuses on the current utilities on Eglin's Main Base that would be used to support the proposed 7SFG(A) cantonment area.

Potable Water

The Housing Area water system on Eglin Main Base would be used to support potable water needs for all three sub-alternatives under 7SFG(A) Cantonment Alternative 1 (Figure 4-12). Since all of the proposed sub-alternative sites for the 7SFG(A) cantonment area are undeveloped, potable water infrastructure is lacking.

The amount of potable water currently drawn from the Floridan Aquifer is less than the levels permitted by the Consumptive Use Permit (CUP) authorization (Table 4-12). As demand increases with the influx of additional people and military missions to Eglin AFB, future considerations for the potable water supply may require developing additional water systems and CUPs, making changes to reduce water consumption, and identifying areas of dependence on the aquifer (Brown, 2006a).

Table 4-12. Permitted and Actual Potable Water Use on Eglin Main Base

Water Supply System	Permitted Average Daily Limit (gal/day)	Permitted Maximum Daily Limit (gal/day)	Permitted Maximum Monthly Limit (gal/month)	2005 Average Daily Rate (gal/day)	2005 Average Monthly Rate (gal/month)
Main Base/ Ammo	1.9 million	4.0 million	91.0 million	847,222	25.7 million
Housing Area	3.39 million	6.08 million	120 million	1.1 million	34.6 million

Source: 96th Civil Engineering Group/Environmental Compliance Branch (96 CEG/CEVC), 2006
gal = gallons

Wastewater

The Plew Wastewater Treatment Facility would service the proposed Triangle and West Gate sub-alternative sites for the 7SFG(A) (Table 4-13 and Figure 4-12). However, this could change depending on the final selection and configuration of each site (Brown, 2006a). The Garnier Wastewater Treatment Facility, operated by Okaloosa County Water and Sewer Department, would service the North Poquito sub-alternative. The Garnier Facility is scheduled to be replaced by a larger capacity facility expected to be completed in mid-2009 (Helms, 2006).

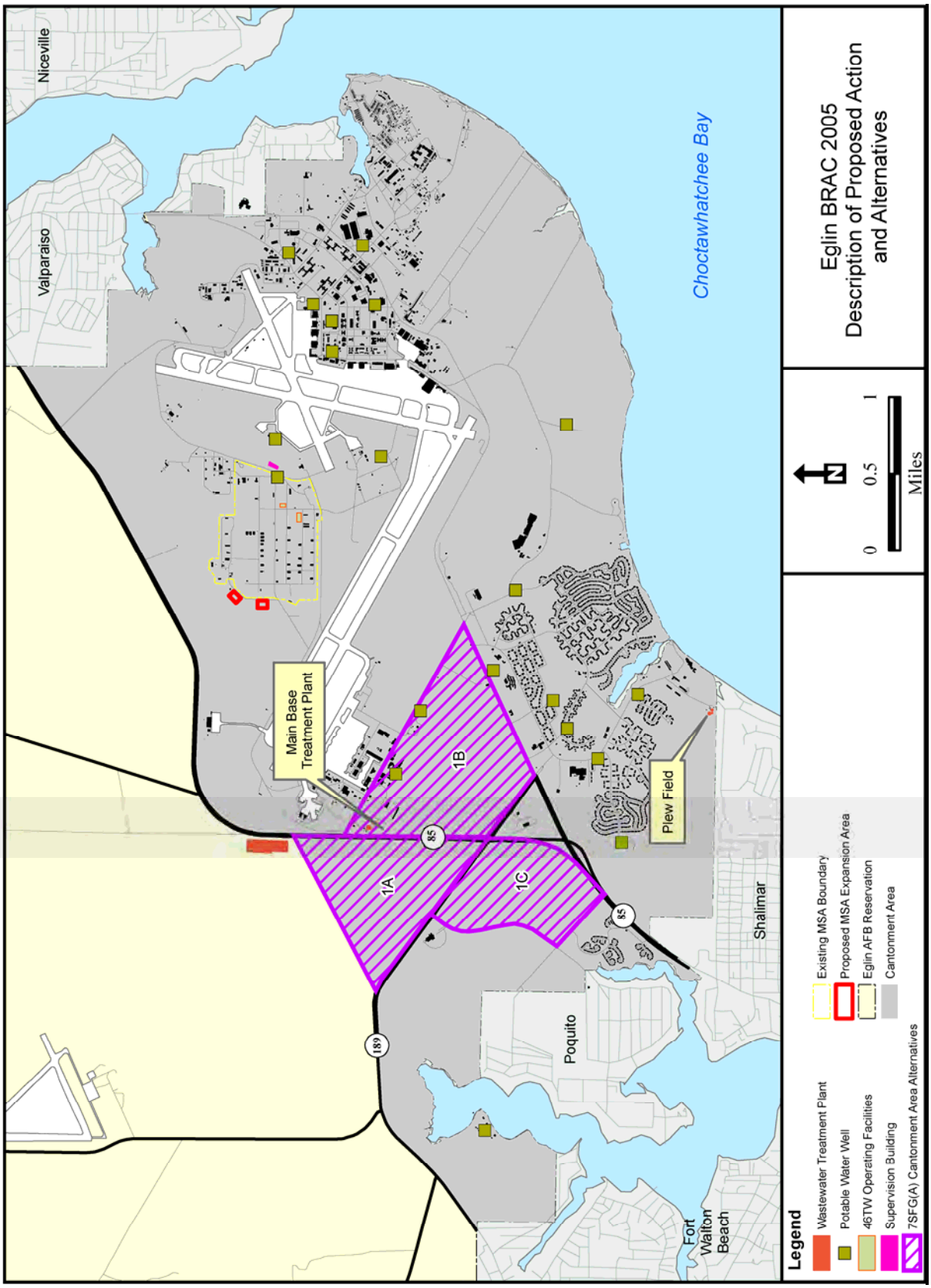

Figure 4-12. 7SFG(A) Cantonment Alternative 1 – Potable Water and Wastewater Utilities on Eglin Main Base

Since all of the proposed sub-alternative sites for the 7SFG(A) cantonment area are undeveloped, infrastructure would have to be established at each site to support potable water and wastewater operations. A 20-inch sanitary forced main traverses the West Gate sub-alternative site; this main would provide a branching-off point for infrastructure needs at this site.

Table 4-13. Wastewater Treatment Plants (WWTPs) Proposed for 7SFG(A) Cantonment Alternative 1 Sites

WWTP Location	Capacity in mgd	Annual Average (including July 2006)	Percentage of Capacity Used	Areas Served by WWTP
Plew Heights Treatment Facility	1.5	0.549	36.6	Main Base housing, 33 FW, Munitions Storage Area
Garnier Treatment Facility	6.5	5.0 to 5.5	77 to 85	Portions of Okaloosa County
Okaloosa County New Treatment Facility[1]	10.0	n/a	n/a	Portions of Okaloosa County

Sources: Brown, 2006a; U.S. Air Force, 2006o; Helms, 2006
mgd = million gallons per day; WWTP = wastewater treatment plant
1. To be completed mid-2009

Electricity

Electricity usage on Eglin AFB has been steady from FY 2000 through FY 2007 (Table 4-14). The electrical infrastructure on Main Base and Duke Field is extensive (Figure 4-13). Gulf Power supplies transmission voltage electricity to Eglin Main Base via a primary meter. Two substations on Eglin track usage, regulate flow, and distribute electricity to Main Base, Duke Field, and portions of the Eglin Range (Fleming, 2006; McBay, 2007).

Table 4-14. Electricity Consumption From 2000–2007 for Eglin AFB[1]

Fiscal Year	Total electric consumption (kWh)
2000	265,650,513
2001	252,823,920
2002	271,832,920
2003	263,271,716
2004	261,955,624
2005	278,051,532
2006	269,711,844
2007[2]	185,661,203

Source: Fleming, 2006; McBay, 2007
kWh = kilowatt hour
1. Electricity consumption data include Main Base, Duke Field and the Eglin Range.
2. FY 2007 data does not include July–September

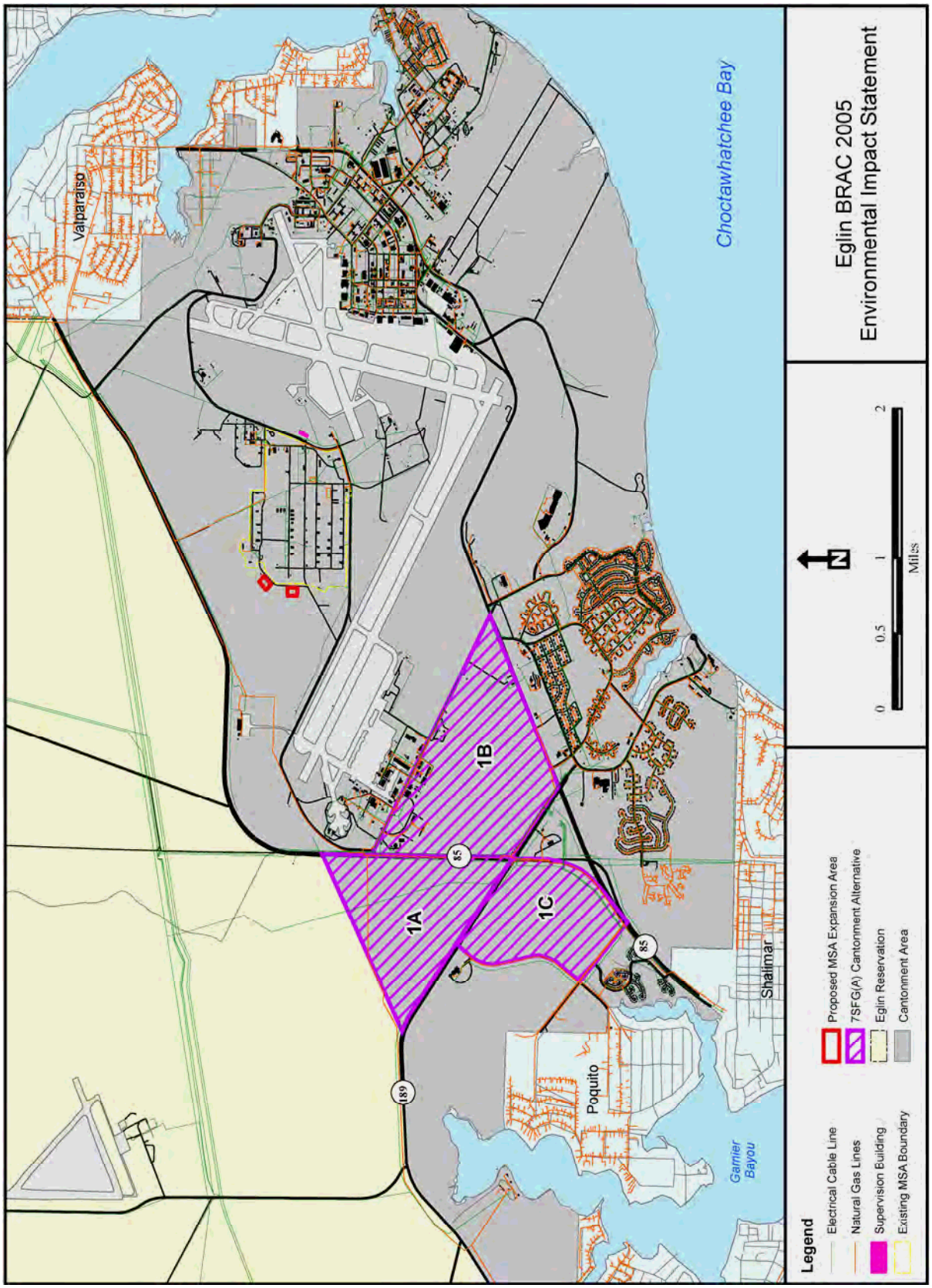

Figure 4-13. 7SFG(A) Cantonment Alternative 1 – Electrical and Natural Gas Utilities on Eglin Main Base

Natural Gas

Natural gas consumption by Eglin Main Base has generally been steady over the last seven years, with a slow decline in usage between 2004 and 2006 (Table 4-15). The theoretical capacity of the gas pipeline into Eglin is a maximum throughput in excess of 68,000 million cubic feet (MCF) per day. The total base demand for natural gas in 2006 was approximately 234,734 MCF or 643 MCF per day. Infrastructure currently exists on Eglin Main Base (Figure 4-13), Duke Field cantonment, and at the Navy EOD School at D-51 on the Eglin Range. Two main metering points for natural gas regulate the flow of natural gas on Main Base and out to Duke Field and the Navy EOD School (Fleming, 2006).

Table 4-15. Natural Gas Consumption From 2000–2007 for Eglin AFB[1]

Year	Total Eastside (MCF)	Total Westside (MCF)	Grand Total Consumption (MCF)
2000	215,840	110,416	326,256
2001	227,901	138,987	366,888
2002	206,764	127,288	334,052
2003	215,710	131,881	347,591
2004	219,560	130,730	350,290
2005	173,242	119,598	292,840
2006	115,783	118,951	234,734
2007[2]	180,795	112,259	293,054

Source: Fleming, 2006; McBay, 2007
MCF = million cubic feet
1. Natural gas consumption data include Eglin Main Base, Duke Field and D-51 (Navy EOD School).
2. Data for 2007 is through June.

4.6.1.2 Environmental Consequences (Utilities – 7SFG(A) Cantonment Alternative 1)

The proposed changes to the MSA at Main Base would not result in an increase or decrease in personnel. For this reason, the amount of utilities would not change based on the proposed changes. However, modifications to the utility infrastructure would occur to accommodate the changes in buildings.

Potable Water

The 7SFG(A) would potentially use approximately 413,500 gallons of water per day or 151 million gallons per year. An explanation of potable water estimates can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Potable Water). The 7SFG(A) water estimate assumes that one battalion is always deployed and therefore not on-site to consume water (BRAC IPT, 2006).

The permitted average daily limit of the Housing Area potable water system is 3.39 million gallons per day (mgd) with a maximum daily limit of 6.08 mgd. The consumption of potable water from the Housing Area water system in 2005 averaged 1.1 mgd. With the addition of 0.413 mgd from the 7SFG(A), the Housing Area water system would reach approximately 1.513 mgd, which is still within permit limits (Table 4-16). Since the additional potable water requirements would not cause the permitted limits to be exceeded, it is expected that there would be no adverse impact on the Housing Area potable water system as a result of the 7SFG(A) cantonment area. Since all the proposed sub-alternative sites for the 7SFG(A) cantonment area are undeveloped, it is expected that potable water infrastructure would have to be established at each site.

Table 4-16. Water Usage – Housing Area Water System and 7SFG(A) Estimates

Water Supply System	2005 Average Daily Rate (mgd)	7 SFG(A) Average Daily Rate (mgd estimate)	Total Average Daily Rate (mgd)	Permitted Average Daily Limit (mgd)	Permitted Maximum Daily Limit (mgd)
Housing Area	1.1	0.413	1.51	3.39	6.08

mgd = million gallons per day

Potable water estimates and impacts are based on numbers of personnel. However, the proposed vehicle wash platform would also draw water from the Floridan Aquifer. This type of water use is classified as industrial water use. To quantify industrial water use on Eglin Main Base and to identify ways to reduce it, Eglin completed the *Main Base Industrial Water Use Survey* in December 2007. The survey determined that industrial water use accounts for only 1.73 percent of the five-year annual average for total water use on Eglin Main Base (Eglin AFB, 2007b). The primary water uses drawing from the Floridan Aquifer on Eglin AFB are public water supply and cooling towers, accounting for 71 percent and 27 percent, respectively, of total water use.

Of the total *industrial* water uses on Eglin Main Base, equipment washing/rinsing (vehicles and aircraft) accounts for 19 percent of the total, and equipment processes (metal finishing operations, x-ray machines, and the cooling tower at McKinley Climatic Lab) account for the remaining 81 percent of the total. To reduce the amount of water used for vehicle washing, the survey recommends the installation of either a self-service pressure washing bay operation or an automatic washing operation. These systems reduce water use from hand washing by 72 and 78 percent, respectively.

The proposed vehicle wash platform for the 7SFG(A) would fall within the same usage rates as quantified in the survey. With the commitment of Eglin AFB to the Northwest Florida Water Management District (NWFWMD) to reduce the amount of water consumed from the Floridan Aquifer and since the 7SFG(A) wash platform would be established new, it is strongly recommended that either the self-service pressure washing bay or an automatic washing operation be used in the design of the wash

platform. Since the amount of water consumed would be similar to what was already quantified and since water saving devices may be used in the design of the vehicle wash platform, there would no significant effects on potable water.

Wastewater

The 7SFG(A) is estimated to produce 67,605 gallons of wastewater per day (Table 4-17). An explanation of wastewater estimates can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Wastewater).

Table 4-17. 7SFG(A) Cantonment Alternative 1 – Estimated Wastewater Flow

Generalized Activity	Number of People[1]	Wastewater Produced per Person (gal/day)	Total Wastewater Produced (gal/day)
Working (office and industrial facilities)	1,790	13	23,270
Living (dormitory)	192	40	7,680
Eating 3 meals/day (dining hall)	192	21	4,032
Eating 1 meal/day (dining hall)	1,598	7	11,186
Gym[2] (industrial type facility)	1,343	13	17,459
		Total	63,627 gallons/day
Structure	**Square Feet**	**Wastewater Produced per sq ft (gal/day)**	**Total Wastewater Produced (gal/day)**
Wash platform	2,340	1.7	3,978
		Total	3,978 gallons/day
		Grand Total	67,605 gallons/day

gal = gallons; sq ft = square feet
1. Since one battalion is always deployed from the Group, the number of people was reduced by either 450 when total number of people was being considered ("working" activity) or by one-third when the activity is limited to the battalion ("living" activity).
2. Assume 75 percent of the total personnel on-site work out in the gym daily.

It is assumed that the Triangle and West Gate sub-alternatives would utilize the Plew Heights WWTP. The current wastewater input to the Plew Heights WWTP consumes less than 40 percent of the total permitted capacity. With the additional wastewater from the 7SFG(A) (67,605 gallons per day), the Plew Heights WWTP annual average would increase to 0.617 mgd. This would result in 41 percent of the total permitted capacity being utilized (Table 4-18). Since the additional wastewater would not cause the permitted level to be exceeded, there would not be an adverse impact to the Plew Heights WWTP as a result of the 7SFG(A) cantonment area.

It is expected that the North Poquito sub-alternative would be serviced by the Garnier Wastewater Treatment Facility, operated by Okaloosa County Water and Sewer Department. The Garnier Facility is scheduled to be replaced by a larger capacity facility expected to be completed in mid-2009 (Helms, 2006). With the additional wastewater from the 7SFG(A) (representing 1.4 percent of Garnier's annual average), the Garnier WWTP annual average would increase to between 5.1 and 5.6 mgd. This would result in an overall increase from 78 to 86 percent of the total permitted capacity

being utilized (Table 4-18). Once the new facility is complete, the wastewater from the 7SFG(A) would represent less than 1 percent of the facility's total capacity. While the additional wastewater from the 7SFG(A) cantonment would increase the amount of wastewater treated at the Garnier Facility and the new facility, both facilities would still be within their permitted capacities and would, therefore, not be adversely impacted by the proposed 7SFG(A) cantonment area.

Table 4-18. 7SFG(A) – Plew Heights and Garnier WWTP Capacities with 7SFG(A) Output

WWTP Location	Annual Average in mgd	Annual Average Including 7SFG(A) in mgd	WWTP Capacity in mgd	Percentage of Capacity Used
Plew Heights Treatment Facility	0.549	.617	1.5	41
Garnier Treatment Facility	5.0–5.5	5.1–5.6	6.5	78–86
Okaloosa County New Treatment Facility	n/a	n/a	10.0	n/a

mgd = million gallons per day; n/a = not applicable

Electricity and Natural Gas

Based on the amount of new square footage that would be constructed for the 7SFG(A) cantonment area, it is estimated that the electrical requirement would be approximately 49,057,196 kilowatt hours (kWh) per year or 134,403 kWh per day, and the natural gas requirement would be approximately 78.2 MCF per year or 0.21 MCF per day. An explanation of electrical and natural gas estimates can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Electricity and Natural Gas). Based on FY 2006 electricity usage on Eglin AFB, the estimated requirement to support the proposed 7SFG(A) cantonment area is approximately 18 percent of the total usage in 2006. According to the military liaison at Gulf Power, they would be able to serve the new electrical power load requirement for Eglin AFB (Erickson, 2007).

Based on the 2006 natural gas usage, the estimated requirement to support the proposed 7SFG(A) cantonment area is less than 0.5 percent of the total usage in 2006 and well within the current theoretical capacity of the gas pipeline serving Eglin AFB. Okaloosa Natural Gas would be able to accommodate this increase in natural gas consumption (Shue, 2007). This alternative is not expected to cause an adverse impact to the electrical or natural gas supply in Northwest Florida.

Overall, electrical infrastructure does not exist on the three sub-alternative sites. Supporting electrical infrastructure from which to branch-off is located in the general vicinity of all three sites. A 115-kV transmission line bisects the Triangle sub-alternative and passes into the northeastern corner of the North Poquito sub-alternative. The transmission line creates an opportunity to expand service into the Triangle and North Poquito sites at less cost.

Additional details are currently unavailable to determine the specific impact of this alternative on existing electrical infrastructure. It is yet to be determined whether Gulf Power would continue to provide a primary feed of transmission voltage to Eglin AFB, and Eglin would continue to operate and maintain substations and distribution lines to serve the proposed cantonment areas. An alternate arrangement would be for Gulf Power to construct substations and distribution lines and either operate and maintain the infrastructure or pass it to Eglin for maintenance and continued operation. However, even without the additional details available, it can be determined that this alternative is not expected to cause an adverse impact to the electrical infrastructure on Eglin Main Base or at any of the proposed cantonment sites.

Natural gas infrastructure does not exist at any of the three proposed sub-alternative sites and new infrastructure would need to be constructed at any of these locations. However, based on the existing capacity of the main lines serving Eglin Main Base, installing pipes at these locations would not cause an adverse impact to the natural gas supply system.

4.6.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.6.2.1 Existing Conditions (Utilities – 7SFG(A) Cantonment Alternative 2)

The following discussion will focus on the current utilities on Duke Field that would be used to support the five sub-areas proposed for the 7SFG(A) cantonment area.

Potable Water

Duke Field has one water system with four wells, three of which draw water from the Floridan Aquifer and provide potable water for all of Duke Field (Figure 4-14). The remaining well draws water from the Sand and Gravel Aquifer for irrigation purposes.

The amount of potable water currently drawn from the Floridan Aquifer is less than levels permitted by the CUP authorization for Duke Field (Table 4-19). Across Eglin AFB, as demand increases with the influx of additional people and military missions, future considerations for the potable water supply may require additional or expanded water systems and CUPs, identifying areas of dependence on the aquifer, and making changes to reduce water consumption (Brown, 2006a).

Table 4-19. 7SFG(A) Cantonment Alternative 2 – Permitted and Actual Potable Water Use on Duke Field

Water Supply System	Permitted Average Daily Limit (gal/day)	Permitted Maximum Daily Limit (gal/day)	Permitted Maximum Monthly Limit (gal/month)	2005 Average Daily Rate (gal/day)	2005 Average Monthly Rate (gal/month)
Duke Field	82,300	335,800	3.13 million	75,460	2.3 million

Source: 96 CEG/CEVC, 2006
gal = gallons

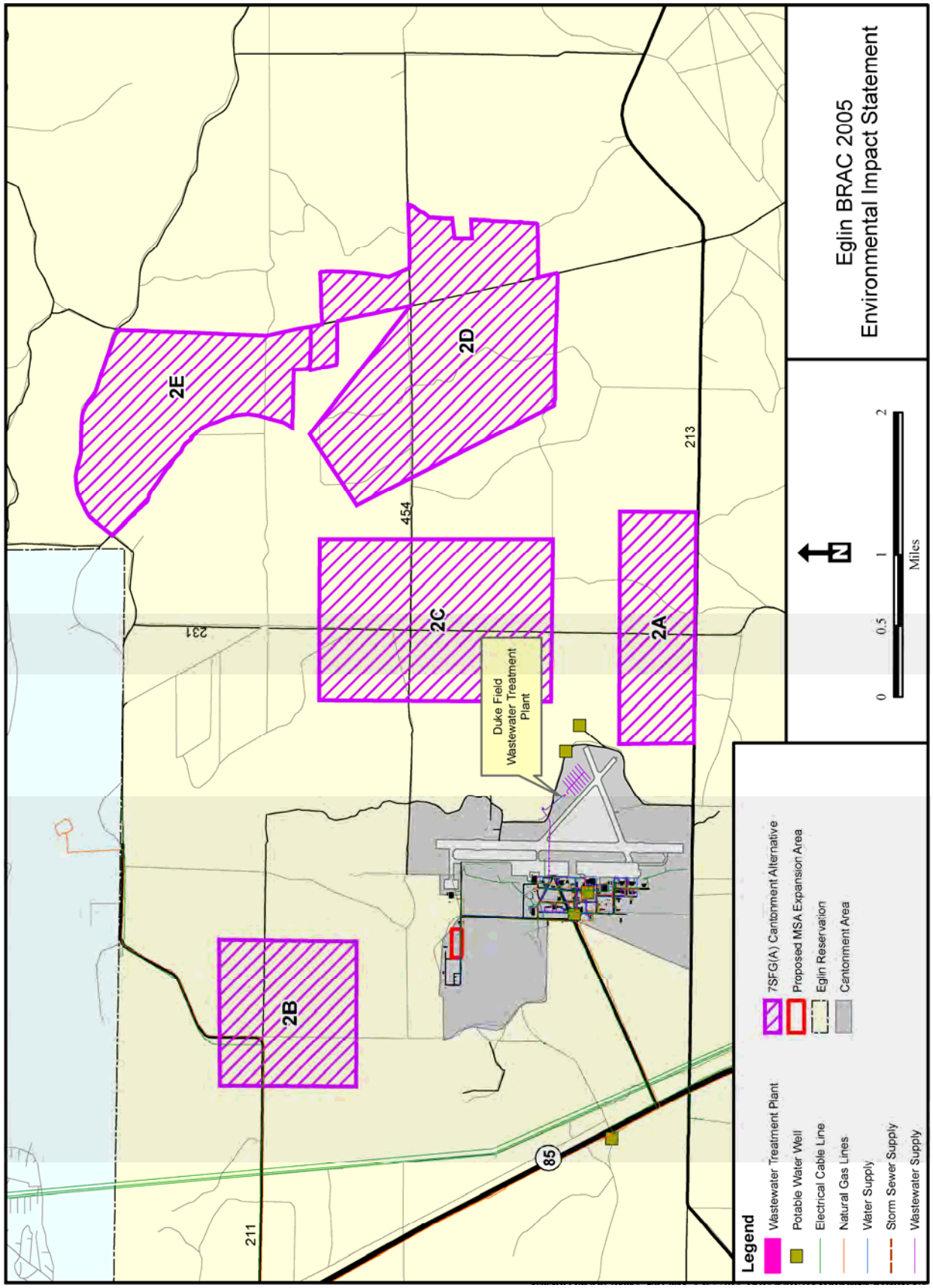

Figure 4-14. 7SFG(A) Cantonment Alternative 2 – Utilities on Duke Field

Wastewater

One WWTP services Duke Field (Table 4-20 and Figure 4-14). It is expected that the proposed five sub-alternative sites would utilize this facility for the 7SFG(A) cantonment area at Duke Field. However, this could change depending on the final selection and configuration of each site. A sprayfield is co-located with the Duke Field WWTP to reuse effluent. Since all of the proposed sub-alternative sites for the 7SFG(A) cantonment area are undeveloped, no sewer lines are in place within the sites to support wastewater operations. It is expected that these lines will have to be established at each site to support wastewater operations.

Table 4-20. 7SFG(A) Cantonment Alternative 2 – Duke Field's WWTP Annual Average and Capacity

WWTP Location	Capacity in mgd	Annual Average in mgd (including July 2006)	Percentage of Capacity Used	Areas Served by WWTP
Duke Field	0.125	.015	12	Duke Field

mgd = million gallons per day; WWTP = wastewater treatment plant

Electricity

Duke Field's electrical consumption is included in the data for Eglin AFB as described for the 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.1). No existing electrical infrastructure is present at any of the proposed sub-alternative sites except for 7SFG(A) Cantonment Alternative 2B. An electrical distribution line is located in the northwestern corner of the proposed 2B location. Additionally, a Gulf Power transmission line is aligned north to south to the west of the 7SFG(A) Cantonment Alternative 2B site.

Natural Gas

Duke Field's natural gas consumption is included in the data for Eglin AFB as described for the 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.1). Infrastructure in support of natural gas is not in place for any of the five sub-alternatives except for the 7SFG(A) Cantonment 2B sub-alternative. A natural gas line is located in the northwestern corner of the proposed 2B location. The natural gas infrastructure currently existing on Duke Field cantonment can be used as a starting point from which to establish infrastructure at the proposed cantonment sites.

4.6.2.2 Environmental Consequences (Utilities – 7SFG(A) Cantonment Alternative 2)

The proposed changes to the MSA at Duke Field would not result in an increase or decrease in personnel, or modification to existing structures. For this reason, the amount of utilities would not change. However, new infrastructure would be established as needed to support the new storage modules, igloos, and explosives operating location.

Potable Water

A description of the methods used to estimate potable water for the 7SFG(A) can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Potable Water). To summarize, the 7SFG(A) is estimated to potentially use approximately 413,500 gallons of water per day or 151 million gallons per year.

The permitted average daily limit of the Duke Field water system is 82,300 gallons per day with a maximum daily limit of 335,800 gallons per day. The consumption of potable water from the Duke Field water system in 2005 averaged 75,460 gallons per day.

The five sub-alternatives are expected to draw water from this water system. With the addition of 413,000 gal per day from the 7SFG(A), the Duke Field water system would exceed its permitted limits daily (Table 4-21). Using a more conservative potable water estimate for the 7SFG(A) (e.g., an average daily rate of 179,000 gal per day) would still cause the total average daily rate (254,460 gal per day) to grossly exceed the permitted limit of 82,300 gal per day at Duke Field. In its current configuration and permitted levels, the Duke Field water system would be adversely impacted by the 7SFG(A) additional water usage. Expansion of the existing Duke Field water system would be required, or an additional water system would need to be established for the 7SFG(A) cantonment area if any of the Duke Field sub-alternative locations are selected (Jordan, 2006).

Table 4-21. 7SFG(A) Cantonment Alternative 2 – Water Use from the Duke Field Water System and 7SFG(A) Estimates

Water Supply System	2005 Average Daily Rate gal/day	7SFG(A) Average Daily Rate gal/day	Total Average Daily Rate (gal/day)	Permitted Average Daily Limit (gal/day)[1]	Permitted Maximum Daily Limit (gal/day)
Duke Field	75,460	413,500	487,960	82,300	335,800

gal = gallons

Wastewater

A description of the methods used to estimate wastewater for the 7SFG(A) can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Wastewater) and in the utilities discussion for 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.2). To summarize, the 7SFG(A) is estimated to produce a total of 67,605 gallons of wastewater per day.

The current wastewater input to the Duke Field WWTP consumes less than 12 percent of the total permitted capacity. With the additional wastewater from the 7SFG(A) (67,605 gallons per day), the Duke Field WWTP annual average would increase to 82,605 gallons per day. This would result in 66 percent of the total permitted capacity being utilized (Table 4-22). While the additional wastewater from the 7SFG(A)

cantonment would substantially increase the amount of wastewater treated at the Duke Field WWTP, it would still be within the permitted capacity of the facility and would not cause an adverse impact.

Since each of the five sub-alternative areas is currently undeveloped, it is expected that sewer lines would have to be established within each site to support wastewater operations. Sewer lines to service four of the five sub-alternative sites (2A, 2C, 2D, and 2E) would be laid within the existing road easements along RRs 213, 231, and 220. Sewer lines to sub-alternative site 2B would be located along a combination of existing range roads through the Duke Field cantonment area and a new road constructed to access the proposed cantonment area.

Table 4-22. 7SFG(A) Cantonment Alternative 2 – Duke Field WWTP Capacities with 7SFG(A) Output

WWTP Location	Annual Average	Annual Average Including 7SFG(A)	Permitted Capacity	Percentage of Capacity Used
Duke Field Treatment Facility	15,000	82,605	125,000	66

Electricity and Natural Gas

Since Duke Field's consumption is accounted for in the overall electrical and natural gas consumption for Eglin AFB, analysis of the electrical and natural gas consumption discussed for the 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.2) also applies to this alternative. To summarize, since the 7SFG(A)'s electrical requirement is 18 percent of the total electricity consumed in FY 2006 and since Gulf Power anticipates being able to serve the increase in power requirements, this alternative would not cause an adverse impact to the electrical supply in Northwest Florida. The same applies to natural gas: since the 7SFG(A)'s requirement is less than 0.5 percent of the total natural gas consumed in FY 2006, and Okaloosa Gas anticipates being able to meet the additional natural gas demand, this alternative would not cause an adverse impact to the natural gas supply in Northwest Florida.

Overall, since electrical and natural gas infrastructure does not exist within any of the five sub-alternative sites, new infrastructure would have to be developed. An electrical substation would be established at the intersection of Hwy 85 and RR 213. Okaloosa Gas has an existing substation located between the main gate of Duke Field and Hwy 85. Electrical and natural gas lines would be laid within the existing road easements along RRs 213, 231, and 220 to access sub-alternatives 2A, 2C, 2D, and 2E. Electrical and natural gas lines to sub-alternative site 2B would be located within the easement of existing range roads through the Duke Field cantonment area and a new road constructed to access the proposed cantonment area. Since electricity and natural gas is already supplied to Duke Field, supplying electricity and natural gas to the proposed cantonment sites would be feasible (Shue, 2007; Erickson, 2007). The addition of the

7SFG(A) cantonment area is not expected to cause an adverse impact to the electrical or natural gas infrastructure on Duke Field or in Northwest Florida.

4.6.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.6.3.1 Existing Conditions (Utilities – 7SFG(A) Cantonment Alternative 3)

This cantonment alternative is located in the northwestern portion of the Eglin Range in proximity to RR 211, Duck Pond, and Lost Boy Pond. This area is essentially undeveloped (except for range roads) and has no existing utilities (Figure 4-15). No potable water wells, septic tanks, or wastewater treatment facilities are located in this area of the Eglin Range. The nearest utility is an electrical distribution line that is located along RR 211, approximately 1.5 miles to the north of the proposed cantonment. A natural gas distribution line is located approximately 4 miles to the east in the right-of-way of Hwy 85.

4.6.3.2 Environmental Consequences (Utilities – 7SFG(A) Cantonment Alternative 3)

The following subsections discuss environmental consequences related to the lack of existing utilities in the area along the northwestern boundary of the Eglin Range where the 7SFG(A) cantonment is proposed. Since there are no utilities to currently use in support of the proposed cantonment, a comparison of permitted capacities and estimated consumption was not made for potable water and wastewater.

The MSA located at Duke Field would be utilized in this alternative. The proposed changes to the MSA at Duke Field would not result in an increase or decrease in personnel or modification to existing structures. For this reason, the amount of utilities would not change. However, new infrastructure would be established as needed to support the new storage modules, igloos, and explosives operating location.

Potable Water

A description of the methods used to estimate potable water for the 7SFG(A) can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Potable Water). To summarize, the 7SFG(A) is estimated to potentially use approximately 413,500 gallons of water per day or 151 million gallons per year. Since the area along the northwestern boundary of the Eglin Range proposed for the 7SFG(A) cantonment contains no potable water wells, a potable water system would need to be established. Establishing potable water at the site would require a new CUP and a potable water system (PWS) permit. Based on amount of water estimated, one to two potable water wells would be required. Due to possible malfunction or lightning strike causing a pump to fail, two wells are recommended for system redundancy. Additionally, infrastructure to support the potable water system would also have to be established within the cantonment site.

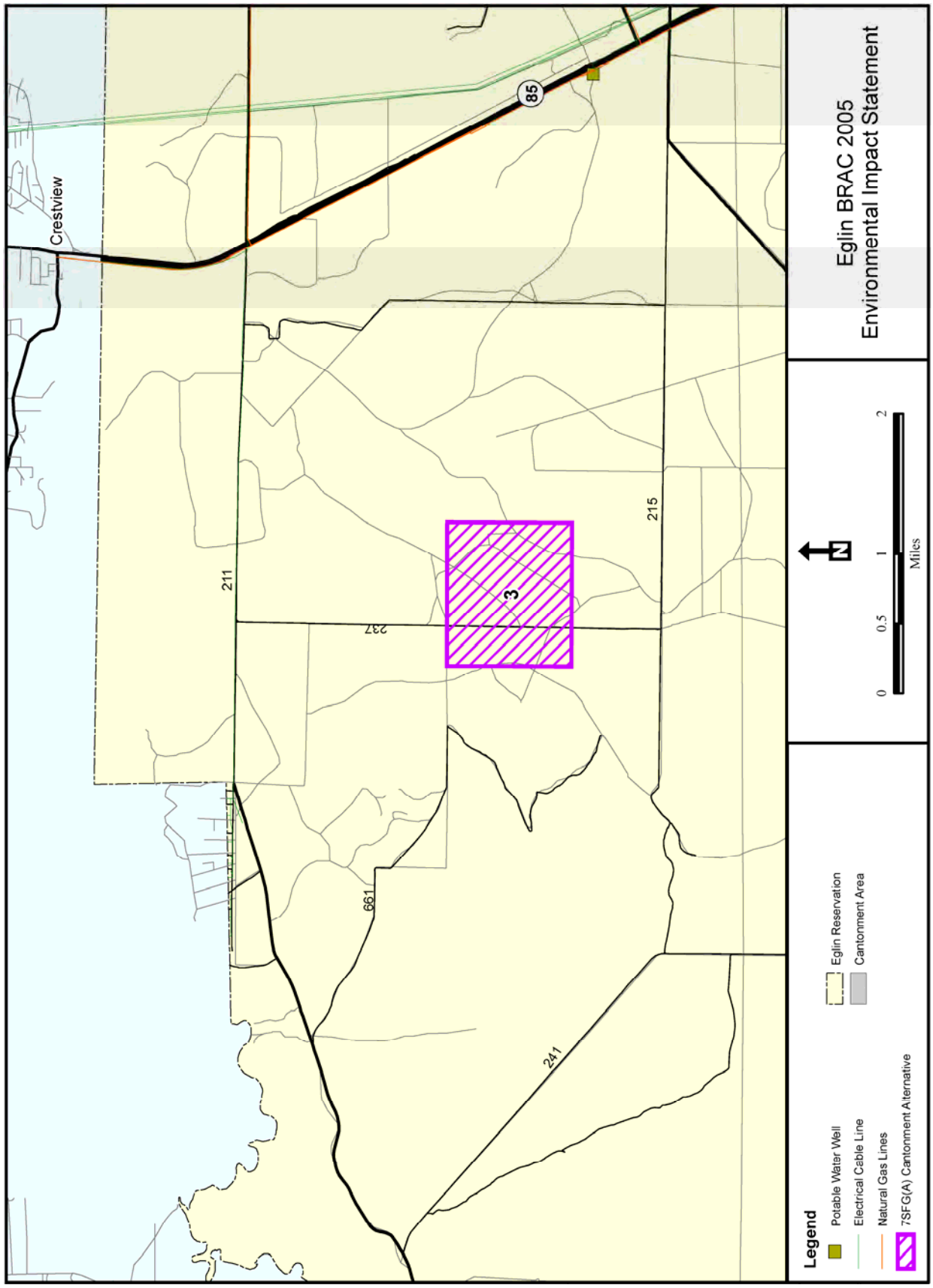

Figure 4-15. 7SFG(A) Cantonment Alternative 3 – Utilities in the Vicinity West of Duke Field

Whether the establishment of a new CUP and PWS would cause adverse impacts on potable water for this alternative cannot be specifically determined at this time. The impact criteria described in Chapter 3 are based on the comparison of current capacities as specified in an existing CUP. The area proposed in this alternative for the 7SFG(A) cantonment does not currently have an existing CUP with permitted levels. Since a new CUP and PWS permit would be required, the determination of impact on potable water would be made during the permitting process when the specifics of the water system and permit requirements are known (e.g., number, size, and depth of wells; size of the lines; pump capacity) (Sculthorpe, 2007).

Wastewater

A description of the methods used to estimate wastewater for the 7SFG(A) can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Wastewater) and in the utilities discussion for 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.2). To summarize, the 7SFG(A) is estimated to produce a total of 67,605 gallons of wastewater per day. Since there currently is no wastewater treatment system in the area along the northwestern boundary, the cantonment area would either require the establishment of an on-site wastewater treatment system and infrastructure to be able to support the 7SFG(A) or removal of the wastewater to the Bob Sikes Reclamation Facility in Crestview.

If an on-site facility is established, the amount of wastewater estimated to be produced would require an on-site wastewater treatment system sized at a minimum of approximately 100,000 gallons per day (Brown, 2007). The amount and type of wastewater expected to be produced by the 7SFG(A) cantonment would also require permitting from the Florida Department of Environmental Protection (FDEP).

FDEP regulations require permits for wastewater treatment systems with a design capacity of more than 10,000 gallons per day of domestic wastewater and more than 5,000 gallons per day of commercial wastewater (see Chapter 3, Section 3.6.2, Region of Influence and Existing Conditions). Depending on the presence of oil and grease or other toxic chemicals in the wastewater system, an industrial permit may also be required.

Whether the establishment of a new wastewater treatment system would cause adverse impacts to wastewater cannot be specifically determined at this time. The impact criteria described in Chapter 3 is based on the comparison of permitted capacities of existing wastewater treatment facilities. The area proposed in this alternative for the 7SFG(A) cantonment does not currently have an existing, permitted wastewater treatment system. Since a new wastewater treatment system would be required, the determination of impact would be made during the planning and permitting process, when the specifics of the wastewater treatment system and permit requirements are known (e.g., size of the facility, permit type, exact location of the facility). At this time, adverse impacts to wastewater are not expected as a result of establishing a new

wastewater treatment facility for the proposed 7SFG(A) cantonment area. To construct a new wastewater treatment plant, the Army would first need to submit an FDEP Form 62-620.910(2), Application for a Domestic Wastewater Facility Permit – Form 2A.

If the Bob Sikes Reclamation Facility in Crestview is selected to service the proposed cantonment area, a large lift station would be established within the cantonment area and sewage would be pumped north to RR 211 and then east to Hwy 85, at which point it would join the Okaloosa County system already in place. A lift station would be established at the junction with Hwy 85 south of the Shoal River (Brown, 2008).

The Bob Sikes Reclamation Facility has a current capacity of 0.3 mgd with an annual average of 0.1 mgd. The capacity is in the process of being upgraded to 1.0 mgd and is expected to be completed by summer 2009 (Mauzey, 2008). The current wastewater input to the Bob Sikes Reclamation Facility consumes 33 percent of the total permitted capacity. With the additional wastewater from the 7SFG(A) (67,605 gallons per day), the Bob Sikes Reclamation Facility annual average would increase to 167,605 gallons per day. This would result in 56 percent of the total permitted capacity being utilized. However, once the upgrade is in place, only 17 percent of the total permitted capacity would be utilized. The additional wastewater from the 7SFG(A) cantonment would increase the amount of wastewater treated at the Bob Sikes Reclamation Facility, but it would still be within the permitted capacity of the facility and would not cause an adverse impact.

Electricity and Natural Gas

Since the square footage estimates for the proposed 7SFG(A) cantonment area are the same under all alternatives and this alternative would utilize the same electrical and natural gas supply (Gulf Power and Okaloosa Natural Gas) as described for 7SFG(A) Cantonment Alternative 1, the environmental consequences for electrical and natural gas are the same as those described for 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.2). The addition of the proposed 7SFG(A) cantonment area is not expected to cause an adverse impact to the electrical or natural gas supply in Northwest Florida.

An electrical substation would be established at the intersection of Hwy 85 and RR 213. From there, electrical and communication lines would be laid within the easement along RR 213 and RR 215, and up RR 237 to the cantonment area. Additional details are currently unavailable to determine the specific impact of this alternative on electrical infrastructure. It is yet to be determined whether Gulf Power would continue to provide a primary feed of transmission voltage to Eglin AFB and whether Eglin would continue to operate and maintain substations and distribution lines to serve the proposed cantonment area. An alternate arrangement would be for Gulf Power to construct substations and distribution lines for the proposed cantonment area and

either operate and maintain the infrastructure or pass it to Eglin for maintenance and continued operation (Erickson, 2007).

The closest supply line for natural gas is approximately 4 miles away. To access the proposed site, Okaloosa Natural Gas would tap into the pipeline existing within the Hwy 85 right-of-way and place the natural gas line within the easement along RR 213 and RR 215, and up RR 237 to the cantonment area. A new substation would be required along the route, which would require additional easement to Air Force land. This alternative is feasible but would require close and early coordination, planning, and analysis by the Okaloosa Natural Gas engineers and Eglin AFB (Shue, 2007).

4.6.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.6.4.1 Existing Conditions (Utilities – 7SFG(A) Cantonment Alternative 4)

The following subsections discuss the current utilities on Eglin Main Base that would be used to support the proposed 7SFG(A) cantonment area.

Potable Water

The Main Base/Ammunition Area water system would potentially be used to support 7SFG(A) Cantonment Alternative 4. The amount of potable water currently drawn from the Floridan Aquifer is less than the levels permitted by the CUP authorization (Table 4-23). The construction of an on-site water system consisting of one to two wells is also an option for this site, depending on the CUP and PWS permitting process, and the cost comparison of installing new wells versus pumping water from the Main Base/Ammunition Area water system (Sculthorpe, 2007). Water supply lines already extend from Main Base/Ammunition Area water system to the Okaloosa Regional Airport, which is located approximately 2 miles south of the proposed cantonment area.

As demand increases with the influx of additional people and military missions to Eglin AFB, future considerations for the potable water supply may require additional water systems and CUPs, making changes to reduce water consumption and identifying areas of dependence on the aquifer (Brown, 2006a). Since this site for the 7SFG(A) cantonment area is undeveloped, infrastructure would have to be established at the site to support potable water requirements.

Table 4-23. 7SFG(A) Cantonment Alternative 4 – Permitted and Actual Potable Water Use by Main Base Water System

Water Supply System	Permitted Average Daily Limit (gal/day)	Permitted Maximum Daily Limit (gal/day)	Permitted Maximum Monthly Limit (gal/month)	2005 Average Daily Rate (gal/day)	2005 Average Monthly Rate (gal/month)
Main Base/Ammo	1.9 million	4.0 million	91.0 million	847,222	25.7 million

Source: 96 CEG/CEVC, 2006
gal = gallons

Wastewater

The Main Base Wastewater Treatment Facility would potentially service the proposed cantonment site north of Eglin Main Base for the 7SFG(A) (Table 4-24 and Figure 4-16). However, this could change depending on the final selection and configuration of the site (Brown, 2006a). The construction of an on-site wastewater treatment facility is also an option for this site, depending on the cost comparison of constructing the new facility or pumping the wastewater to the Main Base Treatment Facility (Brown, 2007). To construct an on-site wastewater treatment facility, the Army would first need to submit an FDEP Form 62-620.910(2), Application for a Domestic Wastewater Facility Permit – Form 2A. Wastewater lines already extend from Main Base Treatment Facility to the Okaloosa Regional Airport, which is located approximately 2 miles to the south of the proposed cantonment area. Since the proposed cantonment is undeveloped, infrastructure would have to be established at the site to support wastewater operations.

Table 4-24. Wastewater Treatment Plant Proposed for 7SFG(A) Cantonment Alternative 4 Site

WWTP Location	Capacity in mgd	Annual Average (including July 2006)	Percentage of Capacity Used	Areas Served by WWTP
Main Base Treatment Facility	1.0	0.469	46.9	Main Base east of the runway

Source: Brown, 2006b and U.S. Air Force, 2006o
mgd = million gallons per day; WWTP = wastewater treatment plant

Electricity

Electricity usage is the same as that discussed under 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.1) since this alternative would be utilizing the same power supply as that analyzed for Eglin Main Base.

Several electrical distribution and transmission lines are located near the proposed cantonment area. Two transmission lines cross through the northwestern corner of the site. Distribution lines run along Hwy 123 to the west, north and south of the site. An additional transmission line is located close to the proposed cantonment site.

Natural Gas

Natural gas usage is the same as that discussed in 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.1) since this alternative would be utilizing the same natural gas supply as Eglin AFB.

A natural gas distribution line is located within the right-of-way of Hwy 85 to the east and to the south of the proposed cantonment area. In addition, natural gas lines are located within a mile of the proposed cantonment area to the east in Valparaiso and to the south on Eglin Main Base.

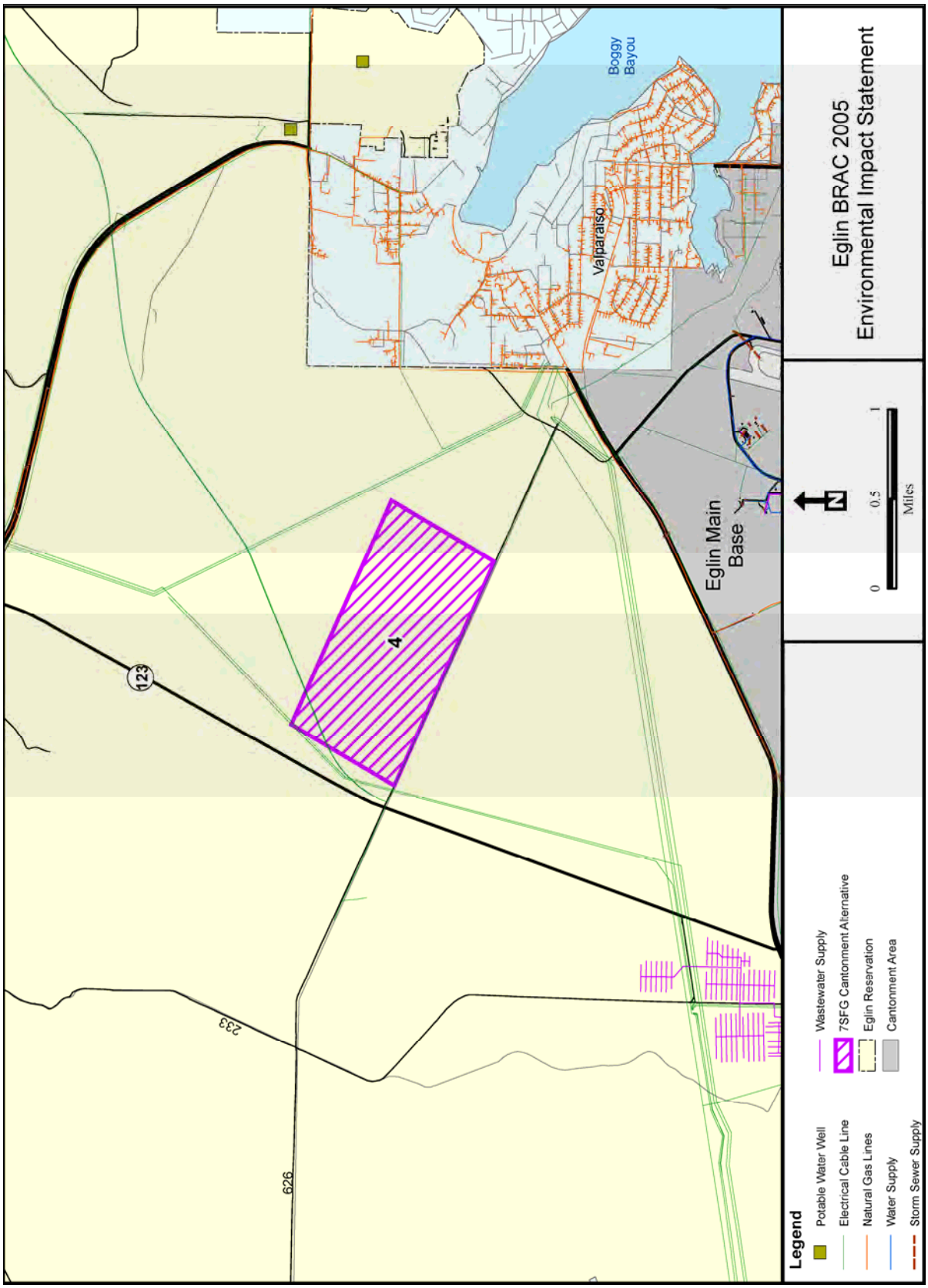

Figure 4-16. 7SFG(A) Cantonment Alternative 4 – Utilities in the Vicinity North of Eglin Main Base

4.6.4.2 Environmental Consequences (Utilities – 7SFG(A) Cantonment Alternative 4)

The following subsections discuss environmental consequences related to the lack of existing utilities in the area along Hwy 123 where the 7SFG(A) cantonment is proposed. A comparison is made of current and estimated consumption of potable water, wastewater, electricity, and natural gas since the overall Eglin AFB usage would include this proposed site.

The proposed changes to the MSA at Main Base would not result in an increase or decrease in personnel. For this reason, the amount of utilities would not change based on the proposed changes. However, modifications to the utility infrastructure would occur to accommodate the changes in buildings.

Potable Water

A description of the methods used to estimate potable water for the 7SFG(A) can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Potable Water). To summarize, the 7SFG(A) is estimated to potentially use approximately 413,500 gallons of water per day (0.414 mgd) or 151 million gallons per year. The permitted average daily limit of the Main Base water system is 1.9 mgd with a maximum daily limit of 4 mgd. The consumption of potable water from the Main Base water system in 2005 was on average 0.847 mgd. With the addition of 0.414 mgd, the Main Base water system would reach approximately 1.26 mgd, which is within permit limits (Table 4-25). Since the Main Base Water System would remain within permitted limits, there would be no adverse impact on potable water from implementing 7SFG(A) Cantonment Alternative 4.

Table 4-25. Water Use by the Eglin Main Base Water System and the 7SFG(A)

Water Supply System	2005 Average Daily Rate (mgd)	7SFG(A) Estimated Average Daily Rate (mgd)	Total Average Daily Rate (mgd)	Permitted Average Daily Limit (mgd)	Permitted Maximum Daily Limit (mgd)
Main Base/ Ammo	0.847	0.414	1.26	1.9	4.0

mgd = million gallons per day

Wastewater

A description of the methods used to estimate wastewater for the 7SFG(A) can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Wastewater) and in the utilities discussion for 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.2). To summarize, the 7SFG(A) is estimated to produce 67,605 gallons of wastewater per day (0.067 mgd) or 24.7 million gallons per year.

The current wastewater input to the Main Base WWTP is less than 50 percent of the total permitted capacity. The location for 7SFG(A) Cantonment Alternative 4 would use

the Main Base WWTP. With the additional wastewater from the 7SFG(A), the Main Base WWTP annual average would increase to 0.536 mgd. This would result in 54 percent of the total permitted capacity being utilized (Table 4-26). The Main Base WWTP would easily accommodate the additional flow from the 7SFG(A) cantonment and would not result in adverse impacts to wastewater capacity.

Table 4-26. 7SFG(A) Cantonment Alternative 4: Main Base WWTP Capacity

WWTP Location	Annual Average Including 7 SFG(A) (mgd)	Capacity (mgd)	Percentage of Capacity Used
Main Base	0.536	1.0	54

mgd = million gallons per day

Electricity and Natural Gas

Since the square footage estimates for the proposed 7SFG(A) cantonment area are the same for all alternatives and this alternative would utilize the same electrical and natural gas supply as described for 7SFG(A) Cantonment Alternative 1, the environmental consequences for electrical and natural gas are the same as those described for 7SFG(A) Cantonment Alternative 1. The addition of the proposed 7SFG(A) cantonment area is not expected to cause an adverse impact to the electrical or natural gas supply in Northwest Florida.

The multiple electrical distribution lines and natural gas lines in the area of the proposed cantonment provide ample points at which to tap into the electrical and natural gas supply. Since Eglin Main Base is already piped and supplied with natural gas and electricity and this location close to Eglin Main Base, this proposed location would be easily accommodated. The exact location of the cantonment will influence specifics of supplying natural gas and electricity, but overall, logistically it would be feasible (Shue, 2007; Erickson, 2007).

4.6.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.6.5.1 Existing Conditions (Utilities – 7SFG(A) Cantonment Alternative 5)

This alternative is located in the northeastern portion of the Eglin Range in proximity to RR 382 and Bullhide Creek. This area is essentially undeveloped (except for range roads) and has no existing utilities (Figure 4-17). No potable water wells, septic tanks, or wastewater treatment facilities are located in this area of the Eglin Range. The nearest utilities are electrical distribution lines and two natural gas lines. Two electrical distribution lines, supplied by Choctawhatchee Electric Cooperative (CHELCO), are located within approximately 2 miles of the proposed site. One is located south of I-10 and the other to the east of the proposed site. The natural gas distribution lines are located to the north of the proposed site within the I-10/Hwy 90 corridor. One line is owned and operated by the DeFuniak Springs Utility Company (Holloway, 2007), and one line is owned and operated by Okaloosa Natural Gas (Shue, 2007).

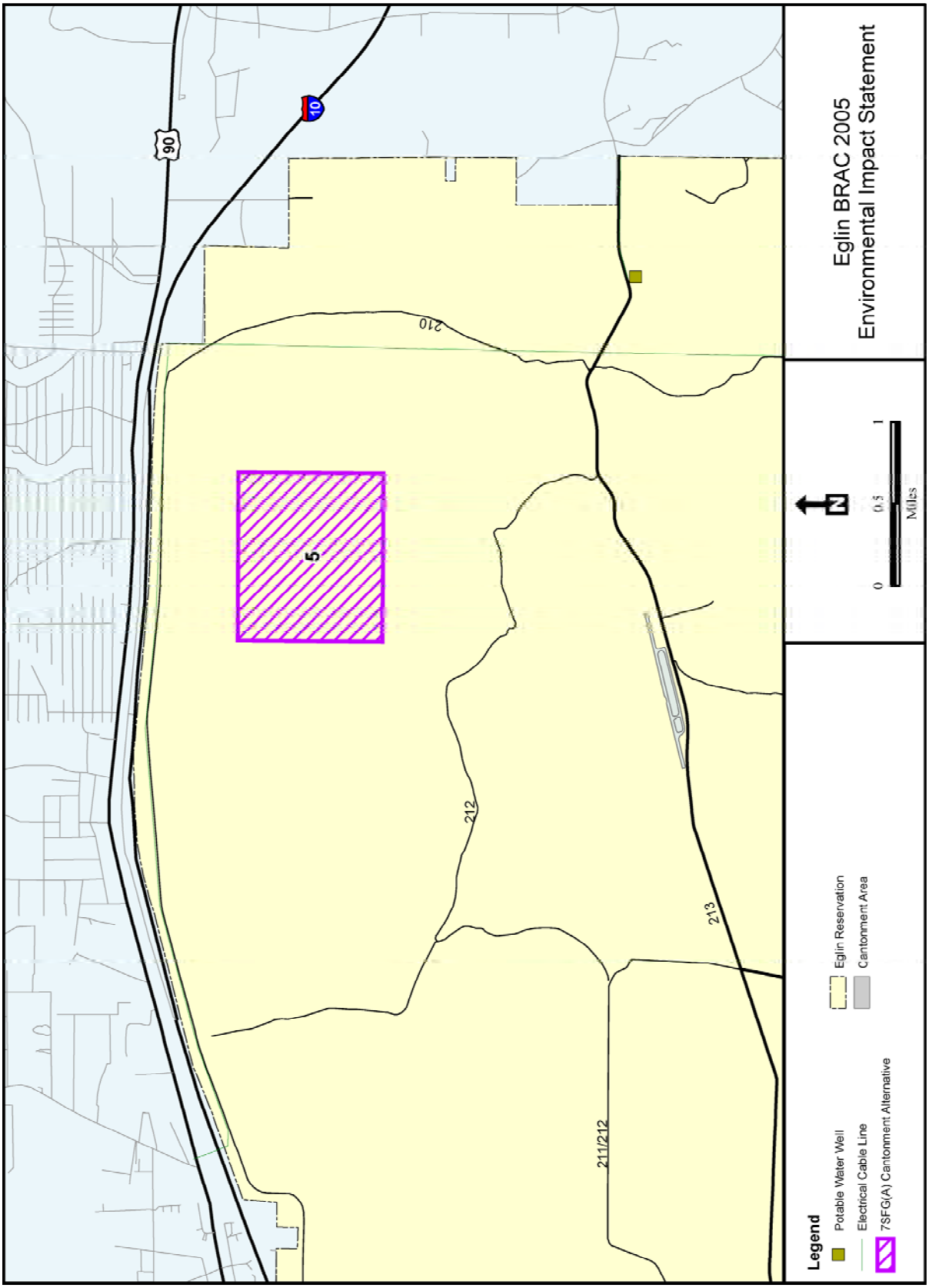

Figure 4-17. 7SFG(A) Cantonment Alternative 5 – Utilities in the Vicinity of DeFuniak Springs

4.6.5.2 Environmental Consequences (Utilities – 7SFG(A) Cantonment Alternative 5)

The following sections discuss environmental consequences related to the lack of existing utilities in the area along the northeastern boundary of the Eglin Range where the 7SFG(A) cantonment is proposed.

Under this alternative, the MSA located at Duke Field would be utilized. The proposed changes to the MSA at Duke Field would not result in an increase or decrease in personnel or modification to existing structures. For this reason, the amount of utilities would not change. However, new infrastructure would be established as needed to support the new storage modules, igloos, and explosives operating location.

Potable Water

A description of the methods used to estimate potable water for the 7SFG(A) can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Potable Water). To summarize, the 7SFG(A) is estimated to potentially use approximately 413,500 gallons of water per day, or 151 million gallons per year. Since the area along the northeastern boundary of the Eglin Range proposed for the 7SFG(A) cantonment contains no potable water wells, a potable water system would need to be established. Establishing potable water at the site would require a new CUP and a PWS permit (Sculthorpe, 2007). Based on the amount of water estimated, one to two potable water wells would be required. Due to possible malfunction or lightning strike causing a pump to fail, two wells are recommended for system redundancy. Additionally, infrastructure to support the potable water system would also have to be established.

Determining whether the establishment of a new CUP and PWS would cause adverse impacts on potable water for this alternative cannot be specifically determined at this time. The impact criteria described in Chapter 3 is based on the comparison of current capacities as specified in an existing CUP. The area proposed in this alternative for the 7SFG(A) cantonment does not currently have an existing CUP with permitted levels. Since a new CUP and PWS permit would be required, the determination of impact on potable water would be made during the permitting process, when the specifics of the water system and permit requirements are known (e.g., number, size, and depth of wells; size of the lines; pump capacity) (Sculthorpe, 2007). At this time, it is not expected that adverse impacts to potable water would result from the 7SFG(A) cantonment area.

Wastewater

A description of the methods used to estimate wastewater for the 7SFG(A) can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Wastewater) and in the utilities section under 7SFG(A) Cantonment Alternative 1 (Section 4.6.1.2). To summarize, the 7SFG(A) is estimated to produce a total of 67,605 gallons of wastewater per day. Since

there currently is no wastewater treatment system in the area, the cantonment area would require the establishment of an on-site wastewater treatment system and infrastructure to be able to support the 7SFG(A). The option of pumping the wastewater to an off-site facility is not feasible since the extensive creeks and other waterways in this portion of the Eglin Range are difficult to traverse with pipes (Brown, 2007).

Based on the amount of wastewater estimated to be produced, an on-site wastewater treatment system with a minimum capacity of approximately 100,000 gallons per day would be required (Brown, 2007). The amount and type of wastewater expected to be produced by the 7SFG(A) cantonment would also require permitting from the FDEP. FDEP regulations require permits for wastewater treatment systems with a design capacity of more than 10,000 gallons per day of domestic wastewater and more than 5,000 gallons per day of commercial wastewater (see Chapter 3, Section 3.6.2, Region of Influence and Existing Conditions). Depending on the presence of oil and grease or other toxic chemicals in the wastewater system, an industrial permit may also be required.

Whether the establishment of a new wastewater treatment system would cause adverse impacts to wastewater cannot be determined at this time. The impact criteria described in Chapter 3 are based on the comparison of permitted capacities of existing wastewater treatment facilities. The area proposed in this alternative for the 7SFG(A) cantonment does not currently have an existing, permitted wastewater treatment system. Since a new wastewater treatment system would be required, the determination of impact would be made during the planning and permitting process, when the specifics of the wastewater treatment system and permit requirements are known (e.g., size of the facility, permit type, exact location of the facility). At this time, it is not expected that adverse impacts would occur to wastewater as a result of establishing a new wastewater treatment facility for the proposed 7SFG(A) cantonment area.

Electricity and Natural Gas

The amount of electricity and natural gas estimated to be required by the proposed 7SFG(A) cantonment area was previously described in Section 4.6.1.2 (7SFG(A) Cantonment Alternative 1). To summarize, the 7SFG(A)'s electrical requirement is 18 percent of the total electricity consumed on Eglin AFB in FY 2006 and less than 0.5 percent of the total natural gas consumed in FY 2006. CHELCO would supply the power to this proposed cantonment site and anticipates being able to accommodate the increase in the electrical load (Avery, 2007; Shaw, 2007). CHELCO currently provides power to other areas within the eastern portion of the Eglin Range. The electrical lines to supply the cantonment would be located either within the existing electrical line easement to the north of the cantonment area or along centerline of RR 210. From there the lines would turn south and be located within the easement for a newly constructed range road that would be established to access the cantonment area. A substation would be created at the northeastern edge of the reservation boundary within a curve of

RR 210. Since CHELCO anticipates being able to serve the increase in power requirements, this alternative would not cause an adverse impact to the electrical supply in Northwest Florida.

Okaloosa Natural Gas would potentially be the natural gas supplier for this proposed cantonment site and anticipates being able to meet the additional natural gas demand (Shue, 2007). However, this alternative would be the most difficult of all the alternatives to provide natural gas infrastructure due to the location of the proposed site and the distance to existing natural gas pipelines. Okaloosa Natural Gas has a pipeline in the Hwy 90 corridor to the north of the proposed cantonment, which would be tapped into to supply the cantonment area. The natural gas lines would be located within the existing easement for electrical lines or along the centerline of RR 210. From there the lines would turn south and be located within the easement for a newly constructed range road that would be established to access the cantonment area. A new substation would be required for this site. This alternative would require extensive analysis by Okaloosa Natural Gas engineers, along with a survey, to determine if a new substation would be reasonable. The feasibility of providing natural gas to this site is difficult to predict (Shue, 2007). However, since Okaloosa Natural Gas can easily accommodate the increase in demand for natural gas at this site, this alternative would not adversely impact the natural gas supply in Northwest Florida.

4.6.6 No Action Alternative

Under the No Action Alternative, the 7SFG(A) would not be relocated to Eglin AFB and therefore would not require the use of existing utilities on Eglin Main Base or Duke Field or the establishment of new utilities on the Eglin Range. The existing conditions discussed in Sections 4.6.1 through 4.6.5 describe the current state of utilities. However, several actions unrelated to BRAC are predicted that would impact the current baseline status of utilities on Eglin Main Base (see Section 2.7, No Action Alternative). Some of the actions represent minor fluctuations in personnel. Generally, the minor changes in levels of use are easily absorbed by the existing utility systems, because none of the utilities are currently nearing their maximum permitted levels or capabilities. These types of fluctuations do not impact utilities on Eglin Main Base.

Three of these actions predicted to occur would result in major changes to numbers of personnel on Eglin Main Base and Duke Field. The drawdown of the 33 FW and the reduction in overall numbers of Department of Defense (DoD) personnel as specified in the President's FY 2007 Budget would result in 2,207 fewer people on Eglin Main Base by 2018. At Duke Field, the relocation of the Air Force Reserve's 919 SOW to Hurlburt Field would reduce the total number of personnel by 1,400 by 2013. This would reduce utility use at Duke Field. However, since the 919 SOW is a reserve squadron, its 1,400 personnel do not contribute to the daily use of utilities since they are generally only on Duke Field during weekend training and active duty training periods. However, reducing the number of reservist personnel would decrease utilities usage during those times that the reservists would have been present at Duke Field.

The reduction of 2,207 personnel on Eglin Main Base would reduce the amounts of potable water consumed and wastewater produced by roughly 29,000 gallons per day based on American Water Works Association (AWWA) estimates (AWWA, 2006) (see Chapter 3, Section 3.6.3, Analysis Methodology, for more details). The reduction in water consumption and wastewater production would have an overall positive impact on utilities. Fewer people on Main Base would also reduce the overall consumption of electricity and natural gas. For these reasons, the reduction of personnel on Eglin Main Base or Duke Field would not adversely impact utilities.

4.7 AIR QUALITY

4.7.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

Identifying the affected area for an air quality assessment requires knowledge of sources of air emissions, pollutant types, emission rates and release parameters, proximity to other emissions sources, and local conditions. Refer to Appendix D, *Air Quality*, for a review of air quality and associated methodologies used for emissions calculations.

4.7.1.1 Existing Conditions (Air Quality – 7SFG(A) Cantonment Alternative 1)

This alternative location is in Okaloosa County, which is included in the ROI used for analysis of air quality. The baseline emission levels for Okaloosa County are discussed in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

4.7.1.2 Environmental Consequences (Air Quality – 7SFG(A) Cantonment Alternative 1)

The air quality analysis evaluates increased emissions from the construction of 33 buildings and vehicle traffic due to an increase in personnel. The analysis of construction emissions expected from the addition of the 7SFG(A) is applicable to 7SFG(A) Cantonment Alternatives 1 through 5 since the types and size of the facilities are expected to be similar. 7SFG(A) Cantonment Alternatives 1 through 4 are located in Okaloosa County, and 7SFG(A) Cantonment Alternative 5 is located in Walton County, all of which are part of the ROI (Okaloosa, Santa Rosa, and Walton Counties) for this analysis. 7SFG(A) Cantonment Alternatives 1 and 4 would utilize the existing 46 TW MSA. 7SFG(A) Cantonment Alternatives 2, 3, and 5 would use the Duke Field MSA. Construction emissions expected for the 7SFG(A) cantonment component of the Proposed Action are summarized in Table 4-27. Construction would occur over a period of time, from CY 2008 through CY 2011. The addition of 2,240 active duty personnel and 2,741 civilians were included in the analysis to account for increased commutes, which would increase emissions from privately owned vehicles. These emissions are described as mobile sources in Table 4-28.

Table 4-27. Construction Emissions Expected From 7SFG(A) Cantonment

Source Type		Emissions (tons/year)				
		CO	NO_x	PM_{10}	SO_2	VOCs
Maximum Annual Emissions CY 2008-2010	Grading Equipment	2.415	9.087	0.746	0.922	0.966
	Grading Operations	0.000	0.000	197.427	0.000	0.000
	Acres Paved	0.000	0.000	0.000	0.000	0.015
	Mobile Equipment	17.068	40.700	3.282	5.033	3.720
	Non-Residential Architectural Coatings	0.000	0.000	0.000	0.000	1.451
	Residential Architectural Coatings	0.000	0.000	0.000	0.000	0492
	Stationary Equipment	115.754	2.998	0.088	0.153	4.333
	Workers Trips	4.262	0.244	0.036	0.000	0.260
	Total	**139.498**	**53.029**	**201.579**	**6.108**	**11.236**

CY = calendar year; CO = carbon monoxide; NO_x= nitrogen oxides; PM_{10} = particulate matter with a diameter of less than or equal to 10 microns; SO_2 = sulfur dioxide; VOCs = volatile organic compounds

Table 4-28. Ratio of the 7SFG(A) Cantonment Construction Emissions to the ROI Emissions

Emission Activities	Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOC
Construction Emissions	139.50	53.03	201.58	6.11	10.74
Point Source	3.49	4.28	0.31	0.03	0.22
Mobile Source	183.60	20.32	0.38	0.27	12.87
Total	**326.59**	**77.62**	**202.26**	**6.40**	**23.83**
ROI Emissions	150,218	22,908	30,828	4,096	23,741
Percentage of ROI Emissions	*0.22%*	*0.34%*	*0.66%*	*0.16%*	*0.10%*

CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = particulate matter with a diameter of less than or equal to 10 microns; ROI = region of influence; SO_2 = sulfur dioxide; VOCs = volatile organic compounds

As indicated in Table 4-28, the individual pollutant emissions from the project would exceed the 250 tons per year impact criteria for carbon monoxide only, and pollutant emissions would not exceed 10 percent of the total ROI emissions for each corresponding pollutant. Carbon monoxide (CO) would be the highest pollutant emission at 326 tons per year and 0.22 percent of the ROI emissions at the peak of the construction activity. The highest pollutant percentage is for particulate matter with a diameter of less than or equal to 10 microns (PM_{10}) and nitrogen oxides (NO_x), which is approximately 0.66 and 0.34 percent of the ROI's total emissions, respectively, based on the U.S. Environmental Protection Agency's (USEPA's) 2002 National Emissions Inventory (NEI). This increase in local air emissions would be temporary. In calculating emissions, certain assumptions were made regarding variables associated with construction activities. Specific details regarding the assumptions and calculations associated with the emissions estimates are presented in Appendix D, *Air Quality*. There will be minor, temporary (CY 2008 through CY 2011) emissions, but these would not be adverse.

4.7.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.7.2.1 Existing Conditions (Air Quality – 7SFG(A) Cantonment Alternative 2)

7SFG(A) Cantonment Alternative 2 is located in Okaloosa County which is part of the ROI. Analysis of air quality emissions are compared to baseline emissions within the ROI as summarized in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

4.7.2.2 Environmental Consequences (Air Quality – 7SFG(A) Cantonment Alternative 2)

7SFG(A) Cantonment Alternative 2 would require the same number of buildings and square footages as addressed in 7SFG(A) Cantonment Alternative 1. An additional 3.5 acres would be cleared for the construction of additional MSA facilities. Table 4-29 summarizes land clearing and construction emissions for 7SFG(A) Cantonment Alternative 2.

Table 4-29. 7SFG(A) Cantonment Alternative 2 Air Quality Emissions Compared to the ROI

Emission Activities	Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOCs
Construction Emissions	154.29	50.66	132.15	5.97	10.90
Point Source	3.74	4.58	0.33	0.03	0.23
Mobile Source	183.60	20.32	0.38	0.27	12.87
Total	**341.63**	**75.56**	**132.85**	**6.26**	**24.01**
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percentage of ROI Emissions	*0.23%*	*0.33%*	*0.43%*	*0.15%*	*0.10%*

CO = Carbon Monoxide; NO_x= Nitrogen Oxides; PM_{10} = Particulate Matter with a diameter of less than or equal to 10 microns; SO_2 = Sulfur Dioxide; VOCs = Volatile Organic Compounds; ROI = Region of Influence

Emissions are expected to be higher for this alternative due to the increased amount of land clearing or grading activities that are required for the MSA. CO would be emitted at 341.63 tons per year, exceeding the 250 tons per year criteria. This is a 0.23 percent increase in CO emissions in the ROI. Emissions of PM_{10} and NO_x, would have the highest percentage increase of the criteria pollutants in the ROI (0.43 and 0.33 percent, respectively). Emissions from this alternative would cause a temporary increase in air emissions during construction activities. Emissions would remain below the 10-percent criterion. Thus, minor, temporary emissions are expected during CY 2008 – CY 2011, but they would not be adverse for 7SFG(A) Cantonment Alternative 2.

7SFG(A) Cantonment Alternative 2E would require a change in the location of a section of the Florida Trail. The trail would be cut and cleared by volunteers using chainsaws and other hand tools. This would have minimal effect on regional air quality. Thus, no adverse impacts to air quality are expected from the change in trail location for Alternative 2E.

4.7.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.7.3.1 Existing Conditions (Air Quality – 7SFG(A) Cantonment Alternative 3)

The 7SFG(A) Cantonment Alternative 3 is located in Okaloosa County, which is part of the affected ROI used in this analysis. Baseline emissions are discussed in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

4.7.3.2 Environmental Consequences (Air Quality – 7SFG(A) Cantonment Alternative 3)

The construction footprint for the 7SFG(A) is assumed to be the same for each of the alternatives. 7SFG(A) Cantonment Alternative 2 was used as the footprint that would be implemented since it provides the most conservative construction scenario. Impacts from the construction of the MSA at Duke Field for 7SFG(A) Cantonment Alternative 3 would be the same as for 7SFG(A) Cantonment Alternative 2. Thus, minor and temporary emissions are expected but would not be adverse for the 7SFG(A) Cantonment Alternative 3.

4.7.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.7.4.1 Existing Conditions (Air Quality – 7SFG(A) Cantonment Alternative 4)

The affected ROI encompasses all of Eglin AFB. The existing conditions are discussed in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

4.7.4.2 Environmental Consequences (Air Quality – 7SFG(A) Cantonment Alternative 4)

The construction footprint for the 7SFG(A) is assumed to be the same for each of the alternatives. 7SFG(A) Cantonment Alternative 2 was used as the footprint that would be implemented since it provides the most conservative construction scenario. Alternative 4 would use the 46 TW MSA as discussed in Alternative 1. Minor and temporary emissions are expected but would not be adverse for 7SFG(A) Cantonment Alternative 4.

4.7.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.7.5.1 Existing Conditions (Air Quality – 7SFG(A) Cantonment Alternative 5)

The affected ROI encompasses all of Eglin AFB. The existing conditions are discussed in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

4.7.5.2 Environmental Consequences (Air Quality – 7SFG(A) Cantonment Alternative 5)

The construction footprint for the 7SFG(A) is assumed to be the same for each of the alternatives. 7SFG(A) Cantonment Alternative 2 was used as the footprint that would be implemented since it provides the most conservative construction scenario. This alternative would require the construction of the MSA near Duke Field as discussed in 7SFG(A) Cantonment Alternative 2. Minor and temporary emissions are expected but would not be adverse for 7SFG(A) Cantonment Alternative 5.

4.7.6 No Action Alternative

Eglin Reservation projects are addressed as cantonment area projects and range projects. The cantonment area projects consist of construction or demolition activities, which are expected to temporarily increase regional air quality. The emissions generated by these projects cumulatively are expected to be minimal compared to Okaloosa, Santa Rosa, and Walton Counties.

VA CBOC and the Joint Reprogramming Facility (JRF) would be located within the air quality ROI (Okaloosa, Santa Rosa, and/or Walton Counties). Baseline emissions for the ROI are discussed in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions). Range projects consist of the implementation of some of the improvements outlined in the ALARNG Master Plan for Cobb Training Site. This would entail an expansion of the Henry Cobb Tank Range on Eglin AFB and development of a military ground training area on Test Area (TA) B-75. Implementation activities would include dismounted movements supported by wheeled vehicles, centralized small-arms weapons live-fire training at a small arms range complex, and the use of approximately 300 acres as an intermediate staging area including buildings, site equipment, and personnel in an Army forward operating base rustic environment. These activities are expected to have a minimal effect on the air quality environment. Other range projects include the Camp Rudder boat house, TA C-74 office construction, laser radar (LADAR) west of TA C-53, RR 218 bypass road at TA D-51, and the Mill Creek restoration project. These projects consist primarily of construction of buildings and/or roadways, and would cause temporary increases in pollutant emissions in the air.

Estimations of air emissions were completed for those projects for which sufficient information was available to quantify emissions; estimated air emissions from the No Action Alternative projects are summarized in Table 4-30.

Table 4-30. No Action Alternative Estimated Air Emissions

Project	Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOC
Cantonment					
Relocate AF EOD Admin Complex	10	3	1	0	1
96th Security Forces Sqd	84	26	9	3	9
PMEL Facility	25	9	14	1	2
Ranger Training Brigade	22	7	7	2	2
Okaloosa Regional Airport	15	13	247	1	2
MFH	80	27	74	3	16
Veterans Administration Community-Based Outpatient Clinic[1]	91	6	9	0	8
Joint Reprogramming Facility[2]	3	1	0	0	0
Decrease in Personnel	-14	-2	0	0	-1
Range					
ALARNG	1,731	1,104	599	112	200
Camp Rudder	22	7	7	2	2
No Action					
Total Emissions	2,068	1,201	967	125	241
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percent ROI Emissions	*1%*	*5%*	*3%*	*3%*	*1%*

1. Source: U.S. Air Force, 2005a
2. Source: U.S. Air Force, 2007e

CO = Carbon Monoxide; NO_x= Nitrogen Oxides; PM_{10} = Particulate Matter with a diameter of less than or equal to 10 microns; ROI = Region of Influence; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound

Air emissions were estimated by the Air Force for the construction of the VA and JRF facilities (U.S. Air Force, 2005a and 2007e). The emissions were extremely low (less than 0.06 percent of ROI emissions) and temporary (lasting only for the year-long construction). Short-term and minor increases in emissions are expected but are not considered adverse for the No Action Alternative.

4.8 SAFETY

4.8.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.8.1.1 Existing Conditions (Safety – 7SFG(A) Cantonment Alternative 1)

Explosives Safety

Explosive safety quantity distance (ESQD) areas are established under Air Force Manual 91-201, *Explosives Safety Standards*. The ESQDs are separation distances between explosive storage areas such as storage igloos, handling areas such as weapon loading areas, and other areas such as "hot" cargo pads. ESQDs are based on the maximum storage capacity of each facility to prevent explosive propagation from one storage facility to another. Additionally, ESQDs are established to provide a safety zone between the explosive storage areas and the surrounding areas.

The largest ESQD area on Eglin Main Base is located on the north side of the runways away from the developed area. This area surrounds the facilities of the MSA. A second ESQD zone surrounds the flightline operations of the 33 FW. This zone is defined as 800 feet from the arm/disarm pads, hot refueling and aircraft parking apron, and 700 feet from the former alert apron. ESQD zones also surround the hot gun line in the main complex and the munitions loading area at Range 22 (U.S. Air Force, 2001a).

Ground Safety

Day-to-day operations, maintenance, and construction activities conducted at Eglin AFB are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements. Specific safety requirements and responses to events that may occur on the range are detailed in published range operating procedures.

4.8.1.2 Environmental Consequences (Safety – 7SFG(A) Cantonment Alternative 1)

Explosives Safety

7SFG(A) Cantonment Alternative 1 would not be impacted by existing ESQD zones at Eglin AFB; however, it would include construction and/or renovation of facilities at Eglin AFB where munitions may be stored (Table 4-31).

Table 4-31. 7SFG(A) Cantonment Alternative 1 – Proposed Munitions Storage/Maintenance Facilities

Facility	Acres
Ammunition Storage Magazine	0.23
Ammunition Surveillance/Inspection	0.14
Segregated Ammunition Storage	0.14

The proposed 7SFG(A) munitions storage and munitions operating facility would be located in the northwest portion of Eglin Main Base, at the existing MSA. The MSA is currently divided in two sections, one for the tenant unit 33 FW and the other for the current host wing, the 46 TW. The 7SFG(A) would construct additional munitions storage facilities within the fence of the existing MSA for the 46 TW.

The selected locations for the 7SFG(A) munitions storage and operating facility at the MSA would meet mission and ESQD requirements—no inhabited buildings or public roadways would be located within the ESQD. As part of the construction of new munitions storage facilities, Explosive Site Plan (ESP) packages would be submitted in accordance with Air Force Manual 91-201, *Explosives Safety Standards*. These ESPs would illustrate the relationships and requirements between surrounding exposures and the facilities being sited. The implementation of 7SFG(A) Cantonment Alternative 1 and the construction of the new MSA facilities would not have any adverse impacts.

Ground Safety

Ground operations and maintenance activities on Eglin AFB would continue to be conducted using the same processes and procedures as under current operations. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable Air Force safety requirements, approved technical data, and AFOSH standards.

To support 7SFG(A) Cantonment Alternative 1, several facilities would be constructed, while other facilities would be altered or have additional space developed. No unique construction practices or materials are required to construct these facilities. During construction, standard industrial safety standards and Best Management Practices (BMPs) would be followed. These would include: implementing procedures to ensure that guards, housekeeping, and personal protective equipment are in place; establishing programs and procedures for lockout, right-to-know, confined space, hearing conservation, forklift operations, and so on; conducting employee safety orientations and performing regular safety inspections; and developing a plan of action for the correction of any identified hazards. No unusual ground safety risks are expected from these activities.

4.8.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.8.2.1 Existing Conditions (Safety – 7SFG(A) Cantonment Alternative 2)

Explosives Safety

Duke Field has two ESQD zones; the northernmost and largest surrounds the MSA. The second ESQD zone at Duke surrounds a hot cargo area on Taxiway D (U.S. Air Force, 2001a).

Ground Safety

The existing conditions for ground safety under this alternative would be the same as those previously described in Section 4.8.1.1 for 7SFG(A) Cantonment Alternative 1.

4.8.2.2 Environmental Consequences (Safety – 7SFG(A) Cantonment Alternative 2)

Explosives Safety

The southern portion of the cantonment for 7SFG(A) Cantonment Alternative 2B, (northwest of Duke Field), is located within the ESQD zone of the existing munitions storage facilities. The other 7SFG(A) Cantonment Alternative 2 sub-alternatives would not require any changes to the existing ESQD zones at Duke Field. Construction of the cantonment for 7SFG(A) Cantonment Alternative 2B would require coordination with Eglin AFB and EOD to ensure that required safety buffers are maintained.

The alternative would also include construction and/or renovation of facilities at Duke Field where munitions may be stored (see Table 4-31).

The proposed 7SFG(A) munitions storage and munitions operating facility would be located in the northwest portion of Duke Field, at the existing MSA. Additionally, there is a requirement to construct two new aircraft Hot Cargo Pad (HCP) on the southeast portion of the runway and upgrade the taxiway to be C-17/C-5 capable. The MSA and the HCP would meet mission and ESQD requirements—no inhabited buildings or public roadways would be located within these ESQDs.

As part of the construction of new munitions storage facilities, ESP packages would be submitted in accordance with Air Force Manual 91-201, *Explosives Safety Standards*. These ESPs would illustrate the relationships and requirements between surrounding exposures and the facilities being sited. Although the cantonment would overlap the munitions storage facility ESQD, because the ESPs would coordinate facility siting with exposures, no adverse impacts to explosive safety from implementation of 7SFG(A) Cantonment Alternative 2 are anticipated.

Ground Safety

The environmental consequences for ground safety under this alternative would be the same as those previously described in Section 4.8.1.2 for 7SFG(A) Cantonment Alternative 1.

4.8.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.8.3.1 Existing Conditions (Safety – 7SFG(A) Cantonment Alternative 3)

Explosives Safety

7SFG(A) Cantonment Alternative 3 would not be impacted by existing ESQD zones, and there are no other unique explosive safety issues associated with this alternative.

Ground Safety

The existing conditions for ground safety under this alternative would be the same as those previously described in Section 4.8.2.1 for 7SFG(A) Cantonment Alternative 2.

4.8.3.2 Environmental Consequences (Safety – 7SFG(A) Cantonment Alternative 3)

There are no environmental consequences for explosive or ground safety that would be different from those already discussed in Section 4.8.2.2 for 7SFG(A) Cantonment Alternative 2.

4.8.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.8.4.1 Existing Conditions (Safety – 7SFG(A) Cantonment Alternative 4)

The existing conditions for explosive and ground safety under this alternative would be the same as those previously described in Section 4.8.1.1 for 7SFG(A) Cantonment Alternative 1.

4.8.4.2 Environmental Consequences (Safety – 7SFG(A) Cantonment Alternative 4)

There are no environmental consequences for explosive or ground safety that would be different from those already discussed in Section 4.8.1.2 for 7SFG(A) Cantonment Alternative 1.

4.8.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.8.5.1 Existing Conditions (Safety – 7SFG(A) Cantonment Alternative 5)

The existing conditions for explosive and ground safety under this alternative would be the same as those previously described in Section 4.8.2.1 for 7SFG(A) Cantonment Alternative 2.

4.8.5.2 Environmental Consequences (Safety – 7SFG(A) Cantonment Alternative 5)

There are no environmental consequences for explosive or ground safety that would be different from those already discussed in Section 4.8.2.2 for 7SFG(A) Cantonment Alternative 2.

4.8.6 No Action Alternative

Under the No Action Alternative, Eglin AFB would continue to employ procedures and requirements associated with explosive and ground safety in order to meet a variety of diverse mission requirements. Continued use of these practices would not have an adverse impact. Drawdown of the 33 FW and the 919 SOW would result in the elimination of current MSAs associated with these units, and no construction of new MSAs would be required. Consequently, there are no adverse impacts associated with implementation of the No Action Alternative.

4.9 SOLID WASTE

4.9.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

As discussed in Chapter 2 (Section 2.3.3.1), 7SFG(A) Cantonment Alternative 1 consists of three sub-alternatives that establish the 7SFG(A) cantonment area on the Eglin Main

Base. Potential impacts associated with the three sub-alternatives include the municipal solid waste generation from the 7SFG(A) personnel and their family members and the generation of C&D waste from the construction, demolition, and renovation of 7SFG(A) facilities. Because the number of additional personnel and square footage of support facilities/structures remains unchanged for these sub-alternatives, the quantity of municipal solid waste and C&D wastes also remains unchanged for each of the three sub-alternatives.

4.9.1.1 Existing Conditions (Solid Waste – 7SFG(A) Cantonment Alternative 1)

Collection and disposal of municipal solid waste at Eglin AFB is handled by contract and administered by the 96th Civil Engineer Group (96 CEG). Arrow Inc. hauls refuse to a transfer station in Fort Walton Beach. The refuse is then transported 50 miles to Spring Hill Landfill, a Class I Landfill in Jackson County, Florida. C&D debris is also collected as part of this contract as well as by independent contractors. Most is taken to Point Center Landfill, a permitted C&D disposal facility located in Okaloosa County (Whittington, 2006a). In 2005, a total of 16,800 tons of municipal solid waste was generated at Eglin AFB. A portion of this waste, or 6,100 tons, was recyclable and diverted from disposal. A total of 10,700 tons of municipal solid waste was disposed of at Spring Hill Landfill, and a total of 3,707 tons of C&D waste was also generated at Eglin AFB in 2005 as discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

Available resources in the immediate vicinity of Eglin AFB include landfills operated in Okaloosa, Walton, and Santa Rosa Counties as discussed in Section 3.9.2.

4.9.1.2 Environmental Consequences (Solid Waste – 7SFG(A) Cantonment Alternative 1)

The impacts are described in terms of municipal solid waste generated by the additional personnel and the C&D debris generated from construction of structures for the 7SFG(A).

7SFG(A) Municipal Solid Waste Generation

The increase in population at Eglin AFB would result in an increase in the generation of municipal solid waste.

Analysis indicates that, utilizing the total estimated number of people associated with the 7SFG(A) realignment (6,067 as identified in Chapter 2), it is anticipated that approximately 27,302 pounds of municipal solid waste would be generated on a daily basis. This quantity is based upon a waste generation rate of 4.5 pounds per person per day for 365 days per year and assumes that personnel will be living throughout the ROI, with the majority expected to reside within Okaloosa County, thereby increasing

the county's solid waste. The waste generated from the additional personnel is considered negligible as it will result in an annual increase of approximately 4,983 tons or 2 percent of the municipal solid waste generated annually in Okaloosa County, Florida. As discussed in Section 4.9.1.1 and Chapter 3 (Section 3.9.2), sufficient landfill capacity and life cycle is expected to exist to accommodate the municipal solid waste generation increase associated with 7SFG(A) personnel.

The latest available statistics indicate that approximately 16 percent of municipal solid waste in Okaloosa County was recycled (FDEP, 2006e). Application of this statistic to new waste projections indicate that, if recycling rates hold steady, the quantity of additional waste requiring disposal in a Class I landfill on an annual basis would be approximately 4,185 tons.

7SFG(A) Construction and Demolition Debris

The development of the cantonment area would result in the generation of wastes associated with the construction of new facilities. C&D debris includes materials such as construction materials for buildings, concrete and asphalt rubble, and land-clearing debris. Quantities of debris associated with the construction and demolition of buildings were calculated using generation rates established in USEPA guidance as discussed in Chapter 3 and are shown in Table 4-32.

Table 4-32. Proposed Cantonment/Support Facility Requirements for the 7SFG(A)

Facility	Total Square Footage Required	C&D Debris Generated (tons)
Special Forces Group Operations Building	67,771	132
Special Forces Battalion Operations Complex	119,883	233
Special Forces Battalion Operations Complex	119,883	233
Special Forces Battalion Operations Complex	119,883	233
Special Forces Battalion Operations Complex (Expanded)	120,207	234
Support Battalion Complex	79,144	154
Vehicle Maintenance Complex	76,827	149
Privately Owned Vehicle (POV) Parking	699,993	1,361
Organizational Vehicle Parking	685,638	1,334
Logistics Complex	49,975	97
Petroleum, Oil, and Lubricant (POL) Storage	2,280	4
Enlisted Unaccompanied Housing	35,136	68
Enlisted Unaccompanied Housing	35,136	68
Enlisted Unaccompanied Housing	35,136	68
Dining Facility	13,245	26
Access Control Facility	3,400	7
Tactical Communications Center with 10-Acre Antenna Farm	3,762	7
Wash Platform	2,340	5
Ammunition Storage Magazine	10,230	20

Continued on the next page…

Table 4-32. Proposed Cantonment/Support Facility Requirements for the 7SFG(A), Cont'd

Facility	Total Square Footage Required	C&D Debris Generated (tons)
Ammunition Surveillance/Inspection	5,895	11
Segregated Ammunition Storage	6,000	12
Indoor Baffle Range	23,000	45
Deployment Readiness Center	50,000	97
Physical Fitness Facility	44,347	86
Maritime Operations Facility	17,295	34
Hazardous Materials (HAZMAT) Storage	7,745	15
Deployment Equipment Storage	36,600	71
Tactical Communications Facility	3,762	7
Unmanned Aerial Vehicle Hangar	9,200	18
Weather Operations Facility	6,500	13
Sidewalks	285,768	556
Roads	1,771,191	3,445
Concrete Aprons	559,350	1,088
Total	***2,826,653***	***9,931***

C&D = Construction and Demolition

Based upon proposed construction activities, a total of 9,931 tons of debris would be generated during construction activities. Construction is anticipated to commence in CY 2008 and be completed by CY 2011.

Under this alternative, buildings 1278, 1284, 1289, and Gazebo J would be demolished to accommodate the additional munitions storage required. These buildings have a combined square footage of 3,709 square feet (ft^2). Using a generation rate of 155 pounds per square feet (lbs/ft^2), a total of 574,895 pounds or approximately 287 tons of debris would be generated from the demolition of the listed buildings. The total mass of debris generated under this alternative includes 9,931 tons from construction activities (Table 4-32) and 287 tons from demolition activities required prior to construction of MSAs, which is 10,218 tons total or approximately 2,555 tons per year on average over the four-year construction period (e.g., CY 2008–2011).

The Air Force compared the estimated amount of C&D debris that would be generated for the 7SFG(A) Cantonment Alternative 1 to the average amount of C&D debris generated in Santa Rosa and Okaloosa Counties and determined the amount of increased waste expected during the construction phase. The Walton County Landfill was not included in the evaluation since it only accepts waste from county residents. Because the current distribution of all wastes generated at Eglin AFB is not known, it was assumed that all C&D waste would be disposed of in a single landfill. The debris generated during 7SFG(A) cantonment construction would increase the use of Okaloosa County's landfill by approximately 3 percent and Santa Rosa County's landfills by approximately 2 percent. However, this estimate may be low due to the unusually large amount of debris that was taken to Okaloosa and Santa Rosa C&D landfills after the

2004 and 2005 hurricane seasons, which artificially inflated the five-year averages. According to local landfill owners/operators, C&D landfills are not currently reaching full capacity and are not expected to be adversely impacted from slightly higher increases (Floyd, 2005; Ensor, 2005; Lingenfelter, 2005; Anderson, 2005).

Overall, sufficient landfill capacity exists to accommodate the additional solid waste generated as a result of C&D activities and daily cantonment operations associated with the 7SFG(A).

4.9.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.9.2.1 Existing Conditions (Solid Waste – 7SFG(A) Cantonment Alternative 2)

The existing conditions of solid waste resources in the vicinity of Eglin AFB are described in the 7SFG(A) Cantonment Alternative 1 discussion and remain the same for 7SFG(A) Cantonment Alternative 2.

4.9.2.2 Environmental Consequences (Solid Waste – 7SFG(A) Cantonment Alternative 2)

The consequences of implementing 7SFG(A) Cantonment Alternative 2 would differ slightly from those discussed for 7SFG(A) Cantonment Alternative 1. A portion of the consequences would remain the same, such as the quantity of municipal solid waste generated from additional personnel at Eglin AFB. The quantity of debris associated with construction would be less under this alternative because demolition of buildings 1278, 1284, 1289, and Gazebo J would not be required. Therefore, based upon proposed construction activities, a total of 9,931 tons of debris would be generated during construction activities. Construction is anticipated to commence in CY 2008 and be completed by CY 2011, which would result in an anticipated annual generation rate of 2,483 tons per year. This would result in an increase in the use of Okaloosa County's landfill by approximately 3 percent and Santa Rosa County's landfills by approximately 2 percent.

This alternative would also require the widening of roads to allow access and establish utility easements and a 5-acre electrical substation as described in Section 2.3.3.2. It is anticipated that the wastes generated from road widening and construction of utilities would result in negligible waste generation as demolition of existing roadways or structures would not occur. Based upon access and utility requirements the roadway/easement would be cleared and widened to 200 feet. Land clearing waste generated from these activities are also anticipated to not require disposal as the vegetative wastes and debris (wood wastes) would be either reused (e.g., chipped for mulch) or burned in place under a permit to conduct such an activity. Therefore the quantity of solid wastes and debris associated with the widening of roads and

establishing of utility services are not anticipated to generate solid wastes in a quantity that would impact currently estimated volumes or mass of wastes.

4.9.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.9.3.1 Existing Conditions (Solid Waste – 7SFG(A) Cantonment Alternative 3)

The existing conditions of solid waste resources for 7SFG(A) Cantonment Alternative 3 are the same as for 7SFG(A) Cantonment Alternative 1.

4.9.3.2 Environmental Consequences (Solid Waste – 7SFG(A) Cantonment Alternative 3)

The consequences of implementing 7SFG(A) Cantonment Alternative 3 would be the same as those discussed for 7SFG(A) Cantonment Alternative 2. The quantity of municipal solid waste generated from additional personnel and the C&D wastes associated with construction of support facilities would be the same as that presented in 7SFG(A) Cantonment Alternative 2. Similar to Alternative 2, road widening and the construction of utilities are anticipated and would include the widening of access roads, placement of utility easements, and construction of an electrical substation. As stated in Section 4.9.2, these improvements are not anticipated to result in the generation of solid waste or debris of significant volume that would require disposal. For this alternative, the northern and southern access would be widened to approximately 80 feet and 200 feet, respectively. Therefore, based upon proposed construction activities, a total of 9,931 tons of debris would be generated during construction activities. Construction is anticipated to commence in CY 2008 and be completed by CY 2011, which would result in an anticipated annual generation rate of 2,483 tons per year. This would result in an increase in the use of Okaloosa County's landfill by approximately 3 percent and Santa Rosa County's landfills by approximately 2 percent.

4.9.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.9.4.1 Existing Conditions (Solid Waste – 7SFG(A) Cantonment Alternative 4)

The existing conditions of solid waste resources for 7SFG(A) Cantonment Alternative 4 are the same as for 7SFG(A) Cantonment Alternative 1.

4.9.4.2 Environmental Consequences (Solid Waste – 7SFG(A) Cantonment Alternative 4)

The consequences of implementing 7SFG(A) Cantonment Alternative 4 would be the same as those discussed for 7SFG(A) Cantonment Alternative 1. The total mass of

debris generated under this alternative includes 9,931 tons from construction activities (Table 4-32) and 287 tons from demolition activities required prior to construction of MSAs, for a total of 10,218 tons or approximately 2,555 tons per year. Construction would begin in CY 2008 and be completed in CY2011. The debris generated during 7SFG(A) cantonment construction would increase the use of Okaloosa County's landfill by approximately 3 percent and Santa Rosa County's landfills by approximately 2 percent.

4.9.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.9.5.1 Existing Conditions (Solid Waste – 7SFG(A) Cantonment Alternative 5)

The existing conditions of solid waste resources for 7SFG(A) Cantonment Alternative 5 are the same as for 7SFG(A) Cantonment Alternative 1.

4.9.5.2 Environmental Consequences (Solid Waste – 7SFG(A) Cantonment Alternative 5)

The consequences of implementing 7SFG(A) Cantonment Alternative 5 would be the same as those discussed for 7SFG(A) Cantonment Alternative 2. This alternative would also require road widening and the construction of utilities. Anticipated activities would include the widening of access roads, placement of utility easements, and construction of an electrical substation. As stated in Section 4.9.2, these improvements are not anticipated to result in the generation of solid waste or debris of significant volume that would require disposal. Therefore, based upon proposed construction activities, a total of 9,931 tons of debris would be generated during construction activities. Construction is anticipated to commence in CY 2008 and be completed by CY 2011 which would result in an anticipated annual generation rate of 2,483 tons per year. This would result in an increase in the use of Okaloosa County's landfill by approximately 3 percent and Santa Rosa County's landfills by approximately 2 percent.

4.9.6 No Action Alternative

The existing conditions of solid waste resources for the No Action Alternative are the same as for Alternative 1.

As described in Section 2.7 for the No Action Alternative, a number of predicted actions would occur at Eglin AFB that are not associated with the relocation of the 7SFG(A). Although specific information was not available for all predicted actions, a portion of these actions did identify the need for construction and impacts to personnel.

Military Family Housing Privatization Initiative. The privatization of military housing at Eglin AFB and Hurlburt Field will involve the demolition of aging housing units and the construction of replacement units to meet the current and foreseeable housing

demand. It is estimated that the project will involve the demolition of 2,257 units and construction of 1,684 units, resulting in the generation of an estimated 332,508 tons of debris during the 5-year construction phase of the project.

Florida Army National Guard (FLARNG), U.S. Army Corps of Engineers (USACE), VA CBOC, 33 FW Drawdown, JRF. Known impacts to personnel include those associated with the VA CBOC, 33 FW Drawdown, Base Personnel Drawdown, and 919 SOW Relocation. Although it is known that additional personnel will be added to Eglin AFB through the ACC TRSS Det 9, USACE, Air Force Cost Analysis Agency, and the FLARNG, specific numbers of personnel were not available for analysis. Therefore, based upon the known personnel impacts, it is anticipated that there will be an overall reduction of municipal solid waste generated at Eglin AFB. The reduction of 2,172 personnel will result in a decrease in solid waste generated on a daily basis by approximately 5 tons, or on an annual basis of 1,784 tons. The total anticipated population loss within the ROI is estimated to be 4,561 persons, which will result in a daily decrease in solid waste generated of approximately 10 tons, or 3,746 tons annually.

The construction required for the VA CBOC project and the JRF is estimated to total 22,900 ft^2. This activity would generate approximately 89,070 pounds or 45 tons of C&D waste.

Alabama Army National Guard Master Plan, Cobb Training Site. As discussed in Section 2.7, Eglin AFB is evaluating the establishment of an approximate 12,000-acre Military Ground Training Area for maneuver and individual/crew/squad training. This action would result in the generation of municipal solid waste from additional personnel at Eglin AFB and C&D wastes associated with construction of the necessary facilities. Sufficient information with regard to personnel was not available to estimate the quantity of municipal solid waste that would be generated due to this action. Existing information does indicate that approximately 82,000 ft^2 will be required, which would result in the generation of approximately 318,980 pounds (or 160 tons) of C&D waste.

Eglin Main, Duke Field and Hurlburt Field Comprehensive Plans. A review of the three Comprehensive Plans has indicated that a total of 97 military construction (MILCON) projects have been identified, as discussed in Section 2.4.1. The projects include construction, demolition or renovation of facilities or runways that will result in the generation of C&D wastes. It is estimated that the planned projects will have a total square footage of more than 5,581,000 ft^2. These construction projects will result in the generation of several thousand tons of C&D debris. Depending upon exact amount of construction and demolition involved, the quantity of C&D debris could range from 10,000 tons to more than 300,000 tons.

Municipal Solid Waste

The planned and foreseeable projects at Eglin AFB (including Eglin Main Base, Duke Field and Hurlburt Field) will result in a decrease in personnel at the facility. As discussed above, the total estimated decrease in municipal solid waste generated at Eglin AFB due to these projects is approximately 1,784 tons annually on Eglin AFB and 3,746 tons annually within the ROI. A reduction in the quantity of municipal solid waste generated will not adversely impact the current available landfill resources within the area.

C&D Waste

Planned or foreseeable projects at Eglin AFB such as improvement projects, and projects that include construction, demolition, and/or renovation will result in the generation of additional C&D wastes. Quantities of C&D wastes estimated from the planned or foreseeable projects range from 342,713 tons up to 632,713 tons, depending upon the amount of demolition that is realized during the implementation of the 97 MILCON projects planned for Eglin Main Base, Duke Field, and Hurlburt Field. Because the specific timing and schedules of these projects is not known, it is difficult to determine the potential impact to existing landfill resources within the region. Although timing of the projects may result in a short-term impact in availability of landfill resources, because of the life expectancy of the landfills reported within the ROI the wastes generated are not anticipated to adversely impact these resources.

4.10 HAZARDOUS MATERIALS

4.10.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.10.1.1 Existing Conditions (Hazardous Materials – 7SFG(A) Cantonment Alternative 1)

Hazardous Materials and Wastes Management

Eglin AFB is responsible for the management of hazardous materials throughout the installation, including Eglin Main Base and areas associated with Duke Field. Practices described in Chapter 3 (Section 3.10.2, Region of Influence and Existing Conditions) for the management of hazardous materials and waste would be common to all 7SFG(A) cantonment implementation scenarios.

Asbestos and Lead-Based Paint

No existing structures that would be impacted by construction activities are located on the proposed 7SFG(A) Cantonment Alternative 1 sites; therefore, there are no existing asbestos-containing material (ACM) or LBP (lead-based paint) concerns.

Environmental Restoration Program Sites

There is one environmental restoration program (ERP) site located within the proposed footprint of 7SFG(A) Cantonment Alternative 1A, The Triangle (Figure 4-18). This site, SS-90, is associated with a former spill of fuel from a tanker truck onto the median of Hwy 85. The spill extended just beyond the west side of the roadway, onto Eglin AFB property. The footprint for this ERP site also extends onto the eastern side of the roadway, into the area associated with 7SFG(A) Cantonment Alternative 1B, West Gate. Additionally, there are several other ERP sites within the footprint of 7SFG(A) Cantonment Alternative 1B (Figure 4-18 and Table 4-33). No ERP sites are located within the 7SFG(A) Cantonment Alternative 1C site or the proposed MSA expansion areas.

4.10.1.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Cantonment Alternative 1)

This section assesses the impacts of hazardous materials use and management and hazardous waste generation associated with the 7SFG(A) cantonment area. These impacts are common to the implementation of any of the alternatives. The potential impacts associated with any existing asbestos or LBP hazards, or with the presence of existing ERP sites, are also assessed.

Hazardous Materials Management

New buildings associated with the proposed cantonment area would be constructed utilizing normal construction methods, which would limit, to the extent possible, the use of hazardous materials. Petroleum products and other hazardous materials (e.g., paints and solvents) would be used during construction/renovation activities. These materials would be stored in the proper containers, employing secondary containment as necessary to prevent/limit accidental spills. All spills and accidental discharges of petroleum products, hazardous materials, or hazardous waste would be reported.

Eglin AFB has developed emergency response procedures and site-specific contingency plans for all hazardous materials locations. Procedures and responsibilities for responding to a hazardous material spill or other incidents are described in the Hazardous Waste Management Plan (U.S. Air Force, 2006e) and the Eglin AFB SPCC Plan (U.S. Air Force, 2005d).

Table 4-33. 7SFG(A) Cantonment Alternatives 1A and 1B – ERP Sites

Site	Description	Status	Potential Impacts – Required Actions/Mitigations
	Cantonment Alternative 1A		
SS-90, Nugget Oil Company Spill Site	In November 1986, a tanker truck owned by the Nugget Oil company overturned, spilling approximately 2,000 gallons of diesel fuel and 4,000 gallons of gasoline into the median. Remedial actions were conducted immediately under the direction of Florida department of Environmental Protection (FDEP). In January 1987, six soil samples were collected and three groundwater monitoring wells installed. Sampling conducted in 1999 showed all samples were below petroleum cleanup levels.	No further action (NFA) has been approved for site.	None expected – Any construction activities on/near this site would be coordinated with Environmental Management Restoration (EMR).
	Cantonment Alternative 1B		
ST-116, Building 1391, ACC Sewage Treatment Plant	Contaminated soils were discovered during closure of a 6,000-gallon underground storage tank (UST) at the site during 1997. Excessively contaminated soils were removed during the tank removal. All subsequent samples collected indicated no contamination above cleanup criteria.	NFA has been approved for site.	None expected – Planned construction activities would not impact Sewage Treatment Plan.
SS-90, Nugget Oil Company Spill Site	In November 1986, a tanker truck owned by the Nugget Oil company overturned, spilling approximately 2,000 gallons of diesel fuel and 4,000 gallons of gasoline into the median. Remedial actions were conducted immediately under the direction of FDEP. In January 1987, six soil samples were collected and three groundwater monitoring wells installed. Sampling conducted in 1999 showed all samples were below petroleum cleanup levels.	NFA has been approved for site.	None expected – Any construction activities on/near this site would be coordinated with EMR
ST-71, Building 2586, Army Air Force Exchange Service (AAFES) West Gate Shoppette	During maintenance activities on a UST in 1994, contaminated soil was discovered at the site. Additional contamination was detected on-site due to leaks in the UST dispenser system. A SVE system was installed in 1995 and operated for nearly four years to remove the contamination.	NFA has been approved for site.	None expected – Planned construction activities would not impact AAFES Shoppette.

Table 4-33. 7SFG(A) Cantonment Alternatives 1A and 1B – ERP Sites, Cont'd

Site	Description	Status	Potential Impacts – Required Actions/Mitigations
ST-71A	Routine monitoring in December 1996 of the SVE system at ST-71 identified elevated organic vapor readings in air samples. Subsequently, several leak tests were performed in January 1997 of the fuel lines, which identified a leak beneath one of the dispensers. A bio-venting system was installed at the site to accelerate cleanup. Post-active remediation monitoring is complete.	NFA has been approved for site.	None expected – Any construction activities on/near this site would be coordinated with EMR.
ST-72, ST-72A, ST-72B, and SS-275, 33 FW Tank Farm	Investigations determined contamination in the areas around Tank 1302 from past fuel disposal practices and fuel spills. A site assessment conducted in 1998 identified petroleum contaminants in the soil. No free product was found in the groundwater. A Remedial Action Plan (RAP) selected aquifer air sparge (AAS), soil vapor extraction (SVE), and natural attenuation for remediation. Monitoring wells have been installed and semiannual monitoring is being conducted during implementation of the RAP.	No actions are currently conducted at ST-72 and ST-72A, and ST-72B. At SS-275, remediation activities are ongoing.	None expected - Construction activities near this site would be coordinated with EMR, and would avoid infrastructure associated with SS-275 remediation activities.
ST-101, Water Tower No. 1322, 33 FW	Analytical results of soil samples at tower sites revealed lead at elevated concentrations. The lead contamination is speculated to have resulted from previous sandblasting of the tower prior to refinishing. In 1999, all contaminated soils were excavated and removed. Confirmatory analyses showed that the remaining soils were below clean-up levels and posed no unacceptable human health risk.	NFA has been approved.	None expected – Planned construction activities would not impact water tower.

Source: U.S. Air Force, 2003b; Armstrong, 2006

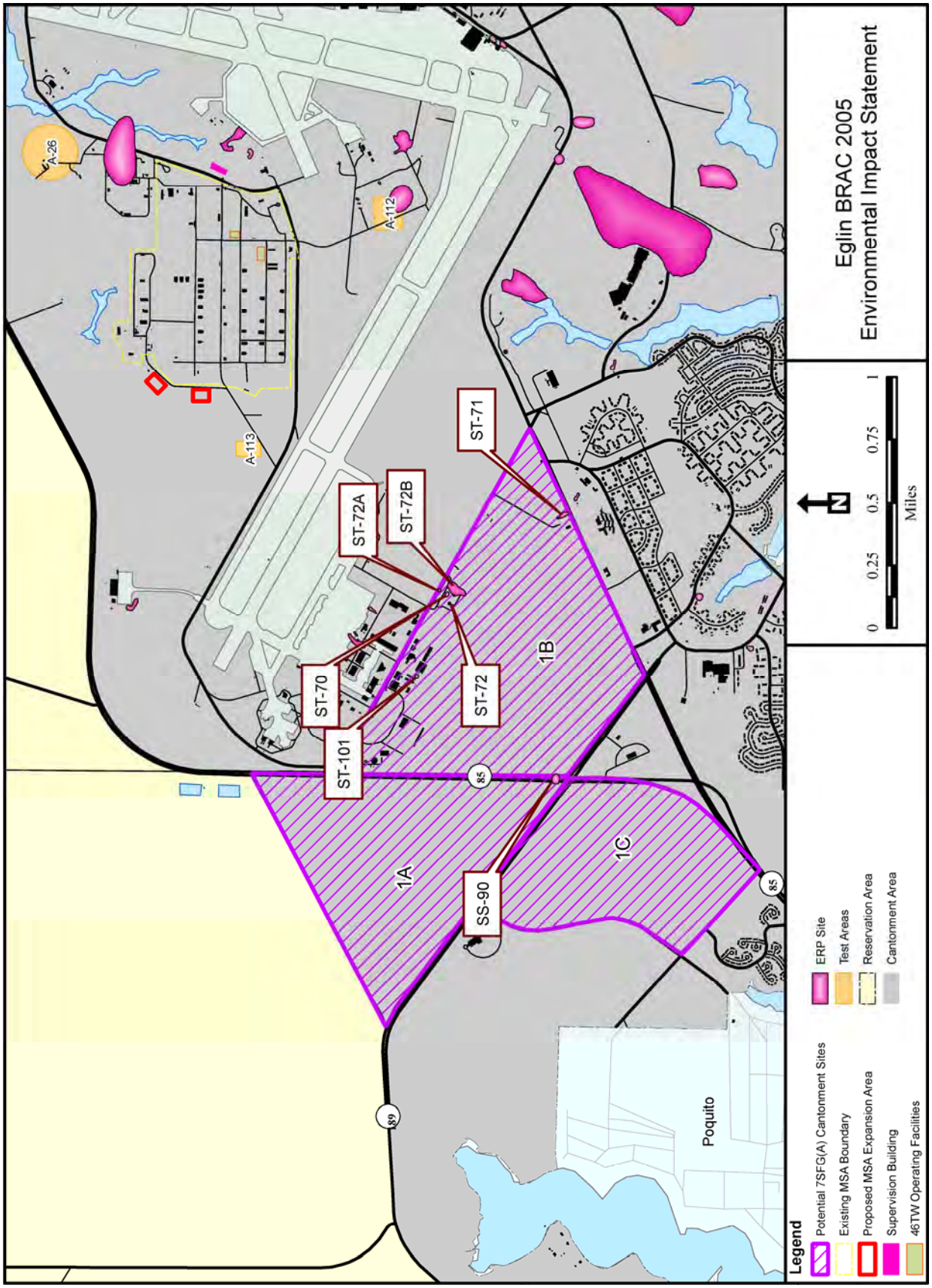

Figure 4-18. 7SFG(A) Cantonment Alternative 1 – ERP Sites

Hazardous materials would also be used in maintenance functions, such as vehicle maintenance, associated with new training units on the base. Hazardous materials (and associated quantities) used in these functions would be consistent with those currently employed at Eglin AFB for similar operations and would include oils, lubricants, cleaners, antifreeze, batteries, paints, etc.

Usage of these hazardous materials would be tracked and documented through the existing Eglin AFB Hazardous Material Management System (HMMS). This automated "pharmacy system" is used to track and control hazardous materials and waste from procurement through disposal. Hazardous materials that are not currently in the HMMS inventory would have to go through an approval process to ensure that they would not pose undue health or environmental hazards before they could be used. This approval process involves a review by various organizations on Eglin, including Bio-Environmental, Safety, and Environmental.

Changes in the overall quantity of hazardous materials used/stored on the installation resulting from the alternatives would be documented and reported to state and local emergency planning committees/local fire departments using the annual Tier II forms or Form R, as required.

No adverse impacts related to hazardous materials are anticipated from implementation of the alternatives.

Hazardous Waste Management

Hazardous and nonhazardous waste would be generated as a result of maintenance functions associated with new training units on the base. Primary among these would be vehicle maintenance operations. Wastes generated from these functions would be consistent with those currently generated at Eglin AFB, and would include used solvents, used oils, off-spec fuel, antifreeze, batteries, etc. Table 4-34 presents an estimate of potentially hazardous and nonhazardous wastes associated with 7SFG(A) maintenance activities.

Table 4-34. Estimated Waste Generation from 7SFG(A) Maintenance Activities

Material	Quantity	Approximate Weight (pounds)
Potentially Hazardous Wastes*		
Off-Spec fuel	500 gallons	3,336
Used solvent	1,400 gallons	8,173
Total		**11,509**
Nonhazardous Waste/ Recyclable Materials		
Used oil	3,000 gallons	20,016
Anti-freeze	500 gallons	4,691
Batteries, Common	500 each	-
Batteries, Vehicle	75 each	-

Source: Green, 2006; * Waste would require characterization prior to disposal as hazardous wastes.

The estimated quantity of hazardous waste would represent an increase in 13.8 percent over current the quantity of hazardous waste currently generated at Eglin AFB (i.e., approximately 158,000 pounds). Note: in the table, off-spec fuel and used solvent are assumed to be hazardous wastes; however, these wastes would require classification in order to determine appropriate classification and disposal method. It is likely that used solvents would be recycled using an existing Eglin AFB vendor, such as Safety Kleen.

The Army would use the existing hazardous materials and hazardous waste management system infrastructure. Eglin AFB would establish new initial accumulation points (IAPs) at generation locations, and personnel managing these locations would be properly trained in waste management. Management of hazardous and nonhazardous wastes would be performed according to prescribed procedures already in place. Base personnel indicate that this projected increase in waste generation would pose no adverse impacts on the current waste management system (Birdsong, 2006). No change to permits, hazardous waste generator status, or management would be required and no adverse environmental impacts are anticipated.

Asbestos and Lead-Based Paint

This alternative would require the construction of new building/facilities, but would not involve the renovation or demolition of any existing structures. ACM and LBP would not be employed for new construction; therefore, no adverse impacts are anticipated.

ERP Sites

No impacts are anticipated from the presence of these ERP sites. Planned construction activities would avoid some sites (i.e., Army Air Force Exchange Service [AAFES] Shoppette, Sewage Treatment Plant, and Water Tower No. 1322), while construction on or near other sites (i.e., Site SS-90) would be possible with prior coordination with Eglin AFB Environmental Management Restoration (EMR) branch. In the case of Site SS-275, which is undergoing active remediation, any construction activities would avoid equipment or infrastructure associated with these activities (Bjorklund, 2007). Regardless, should any unusual odor, soil, or groundwater coloring be encountered during development activities in any areas, construction would cease and EMR would be contacted immediately.

4.10.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.10.2.1 Existing Conditions (Hazardous Materials – 7SFG(A) Cantonment Alternative 2)

The existing conditions associated with hazardous materials, hazardous wastes, asbestos and LBP are the same as those described in Section 4.10.1.1 for 7SFG(A) Cantonment Alternative 1. Additionally, there are no ERP sites located within any of the proposed 7SFG(A) Cantonment Alternative 2 sites.

4.10.2.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Cantonment Alternative 2)

No adverse impacts are anticipated with implementation of this alternative. The environmental consequences associated with hazardous management, hazardous waste management, asbestos, and LBP are the same as those described in Section 4.10.1.2 for 7SFG(A) Cantonment Alternative 1. Since there are no known ERP sites located within the 7SFG(A) Cantonment Alternative 2 sites, no impacts would occur.

4.10.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.10.3.1 Existing Conditions (Hazardous Materials – 7SFG(A) Cantonment Alternative 3)

The existing conditions associated with hazardous materials, hazardous wastes, asbestos and LBP are the same as those described in Section 4.10.1.1 for 7SFG(A) Cantonment Alternative 1. No ERP sites are located within the 7SFG(A) Cantonment Alternative 3 proposed site.

4.10.3.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Cantonment Alternative 3)

The environmental consequences associated with hazardous management, hazardous waste management, asbestos, and LBP are the same as those described in Section 4.10.1.2 for 7SFG(A) Cantonment Alternative 1. As such, no adverse impacts would occur. No known ERP sites are located within the 7SFG(A) Cantonment Alternative 3 site; therefore, no impacts would occur.

4.10.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.10.4.1 Existing Conditions (Hazardous Materials – 7SFG(A) Cantonment Alternative 4)

The existing conditions associated with hazardous materials, hazardous wastes, asbestos and LBP are the same as those described in Section 4.10.1.1 for 7SFG(A) Cantonment Alternative 1. Additionally, there are no ERP sites located within the proposed 7SFG(A) Cantonment Alternative 4 site.

4.10.4.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Cantonment Alternative 4)

No adverse impacts are anticipated with implementation of this alternative. The environmental consequences associated with hazardous management, hazardous waste management, asbestos, and LBP are the same as those described in Section 4.10.1.2 for 7SFG(A) Cantonment Alternative 1. Since there are no known ERP sites located within the 7SFG(A) Cantonment Alternative 4 sites, no impacts would occur.

4.10.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.10.5.1 Existing Conditions (Hazardous Materials – 7SFG(A) Cantonment Alternative 5)

The existing conditions associated with hazardous materials, hazardous wastes, asbestos and LBP are the same as those described in Section 4.10.1.1 for 7SFG(A) Cantonment Alternative 1. No ERP sites are located within the 7SFG(A) Cantonment Alternative 5 proposed site.

4.10.5.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Cantonment Alternative 5)

The environmental consequences associated with hazardous management, hazardous waste management, asbestos, and LBP are the same as those described for 7SFG(A) Cantonment Alternative 1 in Section 4.10.1.2. As such, no adverse impacts would occur. No known ERP sites are located within the 7SFG(A) Cantonment Alternative 5 site; therefore, no impacts would occur.

4.10.6 No Action Alternative

Under the No Action Alternative, Eglin AFB would continue to use hazardous materials and generate hazardous wastes as part of day-to-day operations to support various operations and maintenance activities. The overall quantity of hazardous materials used or hazardous waste generated at the installation would be expected to decrease based on any drawdown in 33 FW operations. Consequently, there are no adverse impacts associated with implementation of the No Action Alternative.

4.11 PHYSICAL RESOURCES

4.11.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.11.1.1 Existing Conditions (Physical Resources – 7SFG(A) Cantonment Alternative 1)

Soils

The topography of the proposed project area is relatively flat with slopes that are less than 1 percent. The landscape is characterized by mild rises in land elevation, forming slight plateau-ridge features intermingled with mild slope-depression topography. Generally these features are indistinguishable to the naked eye under natural vegetated conditions. Soil types for this alternative are listed below (Table 4-35 and shown in Figure 4-19.

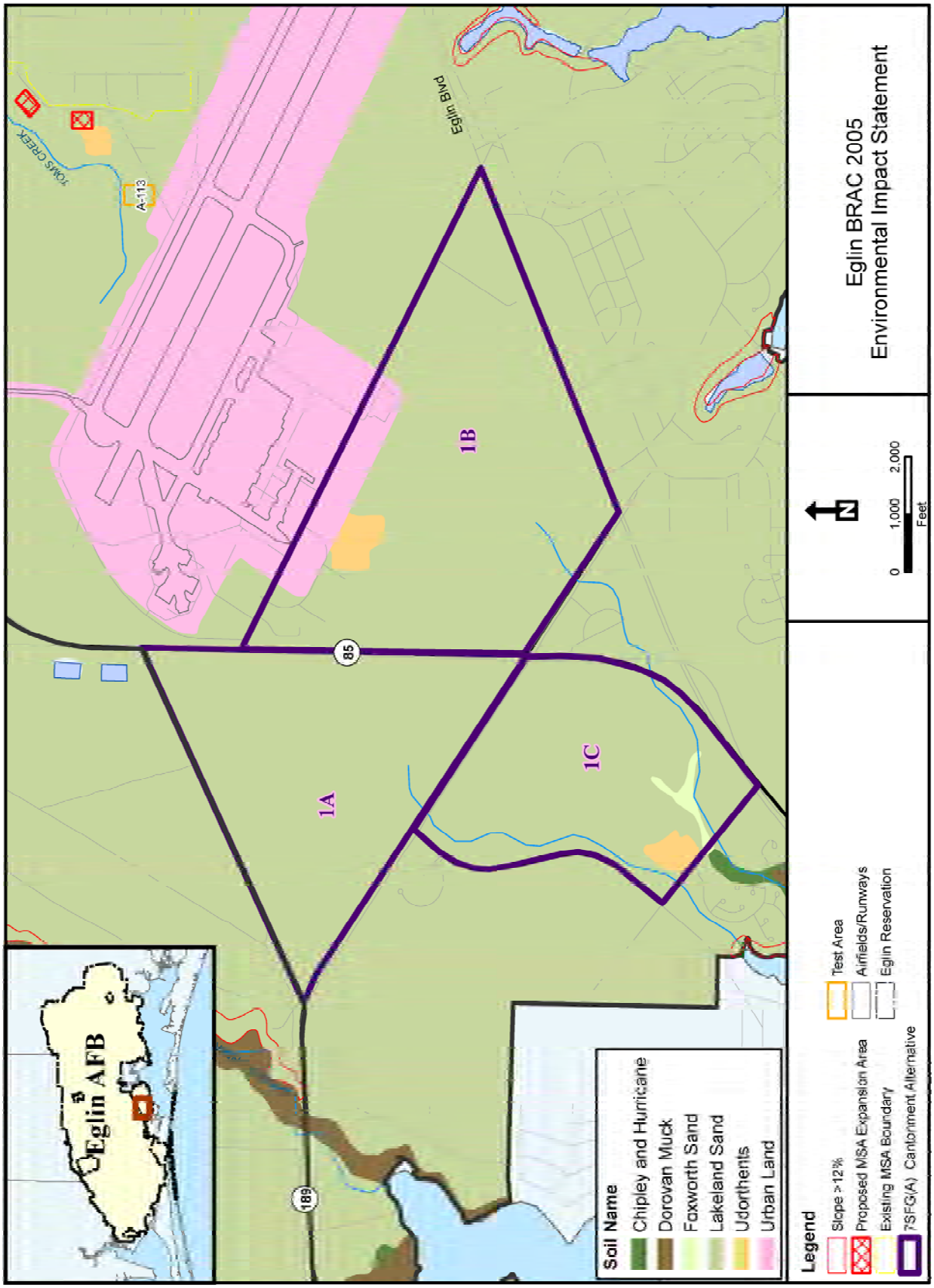

Figure 4-19. 7SFG(A) Cantonment Alternative 1 – Soils

Lakeland Sand is the predominant soil type for this alternative. This sand type has the highest potential for erosion since it is unconsolidated sediment. Urban Land and Udorthents are low in erosion potential since these are mixtures of sand and material from construction (concrete, tar, etc.) and other materials that make these less erodible. Detailed soil descriptions are provided in Appendix G, *Physical Resources*.

Table 4-35. 7SFG(A) Cantonment Alternative 1 – Soils Type and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Alternative Coverage [acres (percent)]		
				1A	1B	1C
Lakeland Sand Slope 0-5%, 5-12%	Moderate	Yellowish brown to grayish brown	Sand	404 (100)	508 (89)	298 (95)
Udorthents	Low	Ponding, very acidic, clayey	Loamy Sand	--	14 (2.4)	9 (2.8)
Urban Land	Low	Variable	Variable	--	49 (8.6)	--
Foxworth Sand	Low to moderate	Unconsolidated marine sediments, brown loam	Loamy Sand	--	--	7 (2.2)

Surface Water

The 7SFG(A) Cantonment Alternative 1C site has two drainages that flow south to Poquito Bayou. Of these two drainages, one drainage originates in the southwest corner of the 7SFG(A) Cantonment Alternative 1A site, and the other in the southwest corner of the 7SFG(A) Cantonment Alternative 1B site (Figure 4-20); these drainages are the only surface water features for all of the sub-alternative cantonment areas in 7SFG(A) Cantonment Alternative 1. A branch of Toms Creek is located approximately 350 feet west of the proposed MSA (Figure 4-20). Surface water regulations and requirements associated with the 7SFG(A) cantonment area alternatives are described in Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

Surface Water Quality

Toms Creek flows into Toms Bayou, which is a smaller surface water that drains into Boggy Bayou and out into Choctawhatchee Bay. Toms Creek and Toms Bayou are not on Florida's 303(d) List of Impaired Surface Waters, but Boggy Bayou is on the List because dissolved oxygen levels were a Parameter of Concern on the 1998 303(d) List (FDEP, 2006f). This bayou has been proposed for delisting due to improved dissolved oxygen levels (FDEP, 2006g). However, Boggy Bayou has been identified as Potentially Impaired for the Biology Listed Parameter and as Verified Impaired for the Bacteria Listed Parameter and thus is on the current 303(d) list for high bacterial levels (FDEP, 2006c). Choctawhatchee Bay is also on the 303(d) list for many different parameters (FDEP, 2006b).

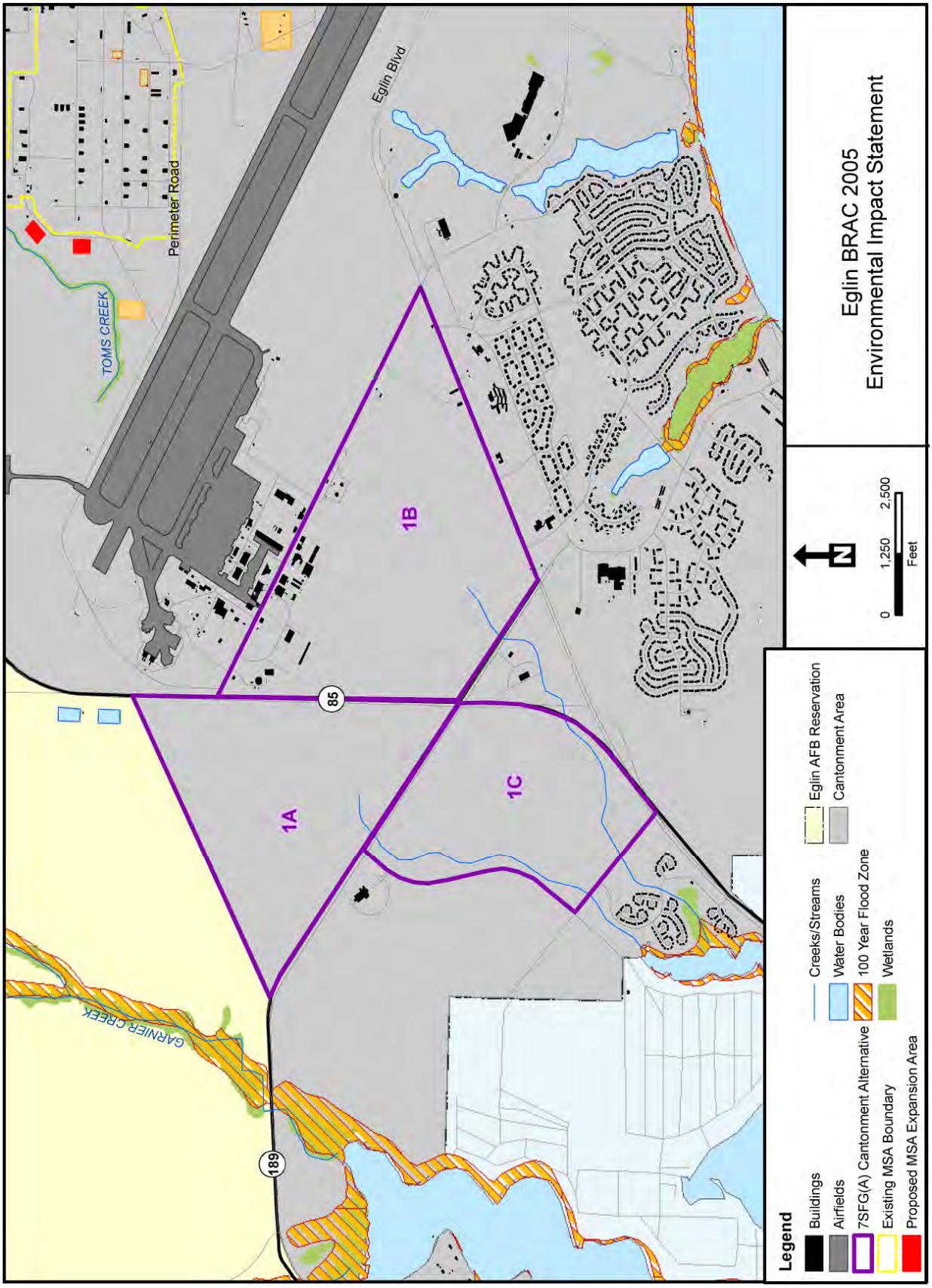

Figure 4-20. 7SFG(A) Cantonment Alternative 1 – Water Resources

Stormwater

The 7SFG(A) Cantonment Alternative 1 areas are not developed; therefore, there are no man-made stormwater drainages or treatment areas to handle stormwater runoff. Stormwater regulations and requirements are discussed in Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

Wetlands and Floodplains

No wetlands or floodplains have been identified within or adjacent to the proposed alternative locations. However, there is a wetland area within approximately 300 feet of the proposed MSA. This wetland area, confined within the area of Toms Creek, is classified as palustrine (nontidal wetlands, lacking vegetation) (U.S. Air Force, 2007f) (Figure 4-20). Wetland and floodplain definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources).

Coastal Zone

The 7SFG(A) Cantonment Alternative 1 area lies within the jurisdictional concerns of the FDEP under the Coastal Zone Management Act (CZMA). Coastal zone definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources). Eglin prepared a CZMA determination to address the impacts to the coastal zone (Appendix I, *CZMA Determination*).

4.11.1.2 Environmental Consequences (Physical Resources – 7SFG(A) Cantonment Alternative 1)

Soils

Potential impacts to soils are associated with increased stormwater runoff and erosion resulting from ground disturbance consequential to these activities. Generally, soils within the affected environment are flat and sandy (allowing for permeation of water deposited on the surface before stormwater sheet flow occurs) and have natural vegetative-cover characteristics not conducive to a highly erosive situation. However, land disturbance and the creation of impervious surfaces (i.e., roads, buildings, and compacted soil) can magnify the potential for erosion. The key issue of concern is the potential for the transport of soils through erosion caused by stormwater runoff from increased impervious surface areas. Quantifying the amount of soil that would potentially erode from a given area is difficult due to several variables. Many unpredictable factors affect erosion potential such as the duration and intensity of storm events, the amount of vegetative loss, etc. Consequently, analysis focused on assessing the vulnerability of the soil types identified at alternative locations to erosion from construction and ground disturbance.

Soil types and the terrain for 7SFG(A) Cantonment Alternative 1 areas have a naturally low to moderate susceptibility to erosion under natural vegetative cover and normal rainfall conditions. Since the slope factor for Lakeland Sand in the sub-alternative areas are very low (less than 5 percent), impact from erosion is expected to be very low. However, the removal of any stabilizing vegetation and increases in impervious surfaces can lead to soil erosion.

Water Resources

There are no water resources on or within or adjacent to the 7SFG(A) Cantonment Alternative 1 cantonment sites. The only water features within the 7SFG(A) Cantonment Alternative 1 sites are two drainages that flow south to Poquito Bayou. Therefore, there would be no direct effects to surface water, groundwater, wetlands, or floodplains. The proposed activities would take place within the jurisdictional concerns of the FDEP and therefore required a consistency determination with respect to Florida's Coastal Zone Management Plan and the Coastal Zone Management Act (CZMA) submitted by Eglin's Natural Resources Section (96 CEG/CEVSN) (Appendix I, *CZMA Determination*).

Potential indirect impacts associated with water quality relate to the potential for increased rate and volume of stormwater runoff, thereby increasing amounts of sediment and pollutant runoff during and after rain events. The construction of the 7SFG(A) cantonment area may present the potential for increased sedimentation. The addition of new, impervious surfaces may also increase the number and kinds of pollutants carried off-site by stormwater runoff from everyday operations.

The Natural Resources Conservation Service (NRCS) computer model, WinTR-55, was used to determine the effects of stormwater in regard to the 7SFG(A) Cantonment Alternative 1 sites. This model was used to evaluate stormwater runoff rates and volumes. Details on the model and parameters used can be found in Appendix G, *Physical Resources*. Stormwater totals were obtained utilizing the average rainfall of a 25-year rain event (one that theoretically occurs every 25 years and lasts for 24 hours), which is 10.23 inches.

Table 4-36 shows current conditions (preconstruction) and conditions after construction (post-construction) obtained from the WinTR-55 model.

Table 4-36. Modeled 7SFG(A) Cantonment Alternative 1 Pre- and Post-Construction Stormwater Runoff Conditions

Alternative	Acres	Runoff[1] (inches)		Peak Flows[2] (ft^3/s)		Runoff Increases due to Construction[3] (inches)
		Pre	Post	Pre	Post	
1A	405	1.32	3.87	44	565	2.55
1B	570	1.32	3.18	239	764	1.86
1C	319	1.32	4.69	142	803	3.37

1. Modeled stormwater runoff amounts currently (Pre) and after construction (Post) in inches
2. Modeled stormwater runoff peak flows currently (Pre) and after construction (Post) in cubic feet per second (ft^3/s)
3. Increases in stormwater runoff after construction over current conditions in inches

A 25-year rainfall event, raining uniformly over any of the 7SFG(A) Cantonment Alternative 1 sub-alternative sites would yield a total of 10.23 inches of water. These areas, which are currently covered by vegetated soil, would soak up all but 1.32 inches of the rainfall based on the permeability factors of the soils in the area. Stormwater that percolates downward into soil has the potential to carry roadway and other paved surface contaminants into the Sand and Gravel Aquifer. (The Sand and Gravel Aquifer is not used as a drinking water source on Eglin AFB.) The 1.32 inches of stormwater remaining would flow off-site at peak flows that are site specific (i.e., depending on elevation changes and drainage patterns). Converting 117 acres of currently vegetated soil to impervious surface for cantonment buildings, roads, sidewalks, and parking lots, would result in increases in stormwater runoff amounts and peak flows. This runoff would potentially be transported over land or in ditches or creeks to adjacent downstream areas. The quantity of stormwater runoff generated at each 7SFG(A) Cantonment Alternative 1 sub-alternative site would increase, based on the modeled data (Table 4-36).

As discussed in Chapter 3 (Section 3.11.7, Analysis Methodology, Water Resources), the USEPA gives guidance on acceptable stormwater runoff volumes and velocities as "to the extent practicable, maintain postdevelopment peak runoff rate and average volume at levels that are similar to predevelopment levels" (USEPA, 1993). According to values obtained from the WinTR-55 model, the postdevelopment peak runoff rate and average volume level would be greater than predevelopment values, which could be perceived as adverse. However, the WinTR-55 model constructs a conservative view of effects as it does not take into consideration certain variables such as the unique characteristics of different soil types. For example, the 7SFG(A) Cantonment Alternative 1 sub-alternative sites are undeveloped and the soils are composed mostly of Lakeland sands. Undisturbed areas containing Lakeland sand have a high rate of permeability, up to 20 inches an hour, which is much greater than the 10.23 inches of rain that might be expected in a 25-year storm (Overing et al., 1995). Therefore, applying the "theorized" scenario (developed utilizing WinTR-55 as discussed above) to unique site characteristics, and assuming the 7SFG(A) Cantonment Alternative 1 sub-alternative areas have never been developed or subjected to soil compaction, no adverse stormwater runoff would be expected.

The creation of impervious areas would require the construction of stormwater management systems (i.e., pond, swale) to provide on-site storage of stormwater. On-site storage of stormwater would prevent direct discharge of stormwater runoff to any surface waters, thereby reducing potentially adverse impacts to surface water quality (FDEP, 2002). However, infiltration from on-site storage systems can still result in the introduction of contaminants into the Sand and Gravel Aquifer via downward percolation through porous soils. Contaminants include nutrients such as nitrogen and phosphorus from fertilizers and natural sources, pesticides, and petroleum-related compounds from vehicle operations and metals, all of which are typical of urban runoff.

There would be no potable water contamination issues since the Sand and Gravel Aquifer is not used for this purpose at Eglin. Contaminants would not reach the Floridan Aquifer, which is the source of potable water on Eglin. The addition of stormwater infrastructure would not adversely impact the seasonal-high water table. Per FDEP requirement, the Army would implement a Stormwater, Erosion and Sedimentation Control Plan, a Storm Water Pollution Prevention Plan (SWPPP), and construction BMPs to reduce stormwater runoff.

In accordance with the Florida Water Conservation Act (Florida Statutes 553.14), the proposed construction at the proposed site would incorporate water conservation measures to the greatest extent possible. Landscaping would consist of native, drought-tolerant vegetation to reduce water use. Any plans involving irrigation would be coordinated through Eglin's Environmental Engineering Section (96 CEG/CEVCE) prior to implementation. These efforts would protect the Eglin water supply by reducing consumptive uses of water withdrawn from the Floridan Aquifer (U.S. Air Force, 2001a).

Applicable permitting requirements would be satisfied in accordance with Florida Administrative Code (FAC) Rule 62-25 and the National Pollutant Discharge Elimination System (NPDES). The Army and any contractors would adhere to all applicable regulatory requirements, which would serve to either offset or minimize any potential impacts from construction operations. The Army would coordinate with 96 CEG/CEVCE to submit a notice of intent to use the Generic Permit for Stormwater Discharge under the NPDES program prior to project initiation according to Florida Statute Section 403.0885.

The 7SFG(A) Cantonment Alternative 1 construction activities would also require coverage under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities, where 1 or more acres of land are disturbed (FAC Rule 62-621). The Army would incorporate a comprehensive Stormwater, Erosion and Sedimentation Control Plan and an SWPPP into the final design plan. Stormwater permits and any necessary utility extension permits would require coordination between the proponent and 96 CEG/CEVCE. The Army would obtain all appropriate permits prior to the commencement of any ground-disturbing activities. A comprehensive list of potential mitigations for further reducing impacts from stormwater runoff is provided at the end of the 7SFG(A) Cantonment analysis.

Based on model results and soil type considerations, no adverse impacts to water quality from the implementation of the 7SFG(A) Cantonment Alternative 1 are anticipated. The Army would obtain the aforementioned permits and would implement, as required by FDEP, site-specific management actions and BMPs.

Munitions Storage Area

Water resources within approximately 350 feet of the proposed MSA include a branch of Toms Creek and a wetlands area associated with this stream. However, these areas would not be directly disturbed by construction activities. Therefore, there would be no direct effects to surface water, groundwater, wetlands, or floodplains. The proposed additions would take place within the jurisdictional concerns of the FDEP and required a consistency determination with respect to Florida's Coastal Zone Management Plan and the CZMA (Appendix I, *CZMA Determination*).

Potential indirect impacts associated with water resources relate to the potential for increased rate and volume of stormwater runoff, thereby increasing amounts of sediment and pollutant runoff during and after rain events. The construction of the 7SFG(A) munitions storage additions may present the potential for increased sedimentation. The addition of new, impervious surfaces may also increase the number and kinds of pollutants carried off-site by stormwater runoff from everyday operations.

Toms Creek (and a wetlands area associated with this stream) runs approximately 350 feet to the west of the proposed MSA. The soil type in this area is Lakeland Sand, which consists of very deep, excessively drained, rapidly permeable soils on nearly level to very steep uplands (Overing et al., 1995). These soil characteristics allow for rapid infiltration (absorption into the soil) of stormwater and reduce the potential for indirect impacts to nearby wetlands and surface waters from stormwater runoff.

Based on the permeable soil type at the proposed 7SFG(A) Cantonment Alternative 1 MSA site, adverse stormwater runoff impacts to wetlands and surface waters are not expected. The Army would implement and adhere to site-specific management actions to control and minimize stormwater runoff. A comprehensive list of the permits, management actions, and potential mitigations necessary to reduce indirect impacts from stormwater runoff is provided in the Permits/Plans and Potential Mitigations subsections that follow.

Permits/Plans

All construction and industrial activities that have the potential to impact stormwater quality or disturb more than 1 acre of land must be permitted under NPDES regulations as administered by the FDEP. The Army must obtain from the FDEP a Generic Permit for Stormwater Discharge for Large and Small Construction Activities. An Application for Stormwater Permit in Northwest Florida will be submitted by the Air Force prior to project initiation according to FAC Rule 62-346.

Actions taking place within the jurisdictional concerns of the FDEP required a consistency determination with respect to Florida's Coastal Zone Management Plan and the CZMA (Appendix I, *CZMA Determination*).

For any construction activities that will disturb 1 acre or more of soil, an Erosion, Sedimentation, and Pollution Control Plan is generated that defines the actions that will be taken during the project to reduce erosion and limit the transport of sediment off the project site. The plan requires:

- Design BMPs to control soil erosion and sedimentation at the site.
- Conduct inspection within seven days of construction start.
- Conduct weekly inspections by qualified personnel.
- Record on-site daily rainfall data.
- Sample stormwater discharge(s) or receiving streams for turbidity.
- Maintain records on-site: plans, inspections, rainfall, and analysis.
- Submit summary monthly monitoring reports.

Additionally, the proponent and its contractor shall coordinate with 96 CEG/CEVCE for the following:

- Final stormwater design and permitting.
- Any potential discharges into surface waters from construction activities.
- Final backflow preventer design, if applicable.

Per Executive Order (EO) 11988, *Floodplain Management*, and EO 11990, *Protection of Wetlands*, the Army is required to consider their actions in wetlands or floodplains. If there are no alternatives to conducting an action in a wetland or floodplain, the Army will state their reasoning in a Finding of No Practicable Alternative (FONPA). This alternative does not require a FONPA.

Potential Mitigations

The implementation of the following mitigations can effectively eliminate or reduce secondary impacts to physical resources. The proponent and its contractor shall coordinate with 96 CEG/CEVCE for the following:

- Install and maintain entrenched silt fencing and hay bales along the perimeter of the construction site prior to any ground-disturbing activities and maintain them in effective, operating condition prior to, during, and throughout the entire construction process to prevent fill material, pollutants and runoff from entering wetlands or other surface waters.
- Incorporate a monitoring plan, especially after rain events, to observe the effectiveness of silt fencing, hay bales, and/or other erosion and sedimentation

control devices and address modification as needed. Any failures would be carefully examined and corrected to prevent reoccurrence.

- Sequence construction activities to limit the soil exposure for long periods of time.
- Vegetate cleared/disturbed areas with native vegetation and grasses or mulch when the final grade is established to reduce/prevent erosion.
- Where applicable, reduce erosion using rough grade slopes or terrace slopes.
- Identify areas of existing vegetation that the proponent would retain and not disturb by construction activities.
- Chemicals, cements, solvents, paints, or other potential water pollutants would be stored in locations where they cannot cause runoff pollution.
- Any repairs, maintenance, and use of construction equipment (i.e., cement mixers) would take place in designated "staging areas" designed to contain any chemicals, solvents, or toxins from entering surface waters.
- Stabilize construction site entrance using Florida Department of Transportation (FDOT)-approved stone and geotextile (fiber fabric).
- Incorporate 10-year storm events into the design of facilities.
- Do not utilize septic tanks.
- Equip all work sites with adequate waste disposal receptacles for liquid, solid, and hazardous wastes to prevent construction and demolition debris from leaving the work site.
- Utilize proper site planning, low-impact design principles, pervious surfaces, and adequately engineered stormwater retention ponds (or swales) to manage stormwater (on-site) and prevent discharges into nearby surface waters. The design would take into consideration the landscape of the area and physical features to determine whether a retention pond or series of swales would be used to contain runoff. In accordance with FDEP regulations, a Florida-registered Professional Engineer would design the proposed retention feature.
- Incorporate into the design and construction of paved surface areas a slope sufficient enough to direct potential runoff away from wetland areas. Design and construct all drainage improvements and related infrastructure in such a manner that the natural hydrologic conditions would not be severely altered.
- Do not use wetlands and other water bodies as sediment traps.
- Design open channels and outfall ditches to include plans so that they do not overflow their banks.
- Where flow velocities exceed 2 cubic feet per second, provide ditch pavement or other permanent protection against scouring. Revegetate all ditches not

protected with a permanent material to provide an erosion resistant embankment.

- Treat runoff from parking lots to remove oil and sediment before it enters receiving waters.
- Provide all construction personnel with proper training regarding all management techniques.
- Establish or leave a 100-foot buffer of vegetation between surface waters or wetlands and structures.

4.11.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.11.2.1 Existing Conditions (Physical Resources – 7SFG(A) Cantonment Alternative 2)

Soils

The topography of the proposed project area is relatively flat with slopes that are less than 1 percent. The landscape is characterized by mild rises in land elevation that form slight plateau-ridge features intermingled with mild slope-depression topography. Generally these features are indistinguishable to the naked eye under natural vegetated conditions. Soils types for this alternative are listed below and shown in Figure 4-21 (detailed soil descriptions are also provided in Appendix G, *Physical Resources*). For comparative purposes, primary soils are presented in Table 4-37, showing attributes and the amount of acreage for each soil type in each sub-alternative area.

Table 4-37. 7SFG(A) Cantonment Alternative 2 – Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Alternative Coverage [acres (percent)]				
				2A	2B	2C	2D	2E
Chipley/Hurricane Series	Moderate	Highly acidic, dark gray	Medium Sand	--	--	--	1	26
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	473	534	934	1,170	672
Dorovan Muck	Low	Clay-like	Organic Muck	--	--	1	--	--
Troup Sand	Moderate	Dark brown, fine sand	Sandy, Find Sand	--	1	88	110	3
Null	N/A	N/A	N/A	--	--	--	--	15

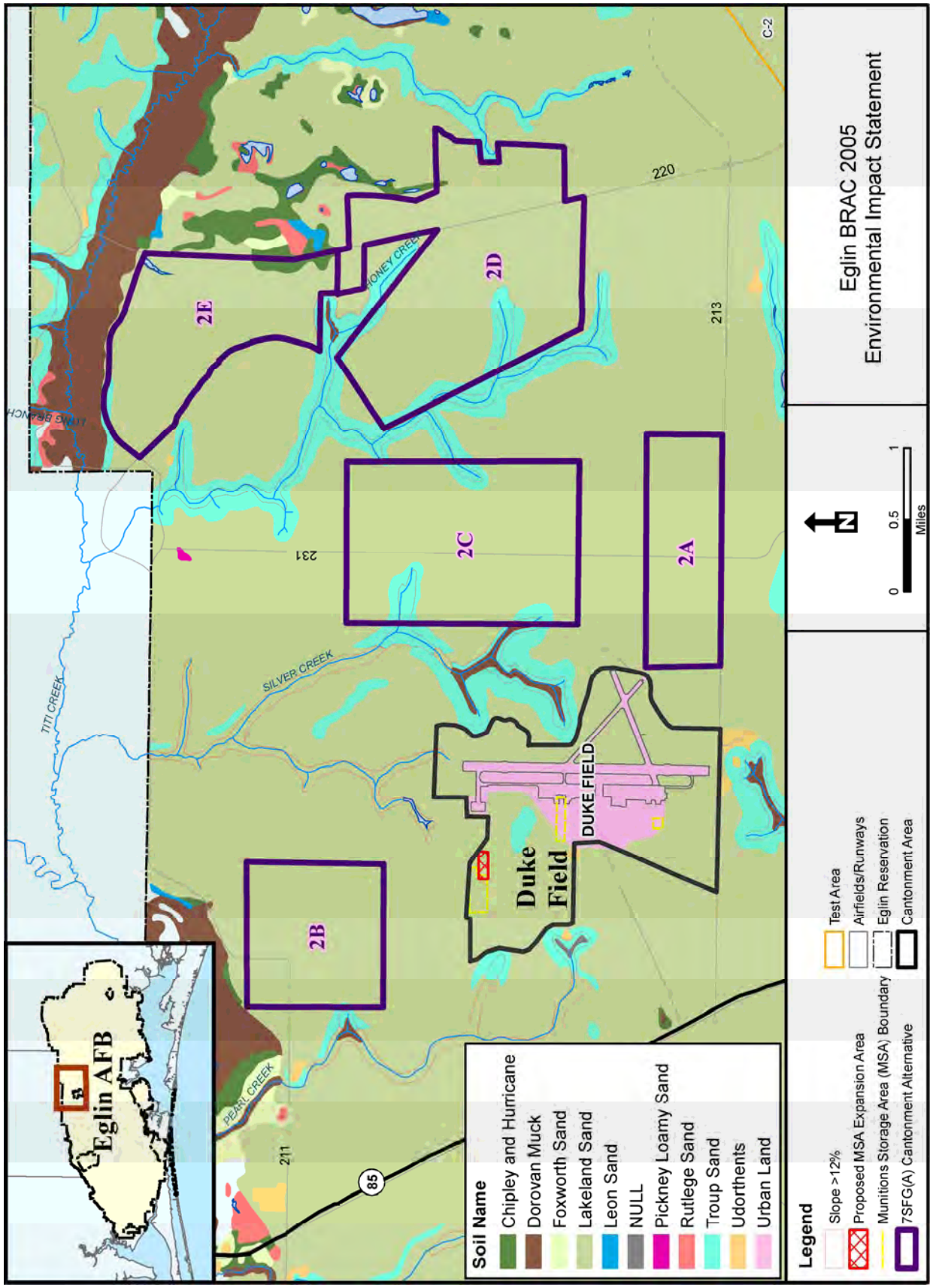

Figure 4-21. 7SFG(A) Cantonment Alternative 2 – Soils

Surface Water

There are no streams or bodies of water on the 7SFG(A) Cantonment Alternative 2A, potential MSA sites, or along the proposed road widening/utilities route. However, Juniper Creek is near (less than 0.5 mile) the southern border of the 7SFG(A) Cantonment Alternative 2A site (Figure 4-22).

7SFG(A) Cantonment Alternative 2B does not contain any streams or bodies of water. However, Pearl Creek is partially parallel to the western border, and the Shoal River lies about 0.63 mile to the north. The proposed road widening/utilities route to this site, substation, and the access control point do not cross through surface waters.

There are two streams that flow through the 7SFG(A) Cantonment Alternative 2C location. Two branches of Silver Creek are located within the western boundary, and two branches and a main section of Honey Creek flow within the eastern side and northeastern corner of 7SFG(A) Cantonment Alternative 2C. The proposed road widening/utilities route to this site, substation, and the access control point do not cross through surface waters.

A branch of Honey Creek is located within the western portion of 7SFG(A) Cantonment Alternative 2D. Other sections of Honey Creek run along the west and northeast borders of this alternative site. Blue Spring Creek flows just to the east of the 7SFG(A) Cantonment Alternative 2D border. The proposed road widening/utilities route to this site, substation, and the access control point do not cross through surface waters.

No streams lie within or adjacent to 7SFG(A) Cantonment Alternative 2E. However, Jr. Walton Pond lies in the northeastern corner of this site. The nearest streams are a branch of Honey Creek, which lies less than 0.25 mile to the southwest, and Titi Creek that is about 0.25 mile to the north. The proposed road widening/utilities route to this site does not cross through surface waters. The nearest stream is Honey Creek located over 0.25 mile west of the proposed route. The access control point and substation would not affect surface waters.

Surface Water Quality

None of the abovementioned streams associated with the 7SFG(A) cantonment area 7SFG(A) Cantonment Alternative 2 sites and proposed MSA are on Florida's 303(d) List of Impaired Waters. For more details about the 303(d) List and surface water regulations and requirements see Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

Stormwater

The 7SFG(A) Cantonment Alternative 2 areas are not developed; therefore, there are no man-made stormwater drainages or treatment areas to handle stormwater runoff. Stormwater regulations and requirements are discussed in Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

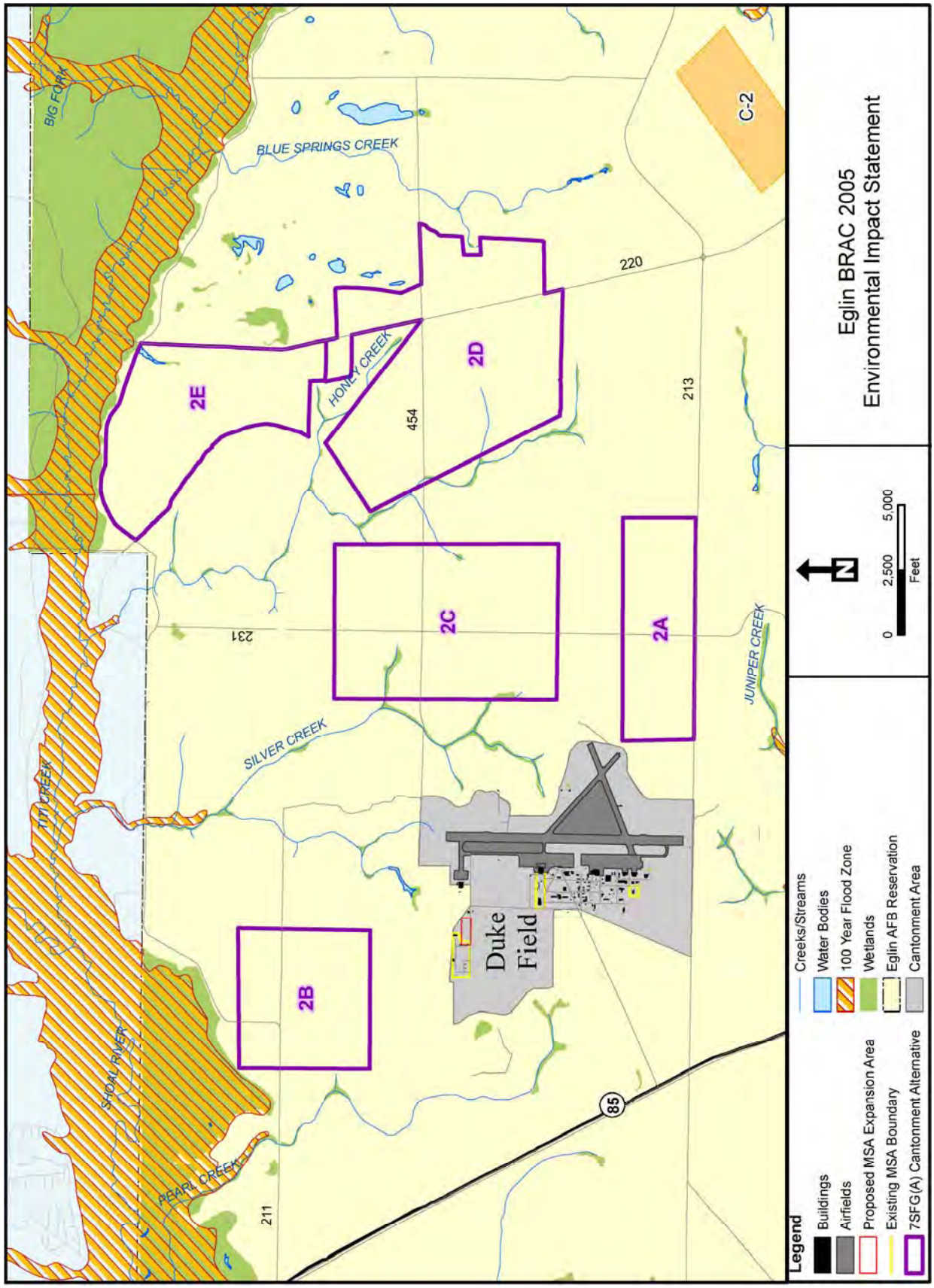

Figure 4-22. 7SFG(A) Cantonment Alternative 2 – Surface Waters

Wetlands and Floodplains

The only wetlands within the 7SFG(A) Cantonment Alternative 2 sites are found within Sites 2C, 2D, and 2E. Wetlands on 2C cover approximately 25.4 acres and are associated with Honey and Silver Creeks. Wetlands associated with Honey Creek cover about 1.1 acres on 2D. Wetlands on 2E are associated with Jr. Walton Pond and cover about 4.3 acres. There are no floodplains within or adjacent to any of the 7SFG(A) Cantonment Alternative 2 sites or proposed road widening/utility easement routes. A segment of the Florida Trail would be repositioned under this alternative. The new segment would be directly adjacent to an area of wetlands and floodplains.

Wetland and floodplain definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources).

Coastal Zone

As with 7SFG(A) Cantonment Alternative 1, the 7SFG(A) Cantonment Alternative 2 proposed sites lie within the jurisdictional concerns of the FDEP under the CZMA. Coastal zone definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources). Eglin prepared a CZMA determination to address the impacts to the coastal zone (Appendix I, *CZMA Determination*).

4.11.2.2 Environmental Consequences (Physical Resources – 7SFG(A) Cantonment Alternative 2)

Soils

Soils for this location are composed solely of Lakeland Sand, 0 to 5 percent slope. Depending on their properties and the topography in which they occur, soils have varying degrees of susceptibility to erosion. In general, Lakeland sand is slightly susceptible to water and wind erosion under natural conditions, though nearly all of the sandy soils have a high susceptibility to wind and water erosion when the area is cleared of vegetation. Topography and surface drainage features are another factor to consider when undertaking various activities due to the erosion potential. The landscape under consideration is fairly level, with very slight rises. No major water features or streams are located within this alternative area. As a result, erosion is not expected to be a major concern. However, since Lakeland has a moderate potential for erosion, BMPs should be implemented since impervious surfaces will be increased, causing the potential for surface runoff.

Soils within the affected environment are flat and sandy (allowing for permeation of water deposited on the surface before stormwater runoff occurs) and have natural vegetative-cover characteristics not conducive to a highly erosive situation. However, land disturbance and the creation of impervious surfaces (i.e., roads, buildings, and compacted soil) can magnify the potential for erosion. The key issue of concern is the potential for the transport of soils through erosion caused by stormwater runoff from increased impervious surface areas. Quantifying the amount of soil that would potentially erode from a given area is difficult due to several variables. Many unpredictable factors affect erosion potential such as the duration and intensity of storm events, the amount of vegetative loss, etc. Consequently, analysis focuses on assessing the vulnerability of the soil types identified at alternative locations to erosion from construction.

Water Resources

Water resources within or adjacent to the 7SFG(A) Cantonment Alternative 2 sub-alternative sites are described in Table 4-38. Construction within a water resource would be avoided. Therefore, there would be no direct impacts to groundwater, surface water, wetlands, or floodplains from cantonment construction or associated access roads. The only potential indirect impacts associated with water resources in this area concern stormwater runoff. Potential indirect impacts associated with water quality relate to the potential for increased rate and volume of stormwater runoff, thereby increasing amounts of sediment and pollutant runoff during and after rain events. The construction of the 7SFG(A) cantonment area may also present the potential for increased sedimentation. The addition of new, impervious surfaces may also increase the number and kinds of pollutants carried off-site by stormwater runoff from everyday operations. Improving roads from sand to paved would have potential benefits to surface waters as the amount of eroded sand available for transport would decrease. The repositioning of the Florida Trail under 7SFG(A) Cantonment Alternative 2E would have minimal effect on adjacent wetlands. The trail would not be rerouted directly through wetlands. No impervious surfaces would be created in conjunction with the trail.

With regard to cantonment construction and access road improvements, stormwater and associated contaminants such as nutrients and petroleum-related compounds would potentially infiltrate into groundwater of the Sand and Gravel Aquifer through the permeable Lakeland soil. The Sand and Gravel Aquifer is not used on Eglin as a source of potable water.

Utilizing the same modeling methods that were described for 7SFG(A) Cantonment Alternative 1 (Section 4.11.1.2), stormwater totals for the 7SFG(A) Cantonment Alternative 2 sub-alternative sites were obtained as follows in (Table 4-38).

Table 4-38. Modeled 7SFG(A) Cantonment Alternative 2 Pre- and Post-Construction Stormwater Runoff Conditions

Alternative	Acres	Water Resources Within or Adjacent to the Alternative	Runoff[1] (inches)		Peak Flows[2] (ft^3/s)		Runoff Increases due to Construction[3] (inches)
			Pre	Post	Pre	Post	
2A	440	None	1.32	3.73	208	1,090	2.41
2B	986	None	1.32	3.32	214	818	2.00
2C	525	Silver and Honey Creeks and their associated wetlands	1.32	2.23	267	634	0.91
2D	902	Honey and Blue Spring Creeks and their associated wetlands	1.32	2.77	424	1,266	1.45
2E	402	Jr. Walton Pond and its associated wetlands	1.32	3.87	216	1,000	2.55

ft^3/s = cubic feet per second
1. Modeled stormwater runoff amounts currently (Pre) and after construction (Post) in inches
2. Modeled stormwater runoff peak flows currently (Pre) and after construction (Post) in cubic feet per second
3. Increases in stormwater runoff after construction over current conditions in inches

Using the analysis methods discussed for 7SFG(A) Cantonment Alternative 1 (Section 4.11.1.2), and assuming the 7SFG(A) Cantonment Alternative 2 sub-alternative areas have never been developed or subjected to soil compaction, no adverse stormwater runoff would be expected.

The Army would obtain permits and implement site-specific management actions detailed in Section 4.11.1.2 for 7SFG(A) Cantonment Alternative 1, Water Resources.

Munitions Storage Area

There are no water resources within the proposed MSA; therefore, there would be no direct effects to surface water, groundwater, wetlands, or floodplains. The proposed activities would take place within the jurisdictional concerns of the FDEP and required a consistency determination with respect to Florida's Coastal Zone Management Plan and the CZMA (Appendix I, *CZMA Determination*).

Potential indirect impacts associated with water resources relate to the potential for increased rate and volume of stormwater runoff, thereby increasing amounts of sediment and pollutant runoff during and after rain events. The construction of the 7SFG(A) MSA may present the potential for increased sedimentation. The addition of new, impervious surfaces may also increase the number and kinds of pollutants carried off-site by stormwater runoff from everyday operations. The mostly flat terrain would reduce the potential for off-site sediment transport during rain events.

As discussed in Section 4.11.1.2 (7SFG(A) Cantonment Alternative 1, Water Resources), the Army will implement and adhere to site-specific management actions as required by the FDEP.

4.11.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.11.3.1 Existing Conditions (Physical Resources – 7SFG(A) Cantonment Alternative 3)

Soils

Soils within the affected environment are flat and sandy (allowing for permeation of water deposited on the surface before stormwater runoff occurs) and have natural vegetative-cover characteristics not conducive to a highly erosive situation. However, land disturbance and the creation of impervious surfaces (i.e., roads, buildings, and compacted soil) can magnify the potential for erosion.

Soil types for this alternative are listed below (Table 4-39) and shown in Figure 4-23 (detailed soil descriptions are also provided in Appendix G, *Physical Resources*). Lakeland Sand is the predominant soil type for this alternative. This sand type has the highest potential for erosion since it is unconsolidated sediment. Troup and Chipley have a moderate erosion potential.

Table 4-39. 7SFG(A) Cantonment Alternative 3 – Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Alternative Coverage [acres (percent)]
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	472 (94)
Troup Sand	Moderate	Dark brown	Loamy sand	10 (2)
Chipley/Hurricane series	Moderate	Highly acidic dark gray	Medium Sand	18 (6)

Surface Water

The only surface water within or adjacent to the 7SFG(A) Cantonment Alternative 3 footprint is Turkey Gobbler Creek, which lies in the southwest corner. Gopher Creek and Turkey Hen Creek lie to the north and to the east of the site border, respectively (Figure 4-24). Sections of RR 211 and RR 237 north of the Alternative 3 site would be improved and widened to 80 feet and would incorporate an easement for sewer lines. This road improvement/sewer easement would cross Gopher Creek and Turkey Hen Creek and a wetland area east of Gopher Creek. RR 213, RR 215, and RR 237 south of

the Alternative 3 site would be improved and widened to 200 feet, which would include an electrical utility easement. This road improvement/utility easement would cross two creeks. A pond is located near the proposed access control point for Alternative 3. The proposed MSA for 7SFG(A) Cantonment Alternative 3 is the same as 7SFG(A) Cantonment Alternative 2 (Section 4.11.2); therefore, it will not be discussed further in this section.

Surface Water Quality

None of the abovementioned streams associated with 7SFG(A) Cantonment Alternative 3 is on Florida's 303(d) List of Impaired Waters. For more details about the 303(d) List and surface water regulations and requirements see Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

Stormwater

The 7SFG(A) Cantonment Alternative 3 site is not developed; therefore, there are no man-made stormwater drainages or treatment areas to handle stormwater runoff. Range roads that would be improved and used to access the site have no stormwater drainages or treatment areas. Stormwater regulations and requirements are discussed in Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

Wetlands and Floodplains

There are no wetlands or floodplains within the 7SFG(A) Cantonment Alternative 3 site. Road improvements and easements would cross through wetlands associated with creeks and ponds. There are no floodplains within Alternative 3 road improvement/ easement routes. Wetland and floodplain definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources).

Coastal Zone

As with 7SFG(A) Cantonment Alternatives 1 and 2, the 7SFG(A) Cantonment Alternative 3 proposed site lies within the jurisdictional concerns of the FDEP under the CZMA. Coastal zone definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources). Eglin prepared a CZMA determination to address the impacts to the coastal zone (Appendix I, *CZMA Determination*).

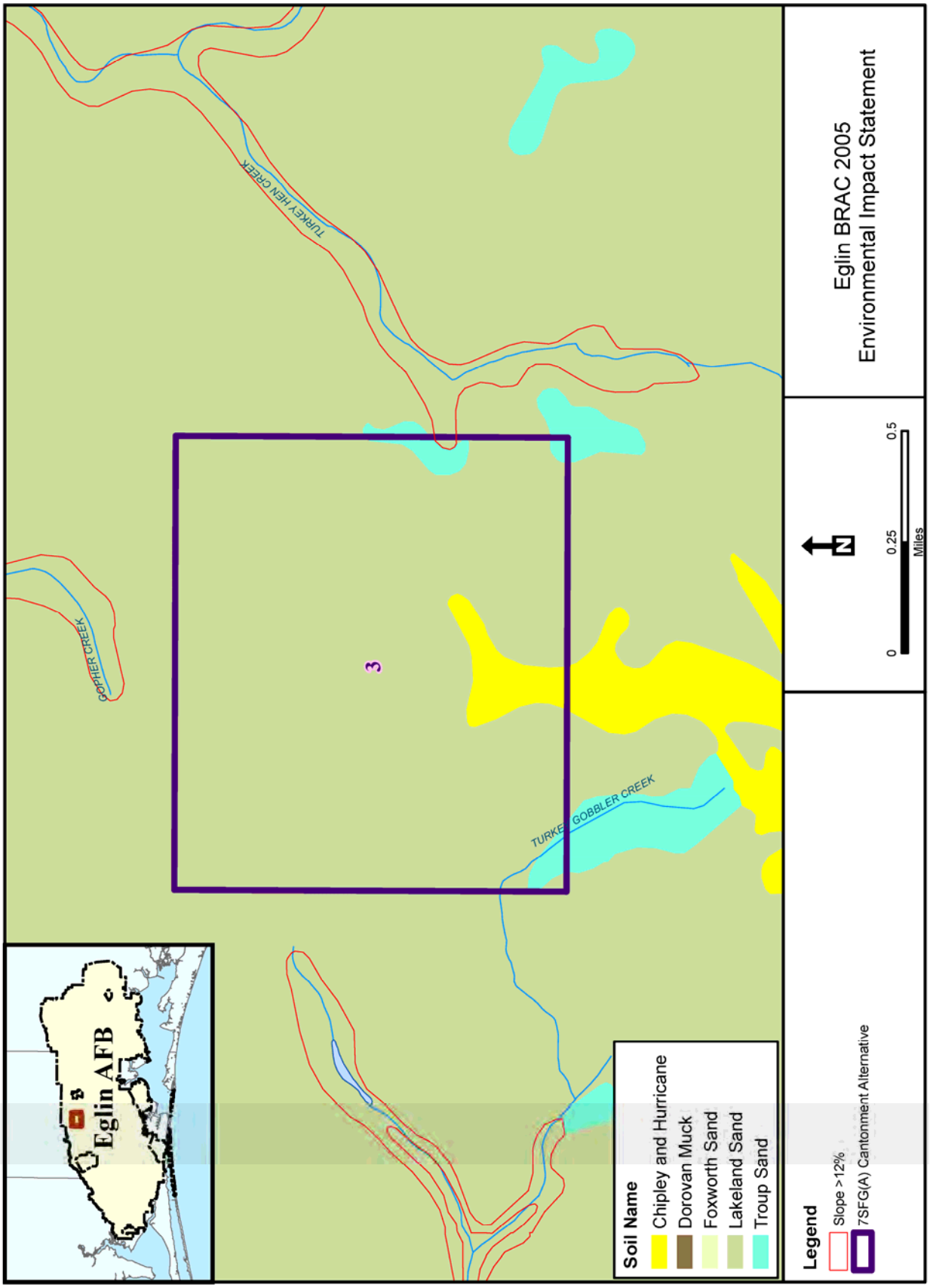

Figure 4-23. 7SFG(A) Cantonment Alternative 3 – Soils

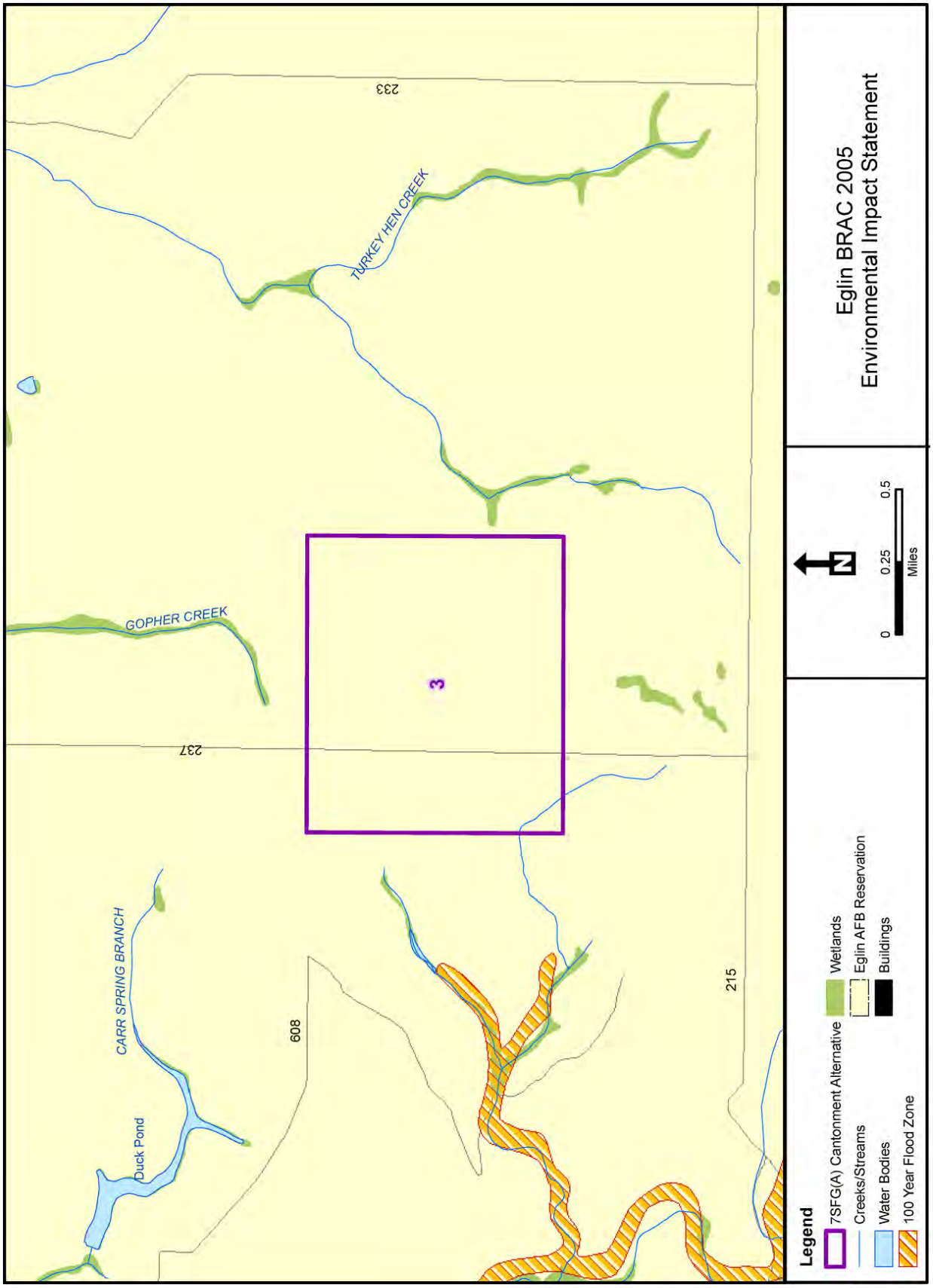

Figure 4-24. 7SFG(A) Cantonment Alternative 3 – Water Resources

4.11.3.2 Environmental Consequences (Physical Resources – 7SFG(A) Cantonment Alternative 3)

Soils

The potential for erosion is extremely low since this is a low-slope area. The exception is the greater than 12 percent slope consisting of Troup sand that is associated with Turkey Hen Creek. Since it is doubtful that any activities would take place along a creek bank, erosion is not expected to be a major concern. However, where slopes greater than 12 percent exist at Turkey Hen Creek, any activities should be avoided since erosion potential would be high.

Depending on their properties and the topography in which they occur, soils have varying degrees of susceptibility to erosion. In general, Lakeland sand is slightly susceptible to water and wind erosion under natural conditions, though nearly all of the sandy soils have a high susceptibility to wind and water erosion when the area is cleared of vegetation. Topography and surface drainage features are another factor to consider when undertaking various activities due to the erosion potential. The landscape under consideration is fairly level, with the exception of a rise consisting of Troup sand along Turkey Hen Creek. However, since Lakeland has a moderate potential for erosion, BMPs should be implemented since sloped surfaces can increase runoff into local creeks and streams. Vegetation, silt fences, and hay bales should be used to reduce soil runoff into Carr Spring Branch.

Water Resources

Water Resources within the 7SFG(A) Cantonment Alternative 3 location consist of surface waters associated with Turkey Gobbler Creek. This area would not be directly disturbed by cantonment construction activities. Therefore, there would be no direct impacts to surface water, groundwater, wetlands, or floodplains associated with the construction of the cantonment area. Range road improvements and widening would directly impact surface waters and wetlands associated with Gopher Creek north of the cantonment area and a pond located near the access control point south of the cantonment area. Road improvement construction would increase sediment deposition into Gopher Creek and the access control point pond, but construction-related erosion would be temporary. A vegetative buffer of 100 feet should be established between any proposed cantonment structures, road improvements, and this creek to protect against direct and indirect impacts from construction. Once the roads are upgraded from dirt to paved or rock surfaces, the long-term impacts of the road widening and improvements would be positive. Paved and rock surfaces are a marked improvement over dirt roads, which are susceptible to erosion. There are no water resource issues with regard to the proposed location of the substation for this alternative.

Indirect impacts associated with water quality relate to the potential for increased rate and volume of stormwater runoff, thereby increasing amounts of sediment and pollutant runoff during and after rain events. The construction of the 7SFG(A)

cantonment area may also present the potential for increased sedimentation. The addition of new, impervious surfaces may also increase the number and kinds of pollutants carried off-site by stormwater runoff from everyday operations.

Utilizing the same modeling methods that were described for 7SFG(A) Cantonment Alternative 1, stormwater totals for the 7SFG(A) Cantonment Alternative 3 site were obtained as follows in Table 4-40.

Table 4-40. Modeled 7SFG(A) Cantonment Alternative 3 Pre- and Post-Construction Stormwater Runoff Conditions

Alternative	Acres	Runoff[1] (inches)		Peak Flows[2] (ft^3/s)		Runoff Increases due to Construction[3] (inches)
		Pre	Post	Pre	Post	
3	500	1.32	3.32	235	840	2.00

ft^3/s = cubic feet per second
1. Modeled stormwater runoff amounts currently (Pre) and after construction (Post) in inches
2. Modeled stormwater runoff peak flows currently (Pre) and after construction (Post) in cubic feet per second
3. Increases in stormwater runoff after construction over current conditions in inches

Using the analysis methods discussed in Section 4.11.1.2 for 7SFG(A) Cantonment Alternative 1, and assuming the 7SFG(A) Cantonment Alternative 3 site has never been developed or subjected to soil compaction, no adverse stormwater runoff would be expected.

No adverse impacts to surface water, groundwater, floodplain, or wetland quality from 7SFG(A) Cantonment Alternative 3 would be expected. The Army would obtain permits and as required by FDEP implement site-specific management actions detailed in Section 4.11.1.2 for 7SFG(A) Cantonment Alternative 1, Water Resources.

For effects to water resources concerning the MSA, see Section 4.11.2.2 (7SFG(A) Cantonment Alternative 2, Water Resources).

4.11.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.11.4.1 Existing Conditions (Physical Resources – 7SFG(A) Cantonment Alternative 4)

Soils

The proposed location, located north of Eglin Main, consists of approximately 500 acres. Some native vegetation exists at this location (Figure 4-25). Soils for this location are composed only of Lakeland Sand (0–5 percent, 5–12 percent and 12–30 percent slope), as shown in Table 4-41. The potential for erosion is extremely low since this is a low-slope area with the exception of slope along Turkey Creek tributaries. As a result, erosion is possible if these slopes are devegetated. Detailed descriptions of soil types are located in Appendix G, *Physical Resources*.

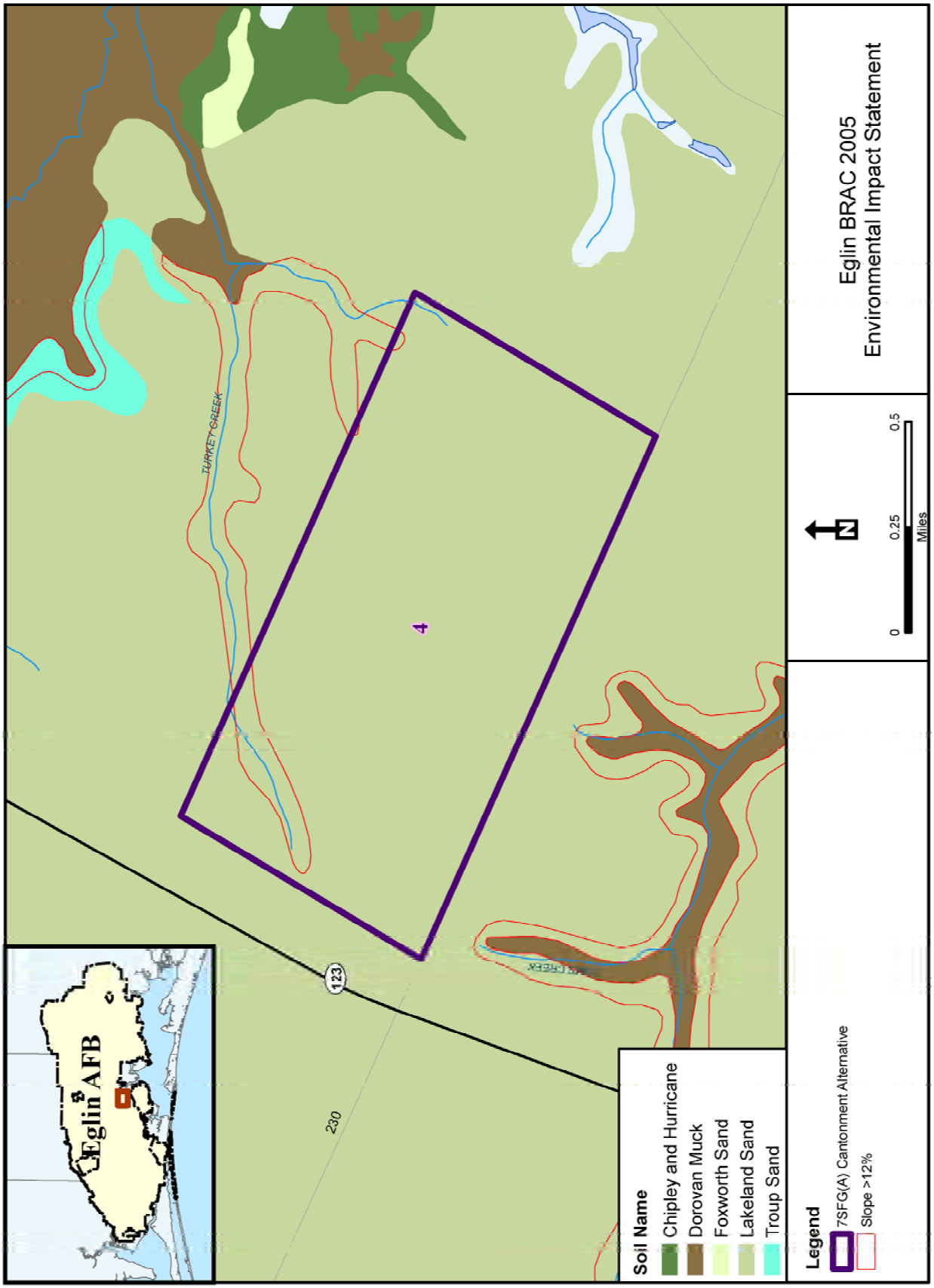

Figure 4-25. 7SFG(A) Cantonment Alternative 4 – Soils

Table 4-41. 7SFG(A) Cantonment Alternative 4 – Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Alternative Coverage [acres (percent)]
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	500 (100)

Surface Water

Two branches of Turkey Creek lie within the 7SFG(A) Cantonment Alternative 4 site, and Toms Creek flows just to the south of this site (Figure 4-26). The proposed MSA for 7SFG(A) Cantonment Alternative 4 is the same as 7SFG(A) Cantonment Alternative 1; therefore it will not be discussed further in this section. For water resource information in regard to the proposed MSAs, see Section 4.11.1.1 (7SFG(A) Cantonment Alternative 1).

Surface Water Quality

None of the abovementioned streams associated with area of the 7SFG(A) Cantonment Alternative 4 is on Florida's 303(d) List of Impaired Waters. For more details about the 303(d) List and surface water regulations and requirements, see Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

Stormwater

The 7SFG(A) Cantonment Alternative 4 area is not developed; therefore, there are no man-made stormwater drainages or treatment areas to handle stormwater runoff. Stormwater regulations and requirements are discussed in Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

Wetlands and Floodplains

Wetlands on 7SFG(A) Cantonment Alternative 4 cover approximately 0.47 acre and are associated with Turkey Creek. There are no floodplains within or adjacent to the 7SFG(A) Cantonment Alternative 4 site. Wetland and floodplain definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources).

Coastal Zone

As with 7SFG(A) Cantonment Alternatives 1, 2 and 3, the 7SFG(A) Cantonment Alternative 4 area lies within the jurisdictional concerns of the FDEP under the CZMA. Coastal zone definitions, regulations and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources). Eglin prepared a CZMA determination to address the impacts to the coastal zone (Appendix I, *CZMA Determination*).

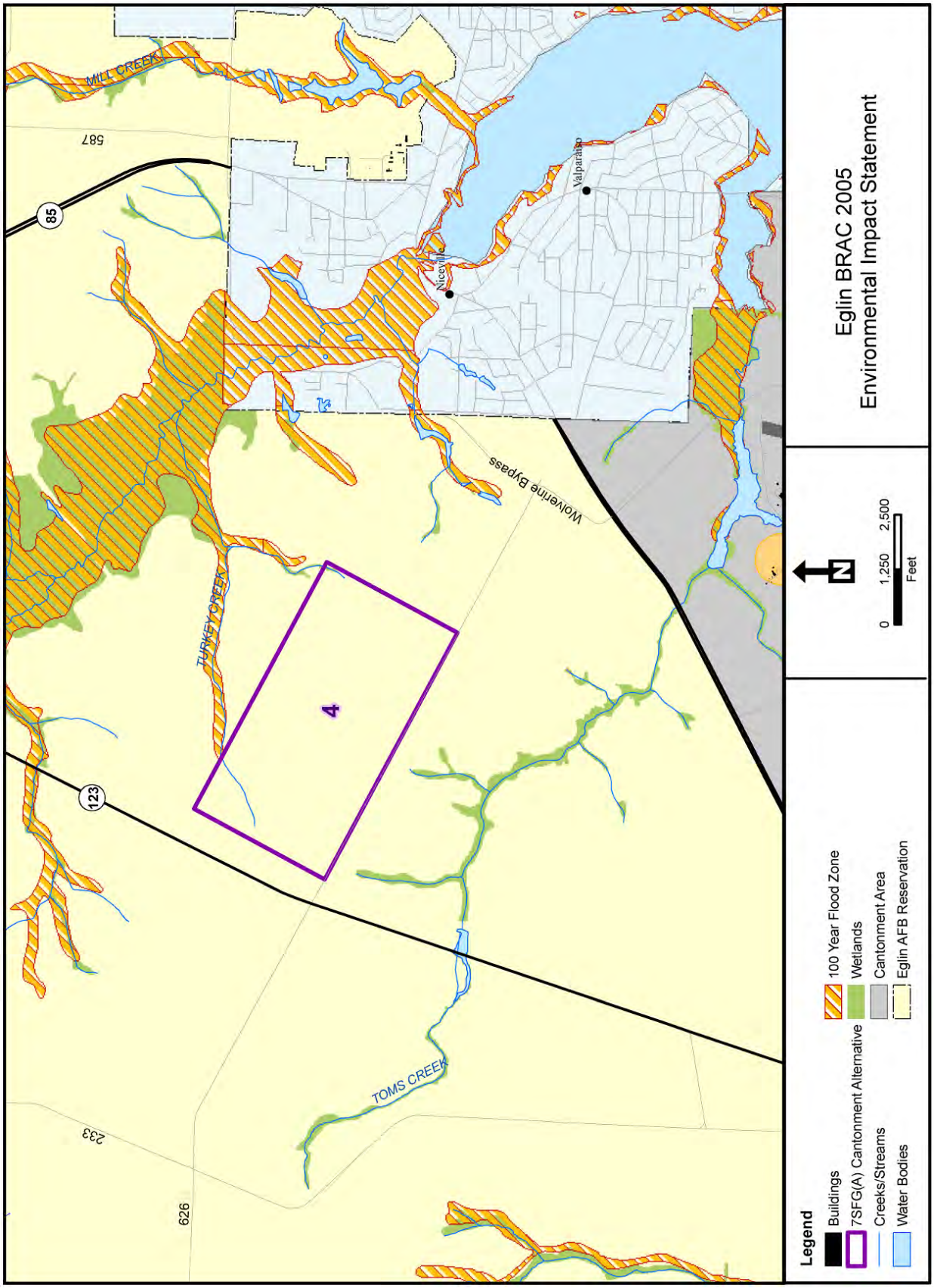

Figure 4-26. 7SFG(A) Cantonment Alternative 4 – Water Resources

4.11.4.2 Environmental Consequences (Physical Resources – 7SFG(A) Cantonment Alternative 4)

Soils

There is a potential for erosion in the high-slope locations that exist along Toms Creek, within Lakeland Sand and Dorovan Muck soils. Since it is doubtful that any activities would take place along a creek bank, erosion is not expected to be a major concern. However, where slopes greater than 12 percent exist, activities that have the potential to disturb soils should be avoided.

Depending on their properties and the topography in which they occur, soils have varying degrees of susceptibility to erosion. In general, Lakeland sand is slightly susceptible to water and wind erosion under natural conditions, though nearly all of the sandy soils have a high susceptibility to wind and water erosion when the area is cleared of vegetation. Topography and surface drainage features are another factor to consider when undertaking various activities due to the erosion potential.

BMPs should be implemented since sloped surfaces can increase runoff into local creeks and streams. Vegetation, silt fences, and hay bales should be used to reduce soil runoff into Toms Creek and its tributaries.

Water Resources

Water resources within the 7SFG(A) Cantonment Alternative 4 location include surface waters (Turkey Creek) and wetlands associated with this stream. However, these areas would not be directly disturbed by construction activities. Therefore, there would be no direct affects to surface water, groundwater, wetlands, or floodplains. Potential indirect impacts associated with water quality relate to the potential for increased rate and volume of stormwater runoff, thereby increasing amounts of sediment and pollutant runoff during and after rain events. The construction of the 7SFG(A) cantonment area may also present the potential for increased sedimentation. The addition of new, impervious surfaces may also increase the number and kinds of pollutants carried off-site by stormwater runoff (sheet flow) from everyday operations.

Making use of the same modeling methods that were described in 7SFG(A) Cantonment Alternative 1, stormwater totals for the 7SFG(A) Cantonment Alternative 4 site were obtained as follows in Table 4-42.

Table 4-42. Modeled 7SFG(A) Cantonment Alternative 4 Pre- and Post-Construction Stormwater Runoff Conditions

Alternative	Acres	Runoff[1] (inches)		Peak Flows[2] (ft^3/s)		Runoff Increases due to Construction[3] (inches)
		Pre	Post	Pre	Post	
4	500	1.32	3.32	222	834	2.00

1. Modeled stormwater runoff amounts currently (Pre) and after construction (Post) in inches
2. Modeled stormwater runoff peak flows currently (Pre) and after construction (Post) in cubic feet per second
3. Increases in stormwater runoff after construction over current conditions in inches

Utilizing analysis methods discussed for 7SFG(A) Cantonment Alternative 1 (Section 4.11.1.2), and assuming the 7SFG(A) Cantonment Alternative 4 site has never been developed or subjected to soil compaction, no adverse stormwater runoff would be expected.

No adverse impacts to surface water, groundwater, floodplain, or wetland quality from 7SFG(A) Cantonment Alternative 4 would be expected. The Army would obtain permits and implement as required by the FDEP site-specific management actions detailed in Section 4.11.1.2 for 7SFG(A) Alternative 1, Water Resources.

For effects to water resources concerning the MSA, see Section 4.11.1.2, Environmental Consequences for 7SFG(A) Cantonment Alternative 1, Water Resources.

4.11.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.11.5.1 Existing Conditions (Physical Resources – 7SFG(A) Cantonment Alternative 5)

Soils

The proposed location, located west of DeFuniak Springs, consists of approximately 500 acres. This is a somewhat remote location and some native vegetation exists (Figure 4-27).

The primary soil type within this alternative location is Lakeland Sands. Other soil types within the site area are listed in Table 4-43. These types include: the Bonneau-Norfolk-Angie Complex and the Kinston-Johnston-Bibb soil series. A detailed description of soil types follows this document in Appendix G, *Physical Resources*.

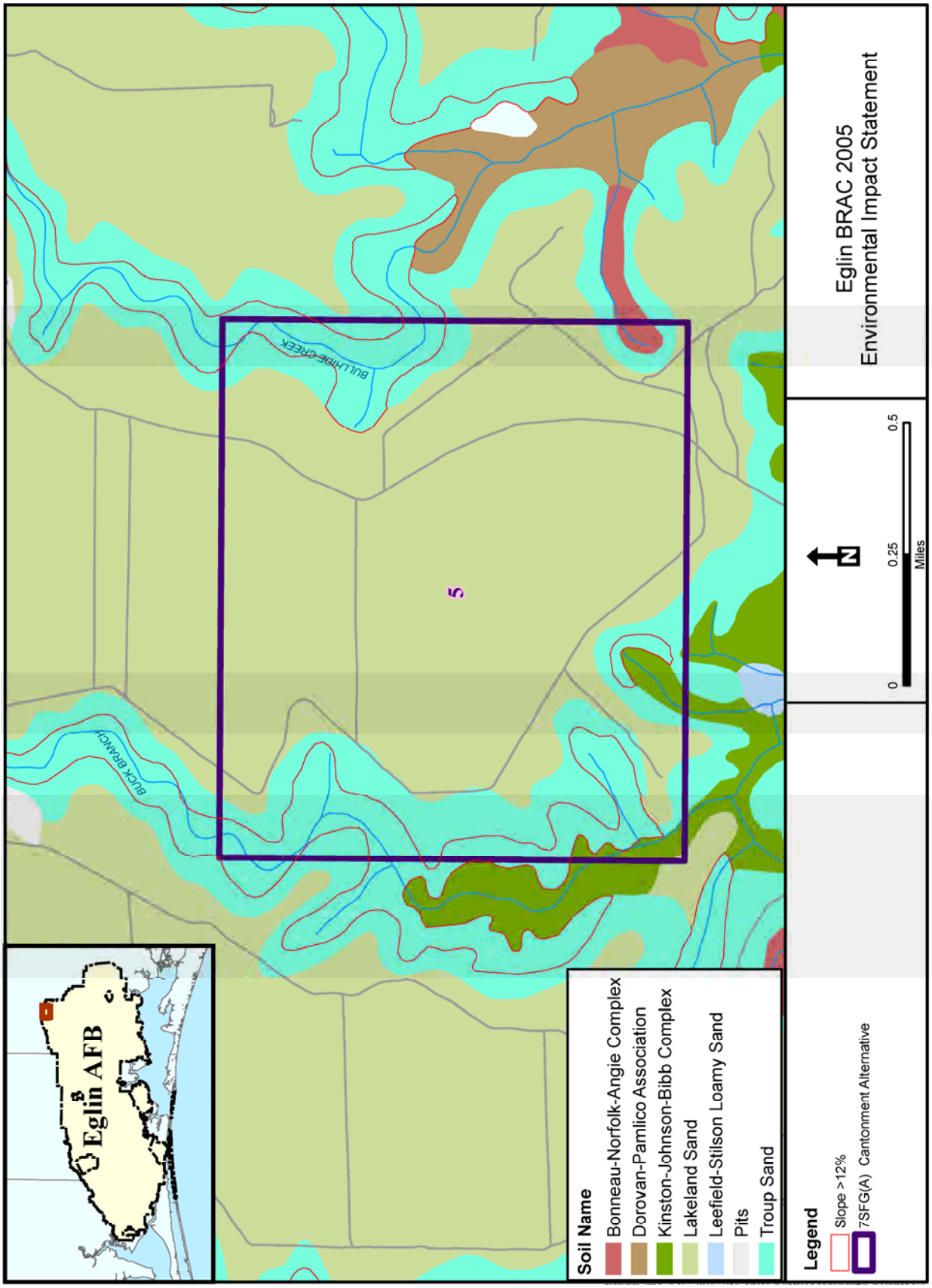

Figure 4-27. 7SFG(A) Cantonment Alternative 5 – Soils

Depending on their properties and the topography in which they occur, soils have varying degrees of susceptibility to erosion. In general, Lakeland sand is slightly susceptible to water and wind erosion under natural conditions, though nearly all of the sandy soils have a high susceptibility to wind and water erosion when the area is cleared of vegetation. Topography and surface drainage features are another factor to consider when undertaking various activities due to the erosion potential.

Table 4-43. 7SFG(A) Cantonment Alternative 5 – Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Alternative Coverage [acres (percent)]
Kinston-Johnson-Bibb	Low	Black, acidic, organic	Variable	9 (1.8)
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	358 (71.6)
Bonneau-Norfolk-Angie	Low	Yellowish-brown	Clayey sediments	2 (0.4)
Troup Sand	Moderate	Dark brown, fine sand	Sandy	131 (26.2)

Major water features or streams are located in association with the alternative area. These are Buck Branch, which runs along the entire western boundary and Bullhide Creek, which runs along a portion of the eastern boundary of the site area. As a result erosion is of potential concern. However, since much of the soil in the area has a high amount of clay, erosion should be at a minimum.

Surface Water

There are two streams that flow through the 7SFG(A) Cantonment Alternative 5 location. Buck Branch weaves in and out of the western border and a branch and main section of Bullhide Creek flow within the eastern side of the area proposed for 7SFG(A) Cantonment Alternative 5 (Figure 4-28). The proposed MSA for 7SFG(A) Cantonment Alternative 5 is the same as 7SFG(A) Cantonment Alternative 2; therefore they will not be discussed further in this section. The proposed road widening and improvements, and utility easement would be routed along RR 210 and an existing easement. RR 210 presently intersects Bullhide Creek. Likewise, the proposed road and easement route would intersect Bullhide Creek. For water resource information in regards to the proposed MSA, see Section 4.11.2, 7SFG(A) Cantonment Alternative 2.

Surface Water Quality

Neither of the abovementioned streams associated with 7SFG(A) Cantonment Alternative 5 is on Florida's 303(d) List of Impaired Waters. For more details about the 303(d) List and surface water regulations and requirements see Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

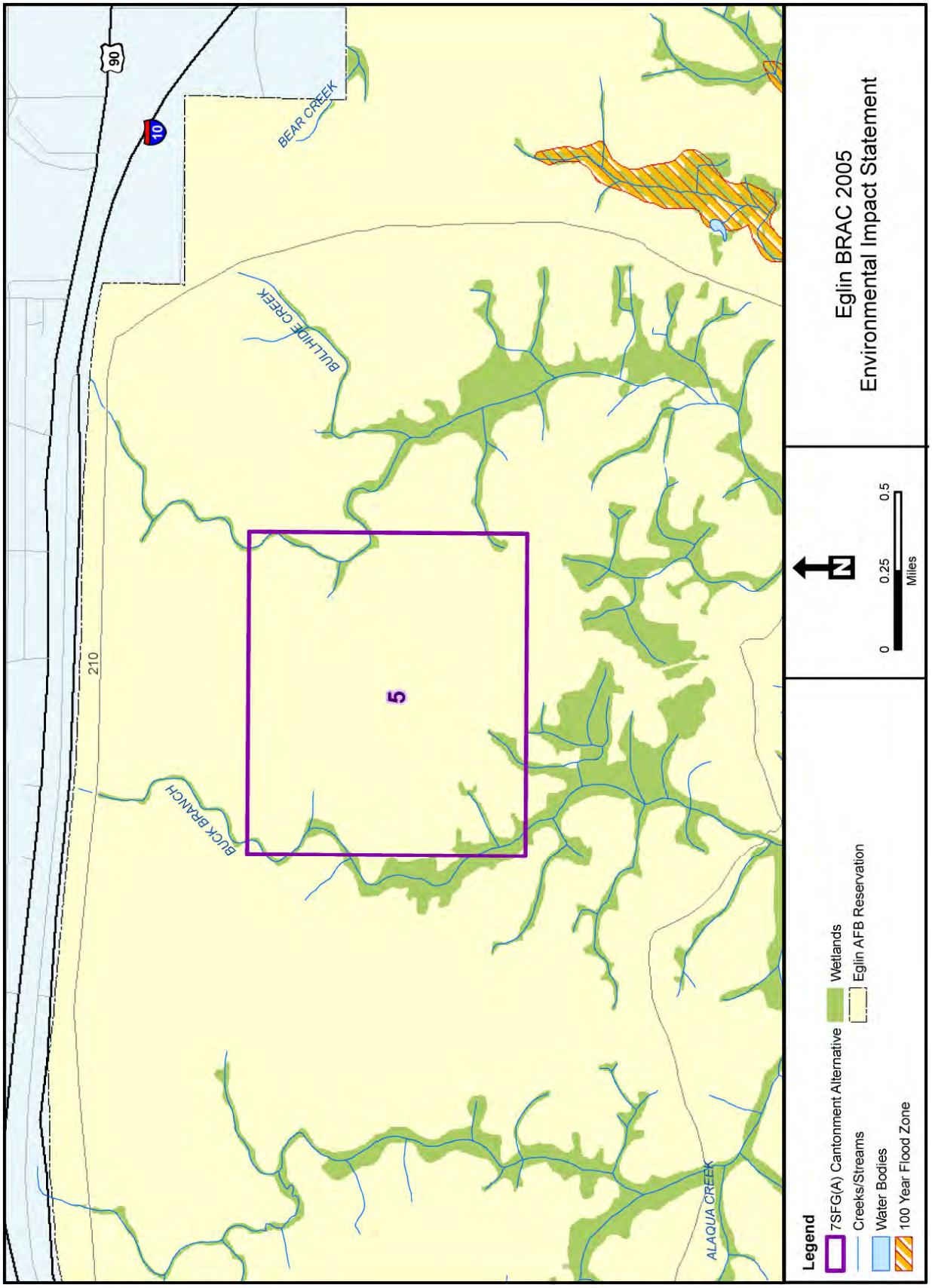

Figure 4-28. 7SFG(A) Cantonment Alternative 5 – Water Resources

Stormwater

The 7SFG(A) Cantonment Alternative 5 area is not developed; therefore, there are no man-made stormwater drainages or treatment areas to handle stormwater runoff. Additionally, there are no stormwater drainage or treatment features along the proposed road improvement and easement route. Stormwater regulations and requirements are discussed in Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources).

Wetlands and Floodplains

Wetlands on 7SFG(A) Cantonment Alternative 5 cover approximately 24.3 acres and are associated with Buck Branch and Bullhide Creek. There are no floodplains within or adjacent to the 7SFG(A) Cantonment Alternative 5 site. The proposed road improvement and easement route would cross adjacent to a wetland area associated with Bullhide Creek and through a 100-year floodplain area located off-base. Wetland and floodplain definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources).

Coastal Zone

As with the other 7SFG(A) cantonment alternatives, the 7SFG(A) Cantonment Alternative 5 area lies within the jurisdictional concerns of the FDEP under the CZMA. Coastal zone definitions, regulations and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources). Eglin prepared a CZMA determination to address the impacts to the coastal zone (Appendix I, *CZMA Determination*).

4.11.5.2 Environmental Consequences (Physical Resources – 7SFG(A) Cantonment Alternative 5)

Soils

There is a potential for erosion in the high-slope locations consisting of Troup sand that exist along Bullhide Creek and Buck Branch. Since it is doubtful that any activities would take place along a creek bank, erosion is not expected to be a major concern. However, where slopes greater than 12 percent exist, activities that have the potential to disturb soils should be avoided.

BMPs should be implemented since sloped surfaces can increase runoff into local creeks and streams. Vegetation, silt fences, and hay bales should be used to reduce soil runoff into Buck Branch and Bullhide Creek.

Water Resources

Water resources within the 7SFG(A) Cantonment Alternative 5 location include surface waters (Buck Branch and Bullhide Creek) and wetlands associated with these streams However, these areas would not be directly disturbed by construction activities. Therefore, there would be no direct impacts to surface water, groundwater, wetlands, or floodplains from cantonment area construction. Indirect water quality impacts associated with cantonment area construction relate to the potential for increased rate and volume of stormwater runoff, which would potentially increase the amount of sediment and pollutant runoff during and after rain events. Thus, the construction of the 7SFG(A) cantonment area may increase sediment transport into surface waters. The addition of new, impervious surfaces may also increase the number and kinds of pollutants carried off-site by stormwater runoff from everyday operations.

Road widening and improvements and easement construction follow existing roads or easements. The route for these improvements crosses Bullhide Creek and runs through a 100-year floodplain. The width of the road and easement would be expanded to 200 feet from approximately 20 feet. The road is currently unpaved, consisting of sand and clay. During construction, road and easement widening at Bullhide Creek would potentially have direct impacts on stream water quality as a result of sediment deposition. A culvert or bridge would potentially be required at Bullhide Creek. Construction would potentially physically modify the stream, affecting the flow of water. Once construction is complete and ground disturbance ceases, stream flow and water quality would improve. The construction of the access control point and the substation would increase the amount of impervious surface area by 10 acres. No surface waters or wetlands would be directly or indirectly affected. The closest surface water is greater than 600 feet from either the access control point or the substation.

Employing the same modeling methods that were described in 7SFG(A) Cantonment Alternative 1, stormwater totals for the 7SFG(A) Cantonment Alternative 5 site were obtained as follows in Table 4-44.

Table 4-44. Modeled 7SFG(A) Cantonment Alternative 5 Pre- and Post-Construction Stormwater Runoff Conditions

Alternative	Acres	Runoff[1](inches)		Peak Flows[2](ft³/s)		Runoff Increases due to Construction[3](inches)
		Pre	Post	Pre	Post	
5	500	1.32	3.32	235	840	2.00

ft^3/s = cubic feet per second
1. Modeled stormwater runoff amounts currently (Pre) and after construction (Post) in inches
2. Modeled stormwater runoff peak flows currently (Pre) and after construction (Post) in cubic feet per second
3. Increases in stormwater runoff after construction over current conditions in inches

Drawing on the analysis methods discussed for 7SFG(A) Cantonment Alternative 1 (Section 4.11.1.2), and assuming the 7SFG(A) Cantonment Alternative 5 site has never been developed or subjected to soil compaction, no adverse stormwater runoff would be expected.

No adverse impacts to surface water, groundwater, floodplain, or wetland quality from 7SFG(A) Cantonment Alternative 5 would be expected. The Army would obtain permits and implement as required by the FDEP site-specific management actions detailed in Section 4.11.1.2, Environmental Consequences for 7SFG(A) Cantonment Alternative 1, Water Resources.

For effects to water resources concerning the MSA, see Section 4.11.2.2, Environmental Consequences for 7SFG(A) Cantonment Alternative 2, Water Resources.

4.11.6 No Action Alternative

The No Action Alternative would involve activities on D-51, Duke Field, and Eglin Main Base as presented in Section 2.7. Soils and water resources quality for this area is described in Section 3.11, Physical Resources. Projects that have the potential to impact soil and water resources would be the construction of the VA CBOC and the JRF. There are no surface waters, wetlands, or floodplains within or adjacent to the VA CBOC footprint. The JRF construction activities would occur approximately 500 feet from Weekly Pond and about 1,000 feet from Weekly Bayou.

Under the No Action Alternative, no construction or land clearing would occur for the 7SFG(A) cantonment area or MSA. Therefore, soil and water resources within the alternative sites and the MSAs would remain as they are currently. Physical resources within the proposed 7SFG(A) project area boundaries would be unaffected under this alternative.

Soil and water resources have the potential to be impacted from other construction activities such as the VA CBOC and the JRF. These construction actions require coverage under the Generic Permit for Stormwater Discharge from Construction Activities that Disturb 1 or More Acres of Land (Rule 62-621, FAC). Both actions would be required to incorporate an SWPPP into the final design plan. Environmental analysis of these projects found no adverse impacts to soils, water resources, or water quality given the attainment of the required permits and the implementation of BMPs defined in the SWPPP (U.S. Air Force, 2005 and 2007a).

Given the assessments above, no adverse impacts to soil or water resources are anticipated under the No Action Alternative.

4.12 BIOLOGICAL RESOURCES

4.12.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.12.1.1 Existing Conditions (Biological Resources – 7SFG(A) Cantonment Alternative 1)

Flora and Fauna

Of Eglin's major ecological associations, only the Sandhills ecological association is found within or adjacent to the project area (Figure 4-29). A portion of the project area is also considered to be Landscaped/Urban. Table 4-45 shows the acreages within the ROI for Sandhills and Landscaped/Urban areas. Only a portion of this acreage would be cleared for the actual footprint of the cantonment area.

Table 4-45. 7SFG(A) Cantonment Alternative 1 – Acres of Habitats

Alternative	Sandhills	Landscaped/ Urban
ALT 1A	404	-
ALT 1B	483	88
ALT 1C	314	14
ALT 1 MSA Expansion	4	-

No invasive nonnative plant species have been documented within any of the 7SFG(A) Cantonment Alternative 1 locations or the Eglin Main Base MSA (Eglin Geographic Information System [GIS], 2007c).

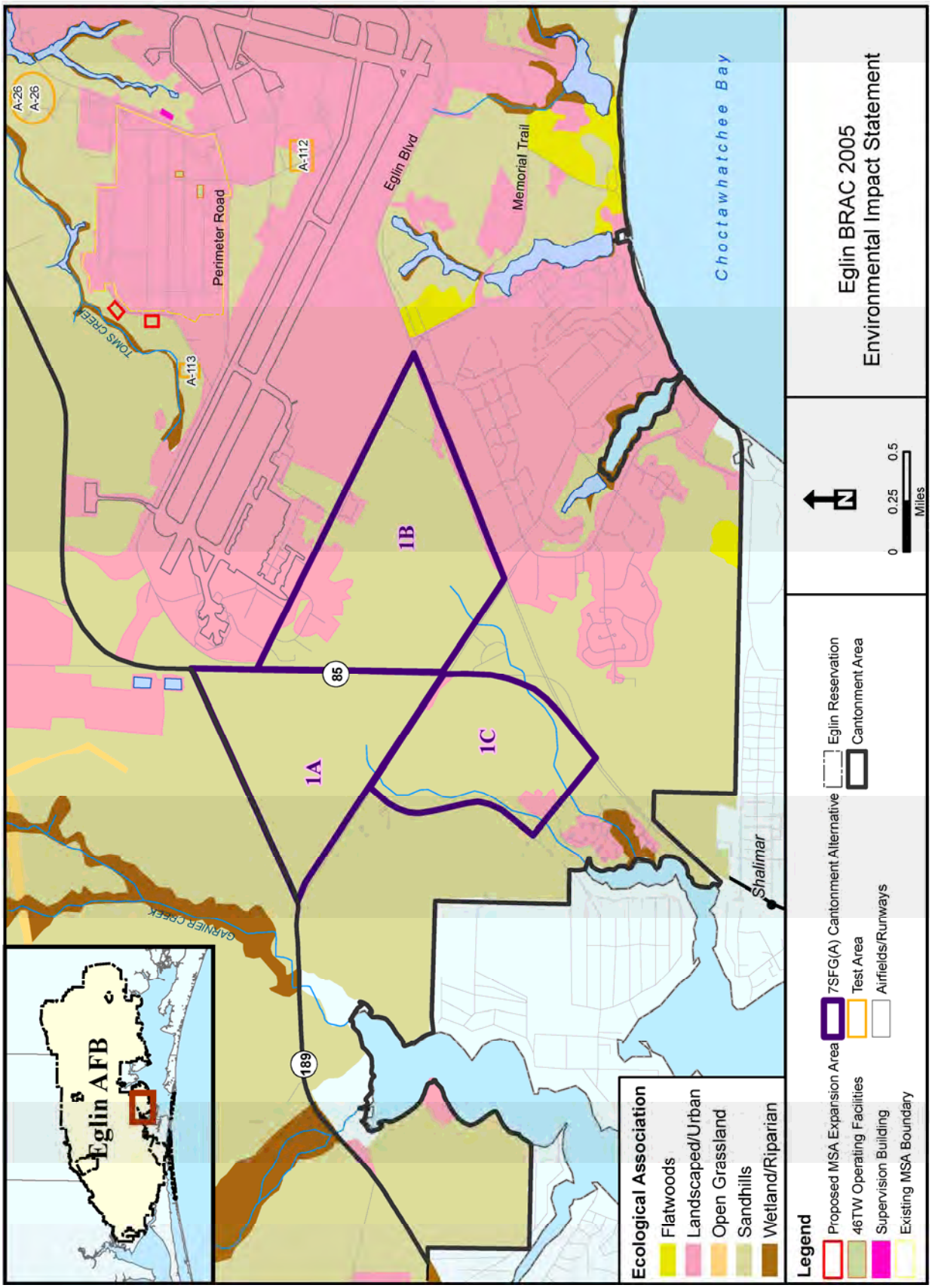

Figure 4-29. 7SFG(A) Cantonment Alternative 1 – Ecological Associations

Sensitive Habitats and Sensitive Species

No sensitive habitats are located within or adjacent to the 7SFG(A) Cantonment Alternative 1 locations. One High Quality Natural Community is located to the north of the MSA. Based on existing information, species documented to occur or potentially be present within the 7SFG(A) Cantonment Alternative 1 locations are identified in Table 4-46.

Table 4-46. 7SFG(A) Cantonment Alternative 1 – Potentially Occurring Sensitive Species Within or Adjacent to the Sites

Scientific Name	Common Name	Status	Site
Reptiles			
Drymarchon corais couperi	Eastern indigo snake	FT, ST	ALL
Gopherus polyphemus	Gopher tortoise	ST	ALL
Pituophis melanoleucus	Florida pine snake	SSC	ALL
Birds			
Picoides borealis	Red-cockaded woodpecker	FE, ST	Inactive Trees at 1B and MSA
Falco sparverius paulus	Southeastern American kestrel	ST	ALL
Mammals			
Ursus americanus floridanus	Florida black bear	ST	1A, 1B, 1C
Fish			
Etheostoma okaloosae	Okaloosa darter	FE, SE	MSA
Plants			
Tephrosia mohrii	Pineland Hoary Pea	ST	1C

Sources: Eglin GIS, 2007a; Eglin GIS, 2007b; Eglin GIS, 2007c
FE = Federally Endangered; FT = Federally Threatened; ST = State Threatened; SE = State Endangered; SSC = State Species of Special Concern

Species documented to occur in the project areas are the Florida black bear and pineland hoary pea (Eglin GIS, 2007c). An Okaloosa darter stream is located to the north of the MSA (Figure 4-30). Multiple inactive RCW trees are located in and adjacent to the 7SFG(A) Cantonment Alternative 1 locations (Figure 4-30). Due to the habitat type, the gopher tortoise, indigo snake, kestrel, and Florida pine snake may utilize the area. Appendix H, *Biological Resources*, provides additional details on sensitive species.

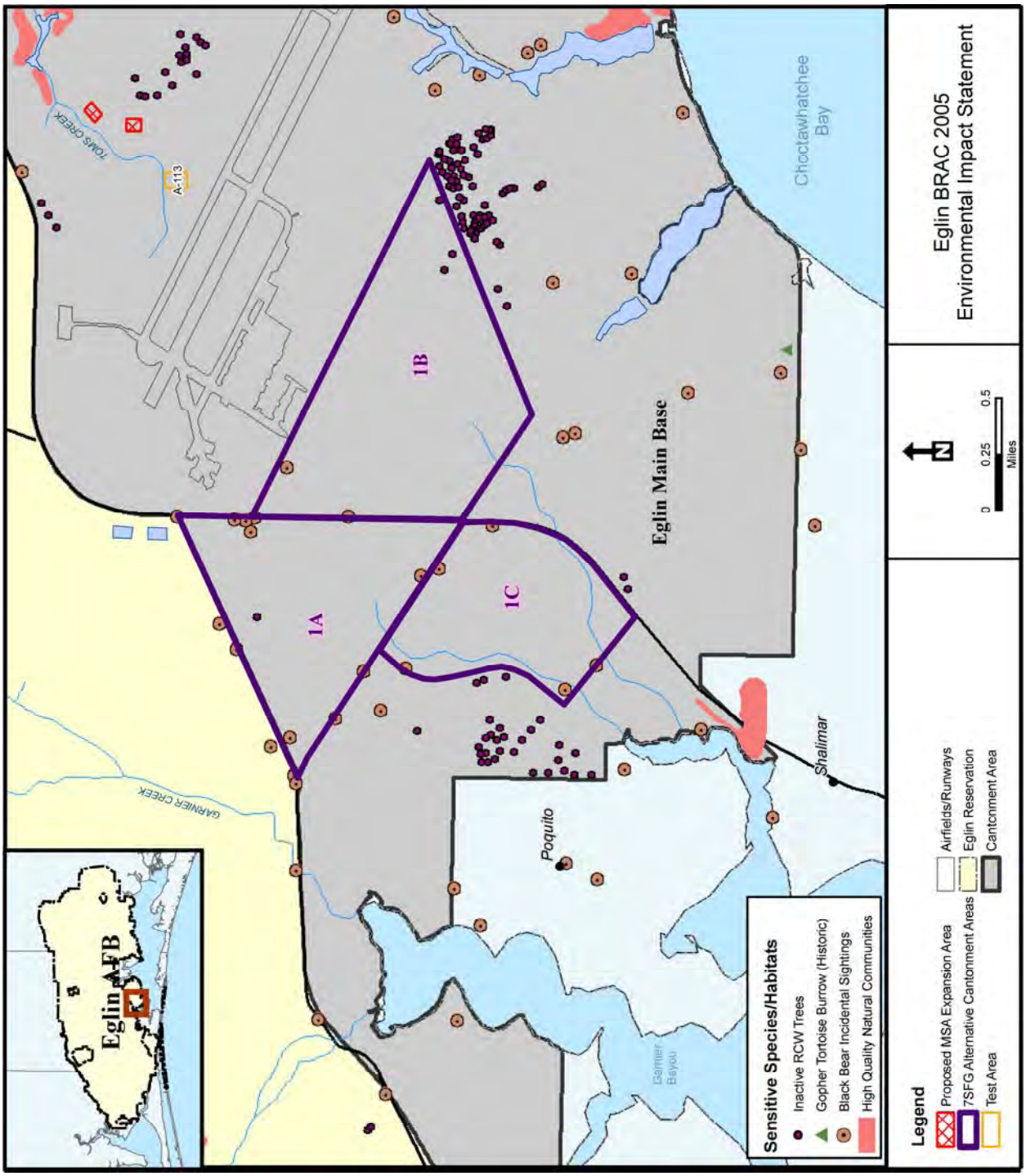

Figure 4-30. 7SFG(A) Cantonment Alternative 1 – Sensitive Habitats and Sensitive Species

4.12.1.2 Environmental Consequences (Biological Resources – 7SFG(A) Cantonment Alternative 1)

This section discusses potential impacts to biological resources located within and adjacent to the action area. Analysis focuses on assessing the potential for impacts to biological resources from land clearing, construction, and daily cantonment activities, as well as on identifying methods to reduce the potential for negative impacts to biological resources from these activities. A significant impact would be one that is likely to jeopardize the continued existence of the species.

Land clearing and daily operations may have a localized effect on native terrestrial wildlife species such as squirrels, raccoons, and rabbits. However, these species would either move to another location or remain within the area and utilize remaining foliage for habitat. In addition, the proposed areas represent only a small percentage of the total land area that Eglin maintains. For streams and wetlands, riparian buffers are important to maintaining the health of aquatic communities. Buffers of 100 feet would provide the following benefits: (1) maintenance of stream temperature, (2) contribution of large woody debris habitat, (3) maintenance of diverse stream invertebrates, and (4) removal of excess sediment, nitrogen, phosphorus, and other contaminants (USFWS, 2001). To provide quality habitat for reptiles, amphibians, interior forest species, and migrating birds, larger buffers are better (300 to 1,000 feet) (USFWS, 2001). Site designs would be modified to avoid aquatic habitats and to provide as much riparian buffer as possible; clearing and construction operations would observe all buffer requirements and erosion control measures resulting from permits. Impacts to terrestrial and aquatic wildlife would not be significant under any of the alternatives. The remaining sections focus on sensitive habitats and species.

Red-cockaded Woodpeckers

Multiple inactive federally endangered red-cockaded woodpecker (RCW) trees are located in and adjacent to the 7SFG(A) Cantonment Alternative 1 and MSA locations (Figure 4-30). Eglin Natural Resources Section (NRS) biologists indicate there is extremely low potential for any of these clusters to become active because the habitat is not suitable for future colonization (Gault, 2006). No good foraging habitat is available near the trees, with most of the surrounding habitat consisting of sand pine. Additionally, the closest active clusters are over five miles away, and RCWs do not fly this great a distance, particularly with no foraging habitat available. These areas are not significant or of importance in future RCW management or as an emphasis area as designated by the Eglin Integrated Natural Resources Management Plan (U.S. Air Force, 2007f). Furthermore, a letter from the U.S. Fish and Wildlife Service (USFWS) on 5 June 1997 concurs with NRS that any future developments impacting inactive RCW trees on Eglin Main Base are not likely to adversely affect the RCW (USFWS, 1997). Thus, land clearing, construction, and daily operations at the 7SFG(A) Cantonment

Alternative 1 sites and MSA are not likely to adversely affect the RCW. Impacts to the RCW would not be significant under any of the alternatives.

Okaloosa Darter

Sedimentation and runoff associated with construction and demolition activities at the MSA have the potential to affect the federally endangered Okaloosa darters in the stream north of the MSA (Toms Creek). Daily operations would not impact the Okaloosa darter. Utilization of erosion control measures such as silt fencing near Toms Creek would reduce impacts. There is no standard guidance for vegetative buffers along Okaloosa darter streams; however, maintenance of at least a 100-foot buffer would substantially reduce the potential for excess sedimentation and runoff to impact the stream north of the MSA and would provide good aquatic habitat protection (USFWS, 2001). It is approximately 700 feet from the proposed MSA expansion area to Toms Creek. With implementation of the suggested mitigations in Table 4-53 (at the end of this Section 4.12), land clearing, construction, and daily operations at the 7SFG(A) Cantonment Alternative 1 sites and MSA activities are not likely to adversely affect the federally listed Okaloosa darter. Impacts to the Okaloosa darter would not be significant.

Florida Black Bear

All of the 7SFG(A) Cantonment Alternative 1 locations have documented occurrences of the Florida black bear. Habitat loss would be minimal, as the alternative locations represent less than one percent of the total area of undeveloped lands on Eglin AFB, which provides black bear habitat throughout the Eglin Reservation. Possible impacts are associated with the potential for increased human-bear interaction. Numerous bear sightings are documented in these areas each year (Hagedorn, 2004). It is unknown exactly what attracts the bear to the area; while bears may be attracted to the Garnier Bayou and Poquito Bayou water interface nearby, they may also be attracted to the area due to a human presence (garbage, etc.) as many more sightings are located near urbanized areas. In addition, since 2003 there have been 21 reported bear mortalities from automobile collisions along Hwy 85 just east of the 7SFG(A) Cantonment Alternative 1C location, and 50 bears have been killed since 1984 by automobiles on roads that border Eglin property (Eglin GIS, 2007a).

Siting of the cantonment area at the Alternative 1 location would lead to an increase in traffic on Hwy 85, thereby increasing the potential of bear mortalities from vehicles. However, the fencing that would surround the cantonment area (preferably electric fencing) should prevent bears from entering the area, thereby reducing the likelihood of bears crossing Hwy 85 and Hwy 123 and related bear-automobile incidents. It is possible that bears may be attracted to the area due to smells despite the fact that they cannot access the cantonment area. As a precaution, it would be important for the

cantonment facility to responsibly handle waste, employing measures such as bear-proof dumpsters, bear-resistant garbage cans, and proper disposal measure of oil waste from dining facilities. Additionally, Eglin could provide informational materials to residents in cantonment areas regarding bears and how to successfully coexist in bear country (i.e., removing wildlife feeders, securing pet food, cleaning and securing barbeque grills). Impacts to the Florida black bear would not be significant under any of the alternatives.

Gopher Tortoise

All 7SFG(A) Cantonment Alternative 1 locations have the potential to provide habitat for the gopher tortoise; however, habitat quality is poor. Naturally forested areas in the alternative locations contain an overstory of scattered longleaf pine and dense sand pine. The midstory is dominated by 20- to 30-foot-tall sand pine and also contains laurel oak, live oak, hawthorn, Vaccinium, and other deciduous species. The ground cover is primarily pine straw and oak leaves, with some woody vegetation such as palmetto and false rosemary. Throughout the areas the groundcover is less than 10 percent herbaceous vegetation; some openings have more groundcover and highly shaded areas have less. The Florida Fish and Wildlife Commission (FWC) (2006) characterizes good gopher tortoise habitat as having:

- The presence of well-drained, sandy soils, which allow for ease of burrowing.
- An abundance of herbaceous groundcover.
- A generally open canopy and sparse shrub cover, which allow sunlight to reach the forest floor.

The 7SFG(A) Cantonment Alternative 1 areas meet only one of these criteria, the presence of well drained, sandy soils. Generally large areas of closed canopy support small tortoise populations. The highest densities are usually found where light levels are high and where there is a diversity of grasses and forbs, some of which serve as food resources (Auffenberg and Franz, 1982). In order to maintain good herbaceous groundcover and an open canopy, prescribed fire or heavy thinning of stands is required. Landers and Speake (1980) recommend judicious thinning of scrub oaks and prescribed burning at least every five to 10 years where summer burns are feasible or every two to four years if winter burns are used. Wilson et al. (1997) recommend a burn rotation of two to five years for sandhill habitat and one to three years for flatwoods habitat. No areas proposed for this project have been burned within the last 20 years. Furthermore, because these parcels of land are adjacent to both urban housing areas and highways, the use of prescribed fire as a management tool in the future is unlikely.

In general, the habitat has a closed canopy with little or no herbaceous understory. In addition, the natural forest in the proposed project areas has been encroached by sand

pine. This species' limb growth results in a dense forest with little or no understory; tortoise densities are extremely low in areas exhibiting these characteristics (Diemer, 1986). Given these factors, it is likely that the gopher tortoise does not occur on a frequent basis.

If present, impacts may result from gopher tortoise burrow collapse or from direct physical impacts during construction and daily cantonment activities. A survey of the alternative areas to evaluate the presence of any gopher tortoise burrows and the subsequent relocation of tortoises identified during the survey would minimize any potential impacts. Eglin would need to obtain a permit from the FWC to relocate any tortoises in imminent danger from construction. Transportation and release of tortoises would follow guidelines established by the FWC in *Gopher Tortoise Permitting Guidelines* (FWC, 2008).

Such relocations already occur on Eglin; since June 1993, 115 gopher tortoises have been relocated. The majority of these tortoises were moved to Eglin from off-site. However, three tortoises were relocated from construction areas either on Eglin or Hurlburt Field. Eglin currently has a number of release areas that have been approved by the FWC. Each site has been surveyed for the appropriate habitat and potential existing tortoise populations. The areas are all burned on a three- to five-year rotation in order to maintain suitable habitat.

Given the degraded condition of the Sandhills habitat in the 7SFG(A) Cantonment Alternative 1 areas, it is unlikely any tortoises would be present. However, if any were found, relocation to another area on Eglin would alleviate impacts. Thus, impacts to the gopher tortoise would not be significant under any of the alternatives.

Eastern Indigo Snake

The federally threatened eastern indigo snake may be present; however few gopher tortoise burrows are present (which indigo snakes often use as refuges during the winter) in this area and habitat quality is poor. In coordination with the USFWS, as part of the eastern indigo snake recovery plan, Eglin has developed standard practices for forestry and other land-disturbing activities to minimize any potential impacts to this species. Such practices include providing project personnel with a description of the eastern indigo snake, its behaviors, and protection under federal law, and giving them instructions not to injure, harm, or kill this species. The primary potential impact would be crushing by vehicles, both during construction and daily operations. Practices that would reduce impacts include ceasing activities if an eastern indigo snake is sighted and allowing the snake to move away from the site before resuming activities, and avoiding disturbance to gopher tortoise burrows.

For any gopher tortoise burrows that were in imminent danger from clearing/ construction, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., indigo snake). In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated. Additionally, Eglin is currently preparing a programmatic Section 7 Endangered Species Act (ESA) consultation with the USFWS to address the potential of finding an eastern indigo snake, relocating it to an appropriate area, and the assignment of take associated with such an action. The term *take* means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Eglin currently applies for permits from the FWC (FWC, 2008) to relocate gopher tortoises and commensal species (including the eastern indigo snake), but does not have associated take for federal actions undertaking otherwise lawful projects that might result in the take of an endangered or threatened species. The programmatic indigo snake Section 7 consultation would be completed prior to any BRAC activity and would provide ESA compliance should an eastern indigo snake need to be relocated. Thus, activities at the 7SFG(A) Cantonment Alternative 1 sites and MSA are not likely to adversely affect the federally threatened eastern indigo snake. Impacts to the eastern indigo snake would not be significant under any of the alternatives.

Florida Pine Snake

In addition to the eastern indigo snake, the Florida pine snake and other commensal species also utilize gopher tortoise burrows as habitat. While the snake has not been documented to occur in any of the project areas, its occurrence is possible given the presence of gopher tortoises nearby and the ecological community types of the project areas. The primary potential impact would be crushing by vehicles, both during construction and daily operations. Practices that would reduce impacts include ceasing activities if a snake is sighted and allowing the snake to move away from the site before resuming activities.

For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., pine snake). In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.

The USACE describes good quality habitat for the pine snake as xeric, pine-dominated or pine-oak woodland with an open, low understory established on sandy soils. Nesting and hibernation sites require forest openings with level, sandy, well-drained soils and minimal shrub cover (USACE, 1998). The project areas are considered

low-quality sandhill habitat, given the requirements listed previously. It follows that the Florida pine snake occurs sparsely, given the low quality of the habitat. While potential adverse impacts to individual snakes could occur if encountered during project activities, the impact to overall populations at Eglin would be minimal considering the following factors: (1) while loss of habitat due to development is one of the main contributors to species decline, Eglin has many thousands of acres that provide suitable habitat for the species; (2) the USACE listed habitat fragmentation as a major threat to pine snake survival in many areas (USACE, 1998), and the project areas are already fragmented from the main reservation; and (3) subspecies of the pine snake in the southeast are intimately associated with habitat that experiences a frequent fire history.

Changes in species composition occur in sandhills that do not experience frequent burning, resulting in increased shading and loss of the natural community over time. The USACE finds that changes in fire regimes in these areas are likely the major factor leading to decline of southeastern subspecies of the pine snake (USACE, 1998). The project areas cannot be fire maintained due to their proximity to developed areas, making them poor habitat for the pine snake. Given the poor quality of the Sandhills habitat in the 7SFG(A) Cantonment Alternative 1 areas, Florida pine snakes are not likely to occur here, making the likelihood of a vehicle encounter low. Impacts to the Florida pine snake would not be significant under any of the alternatives.

Invasive Nonnative Species

Disturbance to soil and vegetation from land clearing and construction could enhance conditions for the establishment and spread of invasive nonnative plant species. However, Eglin Main Base has already been heavily impacted by human disturbance. Because the majority of the cantonment area would be covered by buildings, pavement, or landscaped areas, there would not be many areas with the proper environment for the establishment of invasive nonnative plants. Additionally, all landscaping and plantings of vegetation would conform to the Presidential Memorandum dated 26 April 1994, Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds, and Executive Order 13112, Invasive Species, both of which require the planting of regional natives in landscaping. Mitigations are available to reduce the potential for invasive nonnative species infestations (see Table 4-53 at the end of this Section 4.12). Impacts from invasive nonnative plant species to biological resources would not be significant under any of the alternatives.

7SFG(A) Cantonment Alternative 1A: The Triangle

An estimated 121 acres and four acres of degraded Sandhills ecological association would be cleared for the cantonment area and MSA expansion area, respectively (Figure 4-29). As discussed previously, impacts to the gopher tortoise, Florida pine

snake, and black bear would not be significant. The 7SFG(A) Cantonment Alternative 1A and MSA activities are not likely to adversely affect the federally listed eastern indigo snake, Okaloosa darter, or RCW. The majority of the Sandhills habitat within the 7SFG(A) Cantonment Alternative 1A area is degraded and of poor quality; thus, impacts to biological resources would not be significant.

7SFG(A) Cantonment Alternative 1B: Eglin West Gate

An estimated 145 acres of degraded Sandhills habitat would be cleared for the 7SFG(A) cantonment area near the Eglin West Gate (Figure 4-29). As discussed previously, impacts to the gopher tortoise, Florida pine snake, and black bear would not be significant. The 7SFG(A) Cantonment Alternative 1B and MSA activities are not likely to adversely affect the federally listed eastern indigo snake, Okaloosa darter, or RCW. The majority of the Sandhills habitat within the 7SFG(A) Cantonment Alternative 1B area is degraded, poor quality wildlife habitat, thus impacts to biological resources would not be significant.

7SFG(A) Cantonment Alternative 1C: North Poquito

An estimated 123 acres of degraded Sandhills would be cleared for the 7SFG(A) cantonment area in the North Poquito area (Figure 4-29). As discussed previously, impacts to the gopher tortoise, Florida pine snake, and black bear would not be significant. The 7SFG(A) Cantonment Alternative 1C and MSA activities are not likely to adversely affect the federally listed eastern indigo snake, Okaloosa darter, or RCW. The majority of the Sandhills habitat within the 7SFG(A) Cantonment Alternative 1C area is degraded, poor quality wildlife habitat, thus impacts to biological resources would not be significant.

4.12.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.12.2.1 Existing Conditions (Biological Resources – 7SFG(A) Cantonment Alternative 2)

Flora and Fauna

Of Eglin's major ecological associations, only the Wetland/Riparian and Sandhills ecological associations are found at the project areas (Figure 4-31). Landscaped/Urban and Grassland/Shrubland areas also exist at the project area. Table 4-47 shows approximate acreages for each ecological association and sensitive habitat located within the project areas.

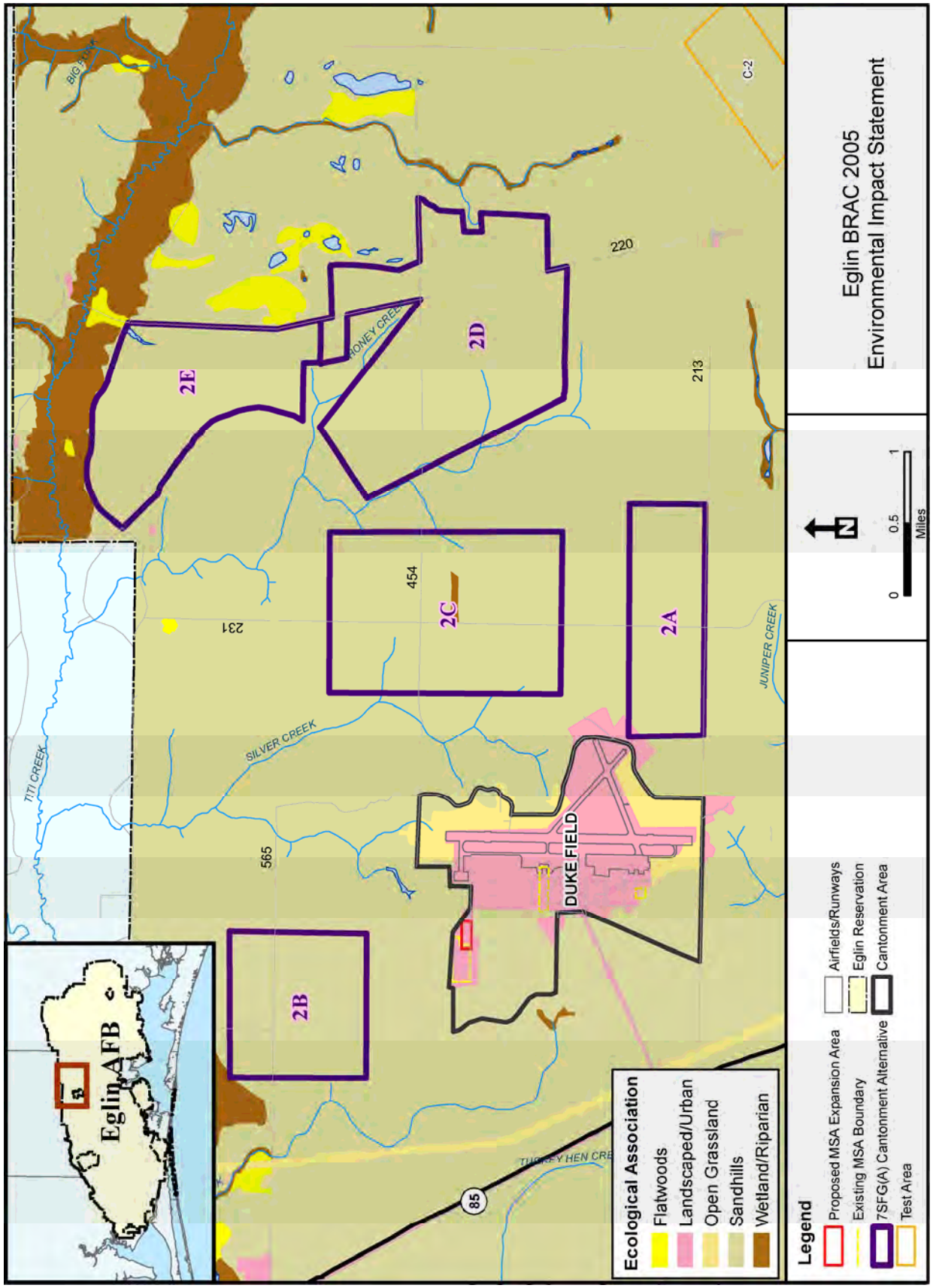

Figure 4-31. 7SFG(A) Cantonment Alternative 2 – Ecological Associations

Table 4-47. 7SFG(A) Cantonment Alternative 2 – Acres of Habitats

Alternative	Sandhills	Wetland/ Riparian	Landscaped/ Urban	Grasslands/ Shrublands	Outstanding Natural Area	Significant Botanical Site	High Quality Natural Community
ALT 2A	470	-	3	-	-	-	-
ALT 2B	534	0.1	-	-	-	-	-
ALT 2C	1,023	9	-	-	-	-	4
ALT 2D	1,281	-	-	-	341	341	20
ALT 2E	716	-	-	-	2	2	-
ALT 2A Roads*	63	-	-	12	-	-	9
ALT 2B Roads*	71	-	-	3	-	-	-
ALT 2C Roads*	87	-	-	11	-	-	9
ALT 2D Roads*	149	-	4	12	16	16	13
ALT 2E Roads*	190	-	4	12	30	30	13
ALT 2 MSA Expansion	5	-	3		-	-	-

*Roads include road widening, access control point, and substation

No invasive nonnative plant species have been documented within any of the 7SFG(A) Cantonment Alternative 2 locations or the Duke Field MSA (Eglin GIS, 2007c).

Sensitive Habitats and Sensitive Species

Two High Quality Natural Communities are located along the southern boundary of the 7SFG(A) Cantonment Alternative 2A site (Figure 4-31) and the road widening area along RR 213. The northwest corner of the 7SFG(A) Cantonment Alternative 2B site is close to a High Quality Natural Community (Figure 4-32). Another small High Quality Natural Community is located in the center of the 7SFG(A) Cantonment Alternative 2C area (Figure 4-32; Table 4-47). Multiple High Quality Natural Communities are present at the 7SFG(A) Cantonment Alternative 2D site—two to the north, one to the southwest, one to the east, and one in the center of the site (Figure 4-32; Table 4-47). At the 7SFG(A) Cantonment Alternative 2E site, High Quality Natural Communities are located to the north, south, and east (Figure 4-31). The Spenser Flats Wetland Outstanding Natural Area/Blue Spring Creek Lakes Significant Botanical Site borders the Alternative 2E site on its eastern side, and a portion of this Outstanding Natural Area/Significant Botanical Site falls within the 7SFG(A) Cantonment Alternative 2D site (Figure 4-31; Table 4-47). RR 220 road widening and the accompanying access control point would occur in the western portion of the Spenser Flats/Blue Spring Creek Lakes area.

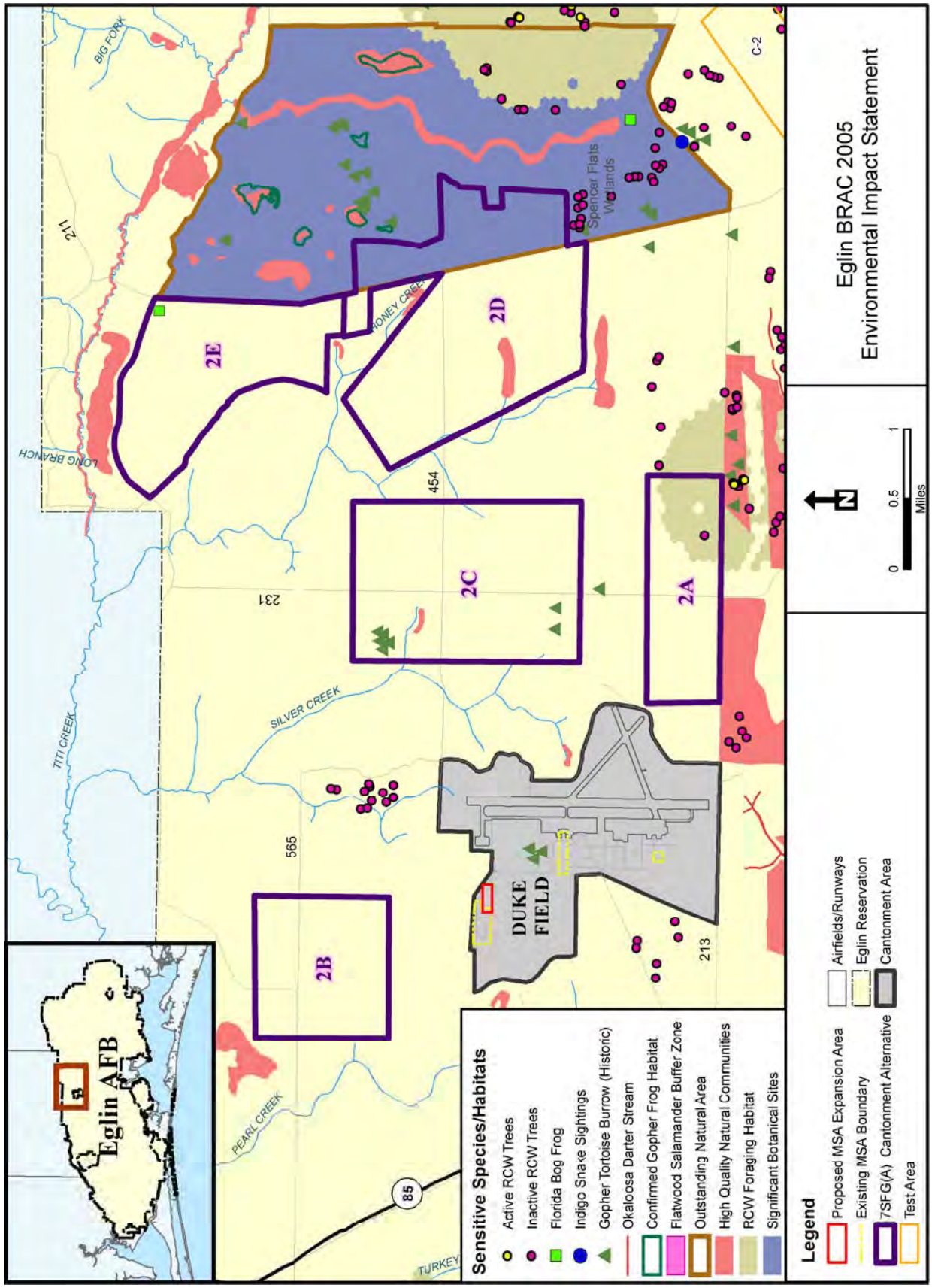

Figure 4-32. 7SFG(A) Cantonment Alternative 2 – Sensitive Habitats and Sensitive Species

Based on existing information, the species documented to occur or potentially present within the 7SFG(A) Cantonment Alternative 2 locations are identified in Table 4-48 and Figure 4-32. The only sensitive animal species documented to occur within the boundaries of the project alternative areas are the gopher tortoise (7SFG(A) Cantonment Alternative 2C) and Florida bog frog (7SFG(A) Cantonment Alternative 2E) (Figure 4-32). Gopher tortoise sightings have also occurred south of the 7SFG(A) Cantonment Alternatives 2A and 2D sites (Figure 4-32). The 7SFG(A) Cantonment Alternatives 2D and 2E sites and their access road (RR 220) overlap with some potential habitat for the federally threatened flatwoods salamander, and documented gopher frog habitat is located to the east of the 7SFG(A) Cantonment Alternative 2D location (Figure 4-32). The headwaters of two Okaloosa darter streams are approximately 0.5 mile south of 7SFG(A) Cantonment Alternative 2A and the RR 213 road widening area (Figure 4-32). Gopher tortoise burrows exist near multiple areas along the road widening routes on RR 213, RR 231, and RR 220.

Table 4-48. 7SFG(A) Cantonment Alternative 2 – Potentially Occurring Sensitive Species Within or Adjacent to the Sites

Scientific Name	Common Name	Status	Site
Reptiles and Amphibians			
Ambystoma cingulatum	Flatwoods salamander	FT, SSC	2D, 2E
Drymarchon corais couperi	Eastern indigo snake	FT, ST	ALL
Gopherus polyphemus	Gopher tortoise	ST	ALL
Pituophis melanoleucus	Florida pine snake	SSC	ALL
Rana capito	Gopher frog	SSC	East of 2D & 2E
Rana okaloosae	Florida bog frog	SSC	2E
Birds			
Picoides borealis	Red-cockaded woodpecker	FE, ST	2A, RR 213
Falco sparverius paulus	Southeastern American kestrel	ST	ALL
Fish			
Etheostoma okaloosae	Okaloosa Darter	FE, SE	South of 2A
Mammals			
Ursus americanus floridanus	Florida black bear	ST	ALL
Plants			
Carex baltzellii	Baltzell's Sedge	ST	2C
Baptisia calycosa var villosa	Hairy Wild Indigo	ST	2C, 2D
Monotropa hypopithys	Pine Sap	SE	2C
Quercus arkansana	Arkansas Oak	ST	2C
Sarracenia rubra	Sweet Pitcher Plant	ST	2D
Tephrosia mohrii	Pineland Hoary Pea	ST	2E

Sources: Eglin GIS, 2007a; Eglin GIS, 2007b; Eglin GIS, 2007c
FE = Federally Endangered; FT = Federally Threatened; ST = State Threatened; SE = State Endangered; SSC = State Species of Special Concern

The kestrel, Florida pine snake, eastern indigo snake, and Florida black bear may pass through the project areas. Multiple inactive RCW trees exist south of the 7SFG(A) Cantonment Alternative 2A and 2D sites. One inactive tree falls within the boundaries of the 7SFG(A) Cantonment Alternative 2A area, and one inactive tree is within the RR 213 road improvement area east of the 2A site. There are five active trees south of 7SFG(A) Cantonment Alternative 2A (Figure 4-32). The 7SFG(A) Cantonment Alternative 2A site and the RR 213 road widening area include some RCW foraging habitat. Multiple state-listed plant species are documented to occur at the alternative sites (Table 4-48), and additional state-listed plant species are located in proximity to the alternative sites in association with stream and wetland features. Appendix H, *Biological Resources*, offers a more detailed natural history description of these species.

4.12.2.2 Environmental Consequences (Biological Resources – 7SFG(A) Cantonment Alternative 2)

This section discusses potential impacts to biological resources located within and adjacent to the action area. Analysis focuses on assessing the potential for impacts to biological resources from land clearing, construction, and daily cantonment activities, and on identifying methods to reduce the potential for negative impacts to biological resources from these activities.

Sensitive Habitats

The focus of management in High Quality Natural Communities, Outstanding Natural Areas, and Significant Botanical Sites is the maintenance of natural processes (e.g., the fire regime), and abatement of specific threats, such as invasive species (e.g., sand pine and cogon grass). The ecological qualities of these areas require that management be carried out with a higher level of scrutiny, especially with regard to the high quality herbaceous ground cover and the high density of rare species. General management suggestions for each community type are presented in the Eglin AFB Natural Community Survey Final Report (Kindell et al., 1997). More specific guidelines relating to each community's management are being developed by NRS staff to be incorporated into pertinent component plans of the Eglin Integrated Natural Resources Management Plan (U.S. Air Force, 2007f). Construction actions in any High Quality Natural Community, Outstanding Natural Area, or Significant Botanical Site would be reviewed by appropriate personnel from each area of expertise within the NRS and recommendations would be made on how to mitigate any potential impacts.

Development of the cantonment area or increased road traffic adjacent to a fire-dependent High Quality Natural Community, Outstanding Natural Area, or Significant Botanical Site would make it much more difficult to maintain a regular prescribed fire rotation. Eglin NRS would not likely be able to burn the area regularly or as thoroughly due to smoke management problems with the cantonment area and road (Furman, 2007b). Eglin NRS would prioritize prescribed fire as resources allow, however, the

High Quality Natural Community, Outstanding Natural Area, or Significant Botanical Site would likely be affected due to fire suppression (Furman, 2007b), primarily from changes in vegetation due to lack of fire.

Only small areas of High Quality Natural Communities, Outstanding Natural Areas, and Significant Botanical Sites would be directly affected by the development of a 7SFG(A) cantonment area at the Alternative 2A, 2B, 2C, or 2E site, or the access control point and road widening of RR 213 and RR 220 (Table 4-47). The greatest potential for impacts would be at the 2D location, which would involve clearing up to 357 acres of an Outstanding Natural Area/Significant Botanical Site. A reduction in prescribed fire would occur in the proximity of all of the 7SFG(A) Cantonment Alternative 2 sites and in the areas along the access roads. Although there would be a reduction in acreage and degradation of certain sensitive habitats (primarily for 7SFG(A) Cantonment Alternative 2D), similar habitats exist on other portions of Eglin and would continue to be maintained. Overall, impacts to these sensitive habitats would not be significant for any of the 7SFG(A) Cantonment Alternative 2 locations.

Gopher Tortoise

Gopher tortoise burrows serve as important habitat for many species, including the federally threatened eastern indigo snake. Gopher tortoise burrows are easily damaged by ground disturbance, especially from heavy equipment, as they can cave-in due to ground instability. Road improvements would create barriers and/or potential hazards from vehicles due to increased traffic volume and speed. Since gopher tortoises may occur within the Proposed Action areas, there is a potential impact through incidental contact. Therefore, gopher tortoise surveys would be conducted immediately prior to construction and road widening. If any burrows were found to be in imminent danger from construction or road widening, Eglin would obtain a relocation permit from the FWC and relocate these tortoises in accordance with FWC guidelines (FWC, 2008).

In the event that a gopher tortoise was spotted after the relocation, actions that would minimize impacts to the gopher tortoise from both construction/clearing activities and daily cantonment operations would include ceasing activity (including driving) if a gopher tortoise were spotted and waiting until the animal moved away from the area. Indirect impacts from the development of the cantonment area at any of the 7SFG(A) Cantonment Alternative 2 sites would include a reduction in future gopher tortoise habitat, and a degradation of surrounding habitats due to fire suppression. However, ample gopher tortoise habitat is available on other portions of Eglin, and any gopher tortoises within the construction footprint would be relocated to high quality habitat at another location on Eglin. Overall impacts to the gopher tortoise would not be significant for any of the 7SFG(A) Cantonment Alternative 2 locations.

Eastern Indigo Snake

The primary potential impact to the federally threatened eastern indigo snake is from direct physical impacts associated with land-clearing activities and increased traffic speed and volume on access roads. Incidental contact with personnel on foot and wheeled vehicles could result in trampling or crushing of individuals on roads, but this occurrence is unlikely, as a snake would most likely move away from the area if it sensed a general disturbance in its vicinity. However, if an indigo snake were sighted, impacts could be avoided if personnel would cease activities until the snake had moved away from the area.

Eglin is currently preparing a programmatic Section 7 ESA consultation with the USFWS to address the potential of finding an eastern indigo snake, relocating it to an appropriate area, and the assignment of take associated with such an action. For any gopher tortoise burrows that need to be relocated, Eglin would obtain a permit from the FWC and relocate these tortoises and any associated commensals (i.e., indigo snake) in accordance with FWC guidelines in *Gopher Tortoise Permitting Guidelines* (FWC, 2008). In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated. The Section 7 consultation would be completed prior to any BRAC activity, and would provide ESA compliance should an eastern indigo snake need to be relocated. Thus, the 7SFG(A) Cantonment Alternative 2 activities are not likely to adversely affect the eastern indigo snake. Overall impacts to the indigo snake would not be significant for any of the 7SFG(A) Cantonment Alternative 2 locations.

Florida Pine Snake

While the state-listed Florida pine snake has not been documented to occur at any of the project areas, its occurrence is possible given the presence of gopher tortoise burrows and the Sandhills habitat of the project areas. Eglin would obtain a permit from the FWC for any gopher tortoise burrows that need to be relocated and would relocate these tortoises and any associated commensals (i.e., pine snake) in accordance with FWC guidelines in *Gopher Tortoise Permitting Guidelines* (FWC, 2008). In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.

Direct physical impacts are also possible due to land-clearing activities and increased traffic speed and volume on access roads. Incidental contact with personnel on foot and wheeled vehicles could result in trampling or crushing of individuals on roads, but this occurrence is unlikely, as a snake would most likely move away from the area if it sensed a general disturbance in its vicinity. However, if an pine snake were sighted,

impacts could be avoided if personnel would cease activities until the snake had moved away from the area.

While potential adverse impacts to individual snakes could occur if encountered during project activities, the impacts to overall populations at Eglin would not be significant considering that Eglin has many thousands of acres that provide suitable habitat for the species.

Flatwoods Salamander

Construction of the 7SFG(A) cantonment area and RR 220 widening (for 7SFG(A) Cantonment Alternatives 2D and 2E) within potential flatwoods salamander habitat may affect hydrology and sediment levels and result in decreased frequency of prescribed fire and increased frequency of wildfire-related suppression. The federally threatened flatwoods salamander is thought to be sensitive to soil and groundcover disturbing activities within its terrestrial habitat, especially when the disturbance creates an impediment to or alteration of the ephemeral wetlands it uses to breed. Soil and vegetation disturbance results in changes to the natural flow and deposition of water, which in turn affects the length of time a pond may hold water and the extent to which ponds are filled. These alterations of hydroperiod have a great potential to interrupt the normal breeding cycle of the flatwoods salamander.

RR 220 improvements would run along the western edge of potential salamander habitat. The road improvements would be in Sandhills habitat, over 1,400 feet from the actual ponds, and thus would not contribute excess sedimentation or cause hydrologic alteration to the ponds.

It is extremely difficult to find adult salamanders or their larvae. Labor- and time-intensive studies would be required to sample all potential ponds, so Eglin looks at certain habitat characteristics to determine if there is a good potential for a salamander to be present. If such habitat is found, Eglin conservatively protects it in case there are salamanders present. Potential and confirmed habitats are treated with the same protection. To identify areas within the 464,000-acre Eglin Reservation where Air Force activities would have the potential to impact flatwoods salamanders, the landcover data layer within the GIS was queried to obtain all polygons with any potential to contain flatwoods salamander habitat. A 1,500-foot buffer was designated around potential habitat to protect pond-breeding flatwoods salamanders to match the *Draft Recovery Plan for the Flatwoods Salamander* (USFWS, 2005b). Subsequent analysis in 2007 altered the polygons to have a buffer zone directly from the potential pond itself. Figure 4-32 shows the location of potential salamander habitat in relation to the proposed cantonment areas for 7SFG(A) Cantonment Alternative 2D and Alternative 2E.

The final rule to list the flatwoods salamander as a federally threatened species states that timber harvesting in pine flatwoods habitat is allowed within a 164-meter (538-foot) radius buffer zone surrounding known flatwoods salamander breeding ponds by using selective harvest only during dry periods; within an outer secondary zone extending from 164 meters (538 feet) to 450 meters (1,476 feet) out from the edge of the breeding pond, a mixture of clear-cutting and selective harvesting is allowed. The rule allows clear-cutting of up to 25 percent of this secondary zone at any give time, as long as 75 percent of the secondary zone remains in pine flatwoods habitat at a basal area of 4.2 to 4.7 square meters per hectare (USFWS, 1999).

Location of the cantonment area in or near potential flatwoods salamander habitat would make it more difficult to conduct prescribed burns, thus resulting in hardwood encroachment on the ephemeral wetlands where salamanders breed. Reductions in prescribed fire would also likely result in increased frequency of wildfires and associated soil-disturbing fire suppression activities. Although the Proposed Action may limit the ability of the NRS to conduct prescribed burns in the area, through coordination with 7SFG(A) and mission personnel, it may be possible to conduct enough burns in the area to continue salamander habitat maintenance. Additional manpower would be required to burn these areas and to coordinate with 7SFG(A) personnel at the cantonment area. Due to concerns with chemical contamination, hydroperiod alteration, and excess sedimentation, chemical and mechanical means of understory control are not preferred and would only be used under the close supervision of wildlife biologists with the NRS.

The NRS believes the 7SFG(A) Cantonment Alternative 2D site and Alternative 2E road widening of RR 213 are not likely to adversely affect the flatwoods salamander because: (1) surveys completed by Eglin's NRS endangered species biologists indicate that all 7SFG(A) Cantonment Alternative 2 sites have a remote possibility of having salamanders present due to low quality habitat to support the species (Miller, 2007a); (2) timber harvesting in pine flatwoods habitat is allowed within the buffer zone surrounding flatwoods salamander ponds, as long as guidelines detailed in the final rule to list the flatwoods salamander are followed (USFWS, 1999); 3) the NRS would work with the 7SFG(A) to continue prescribed fire frequently enough to maintain quality salamander habitat; and 4) erosion control measures associated with the clearing/construction/road improvements would minimize the potential for sedimentation. Impacts to the flatwoods salamander would not be significant under any of the alternatives.

Florida Black Bear

Impacts to the Florida black bear from habitat loss due to the development of a 7SFG(A) cantonment area near Duke Field would be minimal, as it represents less than 1 percent of the total area of undeveloped lands on Eglin AFB, which provides black bear habitat

throughout the Eglin Reservation. Potential impacts would be associated with the possible increased human-bear interaction, with increased vehicular traffic on access roads and Hwy 85 of primary concern. In the event that personnel saw a black bear, impacts could be avoided if activities would cease until the bear moved away from the area.

Bears may be attracted to the cantonment area due to the presence of food waste. As a precaution, it would be important for the cantonment facility to responsibly handle waste, employing measures such as bear-proof dumpsters, bear-resistant garbage cans, and proper disposal measure of oil waste from dining facilities. Additionally, Eglin could provide informational materials regarding bears and how to successfully coexist in bear country to residents in cantonment areas (i.e., removing wildlife feeders, securing pet food, cleaning and securing barbeque grills). Impacts to the Florida black bear would not be significant for any of the 7SFG(A) Cantonment Alternative 2 locations.

Red-cockaded Woodpecker

One essential element of management for the federally endangered RCW is the allocation of foraging habitat to individual groups. Long-term success will require a thorough knowledge of the species' foraging requirements. Partitions around clusters serve to help provide suitable quantity and quality of foraging habitat. Some potentially harmful activities are permitted as long as 150 acres of good quality habitat remain within the partition (Convery and Walters, 2004). Home ranges vary dramatically among and within populations and can complicate analyses. Recently, the quality of habitat has been found to be more important than distance from the cluster (Convery and Walters, 2004). This phenomenon was exaggerated when higher quality habitat (i.e., more characteristics of good quality) existed at or beyond the periphery of the partition but not in proximity to the cavity tree cluster.

The percentage of the RCW protected home range increases as a function of partition radius. However, larger partitions may not be better, since they may not necessarily include good habitat. A trade-off exists, however, between partition size and function, because RCWs are a central-place foraging species (i.e., they regularly return to the cavity tree cluster), and preferentially select habitat near the cavity tree cluster (Rosenberg and McKelvey, 1999). This makes habitat near the cluster center more valuable than habitat further away. Furthermore, the percentage of better quality habitat decreased as a function of partition radius. Using larger partitions may result in restriction on use of land that is in reality unsuitable or poorer quality habitat (Convery and Walters, 2004). Groups often extend their home range in the direction away from neighbors and unsuitable habitat.

An independent Oracle-based GIS tool (model) has been developed as a foraging habitat assessment tool for Eglin to consistently and accurately estimate the available foraging resources without sampling the entire Eglin Reservation (U.S. Air Force, 2006g). The USFWS completed ESA Section 7 consultation on the model in June 2003, and concurred with NRS findings of Not Likely to Adversely Affect. Recent research has demonstrated that foraging analyses such as Eglin's model accurately portray the actual territories of RCW groups (Convery and Walters, 2004).

Eglin NRS has consulted with the USFWS on the guidelines for the habitat conditions and foraging requirements for RCWs on the Eglin Reservation. Eglin NRS personnel use the guidelines identified in the Threatened and Endangered Species Component Plan (U.S. Air Force, 2006l) when determining whether consultation with the USFWS is required. Table 4-49 is a comparison of the current Recovery Plan foraging standards and Eglin-specific standards.

Table 4-49. Foraging Habitat Variable Standards for Red-cockaded Woodpeckers

Parameter	USFWS Recovery Standard	USFWS Managed Stability Standard	Eglin Recovery Standard	Eglin Managed Stability Standard
Acres	200-300	75	300	150
Density (stems per acre)	18 > 14 in dbh	None	20 > 10 in dbh	None
Density total (stems per foraging area)	None	None	6,000 > 10 in dbh	3,000 > 10 in dbh
BA (ft^2 per acre)	20 >14 in dbh	40-70 > 10 in dbh	20 > 10 in dbh	None
BA total (ft^2)	None	3,000 > 10 in dbh	6,000 > 10 in dbh	4,000 > 10 in dbh
Distance from cluster	0.5 mile	0.25 mile	0.5 mile	0.3 mile
Midstory height	7 ft	7 ft	7 ft	7 ft
Ground cover	> 40% herb	None	> 40% herb	None

BA = basal area; dbh = diameter at breast height; ft^2 = square foot; in = inch; > = greater than; < = less than

The first column contains the values defined in the Recovery Plan as the Recovery Standard for public lands. The second column contains the values defined in the Recovery Plan as the Managed Stability Standard for private lands in order to protect existing groups (USFWS, 2003). The last two columns are recommendations for Eglin's Recovery Standard and Managed Stability Standard. A No Effect determination would be made if a cluster's foraging resources exceed Eglin's Recovery Standard after the completion of a proposed action. A Not Likely to Adversely Affect determination would be made if a cluster's foraging resources fall between Eglin's Recovery Standard and Eglin's Managed Stability Standard after the completion of a proposed action. A Likely to Adversely Affect determination would be made if a cluster's foraging

resources fall below Eglin's Managed Stability Standard after the completion of a proposed action. Also, if the proposed action affects less than 1 percent of the foraging resources, and the foraging resources are above Eglin's Managed Stability Standard, then no consultation would be required.

Development of the 7SFG(A) cantonment area and road widening in the middle of a fire-dependent Sandhills habitat would limit the ability of the NRS to conduct prescribed burns in the area (Furman, 2007a). Eglin NRS would not be able to burn the area as frequently or as well due to smoke management problems with the cantonment area and roads. The Eglin NRS would prioritize prescribed fire as resources allow, however, the quality of the RCW foraging habitat around the 7SFG(A) cantonment area and access roads would likely degrade if there is fire suppression and no alternative means (herbicides or mechanical) to control midstory vegetation. A decrease in the frequency of prescribed fires (to reduce fuel loads) may also lead to an increase in the number and severity of wildfires surrounding the cantonment area, which have the potential to damage RCW cavity trees.

Although the Proposed Action may limit the ability of the NRS to conduct prescribed burns in the area, through coordination with 7SFG(A) and mission personnel, it may be possible to conduct enough burns in the area to continue RCW habitat maintenance (Hagedorn, 2007). Additional manpower would be required to burn these areas and to coordinate with 7SFG(A) personnel at the cantonment area. Alternate means of controlling undergrowth are also available and could be used here. These methods include using specific herbicides that target understory or midstory vegetation, and mechanical means. To minimize the harmful effects of fire suppression, Eglin would maintain some sort of habitat management (prescribed fire, chemicals, and/or mechanical) to benefit the RCW.

Land clearing, large machinery operation, and construction may disturb individuals or populations. Foraging RCWs may avoid areas where construction is occurring. Pioneering RCWs may be affected by noise from daily operations and not colonize or immigrate to new areas near the cantonment site or access roads. This could affect the growth of the RCW population around the proposed cantonment area and access roads. Loud noises during nesting season (April-July) may affect RCW reproduction. Certain range roads in proximity to RCW foraging habitat would have an increased amount of traffic both during construction and daily operations, potentially creating noise levels that would affect RCWs.

Suitable habitat appears to outweigh any negative influences associated with noise (whether that is construction or military bombing). Observations have indicated that many animals become adapted to human activities and noises (Busnel, 1978). Scientists

who have researched the effects of noise on wildlife report that animals may initially react with a startle effect from noises, but adapt over time, so that even this behavior is eradicated (Busnel, 1978). Based on the fact that the RCW population continues to grow at Eglin, including areas in close proximity to test areas, it appears that they have adapted to all of the noises associated with the military mission including supersonic booms. Noise from construction and general operations would have much less of an impact.

Analyses (detailed in sections below for 7SFG(A) Cantonment Alternatives 2A–2E) show that the 7SFG(A) Cantonment Alternative 2A site and road widening of RR 213 (for Alternatives 2D and 2E) are not likely to adversely affect the RCW, and the 7SFG(A) Cantonment Alternatives 2B, 2C, 2D, and 2E sites would have no effect on the RCW. Overall impacts to the RCW would not be significant under any of the alternatives.

Southeastern American Kestrel

Kestrels could be affected by noise and human presence associated with 7SFG(A) Cantonment Alternative 2 land clearing, construction, and daily operations. Kestrels typically nest in cavities excavated by woodpeckers in snags (dead trees). They most frequently use decayed longleaf pine trees greater than 9 inches (22.5 centimeters) in diameter and 2 feet (6.7 meters) tall (FNAI, 2006). Kestrels frequently locate their nests in the abandoned longleaf pine nest cavities of the RCW. No such inactive or abandoned RCW nests are located in proximity to the alternative sites and nesting habitat is not abundant. Any kestrels present would likely move to a nearby area with suitable habitat, which is abundant on Eglin. Thus, overall impacts to the southeastern American kestrel would not be significant for any of the 7SFG(A) Cantonment Alternative 2 locations.

Invasive Nonnative Species

Disturbance to soil and vegetation from land clearing and construction could enhance conditions for the establishment and spread of invasive nonnative plant species. However, because the majority of the cantonment area would be covered by buildings, pavement, or landscaped areas, there would not be many areas with the proper environment for the establishment of invasive nonnative plants. Additionally, all landscaping and plantings of vegetation would conform to the Presidential Memorandum dated 26 April 1994, Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds, and Executive Order 13112, Invasive Species, both of which require the planting of regional natives in landscaping. Mitigations are available to reduce the potential for INS infestations (Table 4-48). Impacts from invasive nonnative plant species to biological resources would not be significant.

MSA Sensitive Habitats and Species

The same MSA locations apply for all of the 7SFG(A) Cantonment Alternative 2 sub-alternatives. No sensitive habitats or species are present at or near the existing Duke MSAs or the proposed MSA expansion area, thus impacts to biological resources from MSA activities would not be significant.

7SFG(A) Cantonment Alternative 2A: Southeast of Duke Field

Two fire-dependent High Quality Natural Communities are located along the southern border adjacent to the 7SFG(A) Cantonment Alternative 2A site (Figure 4-32) and one adjacent to the road widening area on RR 213; these communities may be affected due to fire suppression (see discussion above). Federally listed eastern indigo snakes, and state-listed gopher tortoises, Florida pine snakes, southeastern American kestrels, and Florida black bears may occur at the 7SFG(A) Cantonment Alternative 2A site and along the road widening area on RR 213 due to the presence of appropriate habitat. Potential impacts and mitigations are discussed above.

Development of the southeast corner of the 7SFG(A) Cantonment Alternative 2A location may potentially affect foraging habitat for the active federally endangered RCW cluster to the southeast. Based on foraging habitat calculations, GIS analysis, and the potential location of the cantonment area in reference to the foraging habitat, the habitat loss to the cluster due to the Proposed Action at 7SFG(A) Cantonment Alternative 2A would be approximately 137 acres (Figure 4-32). A small fraction (6 percent) of this area is considered optimal habitat.

Based on calculations and assuming the location of the cantonment area would affect all 137 acres, the habitat loss to the cluster would be minimal due to the large amount of foraging area available for this cluster (558 acres). The remaining 421 acres of foraging habitat meet the recovery standard and are above Eglin's Managed Stability Standard. The tree removal within RCW foraging habitat as defined by Eglin's model would be coordinated with NRS personnel, and no active cavity trees would be removed.

Since the proposed alternative location is adjacent to Duke Field and pine plantations, no group isolation is expected. Also, there should be no direct loss of birds due to mortality or loss of active cavity trees so the group dynamics should not be affected. 7SFG(A) Cantonment Alternative 2A would not result in a reduction in group density that would affect the size and reproduction of remaining groups. Group demography is also related to the ability of dispersing birds (mostly subadults) to locate potential breeding vacancies or acquire helper status. Successful dispersal is affected by habitat fragmentation. 7SFG(A) Cantonment Alternative 2A would produce a small amount of fragmentation, but the area is already fragmented along the southern boundary by an old pine plantation. NRS biologists do not expect this fragmentation to be adverse;

however, there is the potential that birds might not disperse to the south (Gault, 2006). 7SFG(A) Cantonment Alternative 2A would limit prescribed fire in the area and adjacent clusters may see an increase in hardwood midstory component which may decrease the habitat quality over time (see the RCW overview at beginning of Section 4.12.2.2). 7SFG(A) Cantonment Alternative 2A would result in a reduction of foraging habitat but would not affect neighboring clusters because of the small impact area, distance of nearest cluster, and low potential to disrupt dispersal since the 7SFG(A) Cantonment Alternative 2A area is adjacent to Duke Field and other pine plantations.

As discussed in the RCW overview at the beginning of Section 4.12.2.2, land clearing, large machinery operation, construction, and daily operations noise may disturb foraging and nesting RCWs. However, due to a large distance (over 150 meters) to the nearest active RCW tree (Figure 4-32), noise from these activities should have minimal effects to the RCW cluster southeast of the 7SFG(A) Cantonment Alternative 2A area. Suitable habitat appears to outweigh any negative influences associated with noise.

Alternative 2A would result in the loss of up to 533 acres of Sandhills habitat and the degradation of adjacent High Quality Natural Communities due to fire suppression, but many acres of similar habitat would continue to be maintained on other portions of Eglin. Although Alternative 2A would result in the loss of 137 acres of foraging habitat, a large amount of foraging area would still be available for this cluster (421 acres), and the remaining acreage meets the recovery standard and is above Eglin's Managed Stability Standard. Noise from construction and daily cantonment operations may deter RCWs from the area, but the nearest active tree is over 150 m from the cantonment area, so impacts to nesting birds would be minor. Thus, the 7SFG(A) cantonment activities at the Alternative 2A location are not likely to adversely affect the RCW. Given the rarity of indigo snakes on Eglin and the relocation of any individuals found during pre-construction surveys, indigo snakes are not likely to be adversely affected. Overall impacts to biological resources would not be significant for 7SFG(A) Cantonment Alternative 2A.

7SFG(A) Cantonment Alternative 2B: Northwest of Duke Field

One High Quality Natural Community located to the northwest of the 7SFG(A) Cantonment Alternative 2B site (Figure 4-32) may be affected due to fire suppression (see discussion above). Road widening and access control point clearing for Alternative 2B would not affect any sensitive habitats or species. Federally listed eastern indigo snakes, and state-listed gopher tortoises, Florida pine snakes, southeastern American kestrels, and Florida black bears may occur at the 7SFG(A) Cantonment Alternative 2B area due to the presence of appropriate habitat. Potential impacts and mitigations are discussed above.

The main issues of concern for the federally endangered RCW at the 7SFG(A) Cantonment Alternative 2B site would be fire suppression and the large amount of tree clearing. However, because the area to be cleared is considered poor quality foraging habitat for the RCW the area is not considered to be an area for future growth for RCWs and clearing of these trees would not reduce potential future RCW habitat (Gault, 2006). Development of the 7SFG(A) Cantonment Alternative 2B would limit prescribed fire in the area, and nearby clusters may see an increase in hardwood midstory component which may decrease the habitat quality over time (see RCW overview at beginning of Section 4.12.2.2).

Alternative 2B would result in the loss of up to 605 acres of Sandhills habitat and the degradation of adjacent High Quality Natural Communities due to fire suppression, but many acres of similar habitat would continue to be maintained on other portions of Eglin. Even though development of the 7SFG(A) Alternative 2B cantonment area would limit prescribed fire, the habitat near the site is already in poor condition and not considered good RCW foraging habitat. Thus, cantonment activities are not likely to adversely affect the RCW at this site. Given the rarity of indigo snakes on Eglin and the relocation of any individuals found during pre-construction surveys, indigo snakes are not likely to be adversely affected. Overall impacts to biological resources would not be significant for 7SFG(A) Cantonment Alternative 2B.

7SFG(A) Cantonment Alternative 2C: Northeast of Duke Field

One small High Quality Natural Community and some state-listed plants (pine sap and Arkansas oak) exist in the center of the 7SFG(A) Cantonment Alternative 2C site (Figure 4-32). The High Quality Natural Community on Site 2C is located on a steephead area with steep slopes, thus is not a good area for construction. Impacts to the High Quality Natural Community and associated state-listed plants could be avoided if construction did not take place near the High Quality Natural Community. Furthermore, it is likely that construction permits would require buffers around this stream and erosion control measures to lessen potential runoff, thus protecting the High Quality Natural Community.

The state-listed gopher tortoise has been sighted at the 7SFG(A) Cantonment Alternative 2C location, and the federally listed eastern indigo snake, and the state-listed Florida pine snake, southeastern American kestrel, and Florida black bear may occur at the 7SFG(A) Cantonment Alternative 2C site due to the presence of appropriate habitat. Also, a High Quality Natural Community is adjacent to RR 213 and a gopher tortoise burrow is adjacent to RR 231 road widening. Potential impacts and mitigations are discussed above for these habitats and species.

The main issues of concern for the federally endangered RCW at the 7SFG(A) Cantonment Alternative 2C site would be fire suppression and the large amount of tree

clearing. However, the area is not considered to be an area for future growth for RCWs because the area to be cleared is considered poor quality foraging habitat for the RCW, and thus clearing of these trees would not reduce potential future RCW habitat (Gault, 2006). Development of the 7SFG(A) Cantonment Alternative 2C would limit prescribed fire in the area, and nearby clusters may see an increase in hardwood midstory component which may decrease the habitat quality over time (see RCW overview at beginning of Section 4.12.2.2).

7SFG(A) Cantonment Alternative 2C would result in the loss of up to 1,110 acres of Sandhills habitat, but many acres of similar habitat would continue to be maintained on other portions of Eglin. The High Quality Natural Community in the center of Alternative 2C is a steephead stream; it would likely not be cleared and would be protected by a vegetated buffer. Even though development of the 7SFG(A) Cantonment Alternative 2C area would limit prescribed fire, the habitat near the site is already in poor condition and not considered good RCW foraging habitat. Thus, cantonment activities are not likely to adversely affect the RCW at this site. Given the rarity of indigo snakes on Eglin and the relocation of any individuals found during pre-construction surveys, indigo snakes are not likely to be adversely affected. Overall impacts to biological resources would not be significant for 7SFG(A) Cantonment Alternative 2C.

7SFG(A) Cantonment Alternative 2D: East of Duke Field

A portion of the Spenser Flats Wetland Outstanding Natural Area/Blue Spring Creek Lakes Significant Botanical Site falls within this site (Figure 4-32) and adjacent to RR 220 road widening and access control point. This Outstanding Natural Area/Significant Botanical Site supports the highest concentration of depressional wetlands occurring in a matrix of sandhills on the base, and multiple sensitive plant species grow around these wetlands. The portion of the Outstanding Natural Area/Significant Botanical Site that 7SFG(A) Cantonment Alternative 2D overlaps is sandhills, with no wetlands, although some wetlands are close to the eastern boundary and could be impacted by erosion from construction activities (Figure 4-32). It is likely that construction permits would require vegetative buffers around these wetlands and erosion control measures to lessen potential runoff, thus protecting water quality and the rare plants surrounding the wetlands. Because the portion of the Outstanding Natural Area/Significant Botanical Site contained within the 7SFG(A) Cantonment Alternative 2D site is sandhills, another concern is fire suppression. As noted above, development of the cantonment area and road widening within the Outstanding Natural Area/Significant Botanical Site would make it much more difficult to maintain a regular prescribed fire rotation in the surrounding area, thus this Outstanding Natural Area/Significant Botanical Site would likely be affected due to fire suppression, resulting in changes to the vegetation composition and structure.

All of the High Quality Natural Communities at the 7SFG(A) Cantonment Alternative 2D site are associated with wetland/riparian areas (Figure 4-32), therefore it is likely that construction permits would require buffers around streams/wetlands and erosion control measures to lessen potential runoff, thus protecting these sensitive habitats. Additionally, for the High Quality Natural Community on the 7SFG(A) Cantonment Alternative 2D site, slope and wet conditions would not make this a good location for construction. Restricting construction in the High Quality Natural Community would avoid impacts to this sensitive habitat.

Sedimentation associated with construction activities has the potential to affect gopher frog ponds to the east of the 7SFG(A) Cantonment Alternative 2D site. Erosion control measures such as silt fencing and vegetative buffers would reduce sediment runoff into the ponds. Federally listed eastern indigo snakes, and state-listed gopher tortoises, Florida pine snakes, southeastern American kestrels, and Florida black bears may occur in the 7SFG(A) Cantonment Alternative 2D area due to the presence of appropriate habitat. Multiple gopher tortoise burrows occur in close proximity to RR 213 and RR 220 road widening. For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., gopher frog, pine snake, indigo snake). In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated. Potential impacts and mitigations are discussed above.

As noted in the overview for the flatwoods salamander at the beginning of Section 4.12.2.2, the primary impacts of concern for the federally threatened flatwoods salamander would be habitat destruction, hydrologic alteration, and sedimentation. Although the 7SFG(A) Cantonment Alternative 2D site and RR 231 road widening area overlap with 123 acres of potential flatwoods salamander habitat (Figure 4-32), the NRS believes 7SFG(A) Cantonment Alternative 2D is not likely to adversely affect the salamander because: (1) surveys completed by Eglin's NRS endangered species biologists indicate this site has a remote possibility of having salamanders present due to low quality habitat to support the species (Miller, 2007a); (2) timber harvesting in pine flatwoods habitat is allowed within the buffer zone surrounding flatwoods salamander ponds, as long as guidelines detailed in the final rule to list the flatwoods salamander are followed (USFWS, 1999); and (3) erosion control measures associated with the construction would minimize the potential for sedimentation.

The road widening area on RR 213 may affect the active RCW cluster to the south due to habitat loss, habitat degradation, and increased traffic. To minimize impacts from noise and human presence, troops and vehicles would observe the restrictions in the

Army Guidelines (U.S. Army, 2006). Potential impacts from fire suppression (habitat degradation) are discussed in the overview for the RCW at the beginning of Section 4.12.2.2. Based on foraging habitat calculations, GIS analysis, and the potential location of the cantonment area in reference to the foraging habitat, the habitat loss to the cluster due to the road widening would be approximately 12 acres. The habitat loss to the cluster would be minimal due to the large amount of foraging area available for this cluster (558 acres). The remaining 546 acres of foraging habitat meet the recovery standard and are above Eglin's Managed Stability Standard. The tree removal within RCW foraging habitat as defined by Eglin's model would be coordinated with NRS personnel, and no active or inactive cavity trees would be removed. Thus, the 7SFG(A) cantonment activities at the 7SFG(A) Cantonment Alternative 2D location are not likely to adversely affect the RCW.

Alternative 2D would result in the loss of up to 1,430 acres of Sandhills habitat, but many acres of similar habitat would continue to be maintained on other portions of Eglin. The High Quality Natural Community at the Alternative 2D site is a wetland. Thus, it would likely not be cleared and would be protected by a vegetated buffer. The Outstanding Natural Area/Significant Botanical Site would likely become degraded due to fire suppression. Given the relocation of any individuals found during pre-construction surveys, indigo snakes are not likely to be adversely affected. The buffer area within the 7SFG(A) Cantonment Alternative 2D site is considered to have a low likelihood of supporting flatwoods salamanders due its poor habitat qualities, thus 7SFG(A) cantonment activities at the Alternative 2D location are not likely to adversely affect the flatwoods salamander. No active or inactive RCW trees would be cleared, and only a small area of foraging habitat would be cleared (12 acres), thus the RCW is not likely to be adversely affected. Overall impacts to biological resources would not be of a magnitude to be considered significant for 7SFG(A) Cantonment Alternative 2D.

7SFG(A) Alternative 2E: Eglin North Border near Duke Field

The Spenser Flats Wetland Outstanding Natural Area /Blue Spring Creek Lakes Significant Botanical Site is adjacent to this site and RR 220 road widening on the east (Figure 4-32). Because much of the Outstanding Natural Area/Significant Botanical Site near the 7SFG(A) Cantonment Alternative 2E site is sandhills, fire suppression is a concern (see discussion above). Some Outstanding Natural Area/ Significant Botanical Site/ High Quality Natural Community wetlands are close to the eastern boundary and could be impacted by erosion from construction activities (Figure 4-32). It is likely that construction permits would require vegetative buffers around these wetlands and erosion control measures to lessen potential runoff, thus protecting water quality and the rare plants surrounding the wetlands.

The Florida bog frog has been documented in the northeast corner of the site. Bog frogs are typically associated with boggy areas adjacent to streams, so this portion of the site is not a good area for construction. Impacts to the bog frog could be minimized if construction did not take place near bog frog habitat. Furthermore, it is likely that construction permits would require buffers around streams and erosion control measures to lessen potential runoff, thus protecting the bog frog.

Federally listed eastern indigo snakes, and state-listed gopher tortoises, Florida pine snakes, southeastern American kestrels, and Florida black bears may occur in the 7SFG(A) Cantonment Alternative 2E area due to the presence of appropriate habitat. Multiple gopher tortoise burrows occur in close proximity to RR 213 and RR 220 road widening. For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., gopher frog, pine snake, indigo snake). In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated. Potential impacts and mitigations are discussed above.

The 7SFG(A) Cantonment Alternative 2E site and the RR 231 widening area overlap with 5.6 acres of potential habitat for the federally threatened flatwoods salamander (Figure 4-32). Potential impacts would be the same as those for 7SFG(A) Cantonment Alternative 2D. The road widening area on RR 213 would be the same as that for Alternative 2D. Potential impacts to the RCW would be the same as those for 7SFG(A) Cantonment Alternative 2D (loss of 12 acres of RCW foraging habitat).

7SFG(A) Cantonment Alternative 2E would result in the loss of up to 906 acres of Sandhills habitat, but many acres of similar habitat would continue to be maintained on other portions of Eglin. The High Quality Natural Community wetlands to the east of the 7SFG(A) Cantonment Alternative 2E site likely would be protected by vegetated buffers. The adjacent Outstanding Natural Area/Significant Botanical Site would likely become degraded due to fire suppression. Given the rarity of indigo snakes on Eglin and the relocation of any individuals found during pre-construction surveys, indigo snakes are not likely to be adversely affected. The buffer area within the 7SFG(A) Cantonment Alternative 2E site is considered to have a low likelihood of supporting flatwoods salamanders due to its poor habitat qualities. Thus 7SFG(A) cantonment activities at the Alternative 2E location are not likely to adversely affect the flatwoods salamander. No active or inactive RCW trees would be cleared, and only a small area of foraging habitat would be cleared (12 acres), thus the RCW is not likely to be adversely affected. Overall impacts to biological resources would not be significant for 7SFG(A) Cantonment Alternative 2E.

4.12.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.12.3.1 Existing Conditions (Biological Resources – 7SFG(A) Cantonment Alternative 3)

Flora and Fauna

Of Eglin's major ecological associations, only the Sandhills (500 acres) ecological association is found within or adjacent to the project area (Figure 4-33). Clearing for the access control point, substation, and road widening/improvements would occur within Sandhills (181 acres), Flatwoods (1 acre), Wetland/Riparian areas (1 acre), Grasslands/ Shrublands (1 acre), and Landscaped/Urban areas (1 acre). No invasive nonnative plant species have been documented within any of the 7SFG(A) Cantonment Alternative 3 locations (Eglin GIS, 2007c).

Sensitive Habitats and Sensitive Species

No High Quality Natural Communities, Outstanding Natural Areas, or Significant Botanical Sites are located on or near the 7SFG(A) Cantonment Alternative 3 site; however, road widening along the southern route would result in clearing of 53 acres of High Quality Natural Community habitat. Road improvements on RR 211 and RR 237 would cross Gopher Creek and Turkey Hen Creek and a wetland area east of Gopher Creek. Improvements on RR 237 and RR 215 would cross two creeks. A pond is located near the proposed access control point for Alternative 3.

Biological surveys conducted by the Florida Natural Areas Inventory (FNAI) for sensitive species have been completed and the results of these surveys revealed no notable changes to current data. The FNAI surveys provided a more thorough knowledge of state listed species and can be found in Appendix H, *Biological Resources*. Based on existing, available information, the species documented to occur or that may potentially be present at the 7SFG(A) Cantonment Alternative 3 location are identified in Table 4-50 and Figure 4-34.

Table 4-50. 7SFG(A) Cantonment Alternative 3 – Potentially Occurring Sensitive Species Within or Adjacent to the Site

Scientific Name	Common Name	Status
Reptiles and Amphibians		
Ambystoma cingulatum	Flatwoods salamander	FT, SSC
Drymarchon corais couperi	Eastern indigo snake	FT, ST
Gopherus polyphemus	Gopher tortoise	SSC
Pituophis melanoleucus	Florida pine snake	SSC
Birds		
Picoides borealis	Red-cockaded woodpecker	FE, ST
Falco sparverius paulus	Southeastern American kestrel	ST
Mammals		
Ursus americanus floridanus	Florida black bear	ST

Sources: Eglin GIS, 2007a; Eglin GIS, 2007b; U.S. Air Force, 2002a
FE = Federally Endangered; FT = Federally Threatened; ST = State Threatened; SSC = State Species of Special Concern

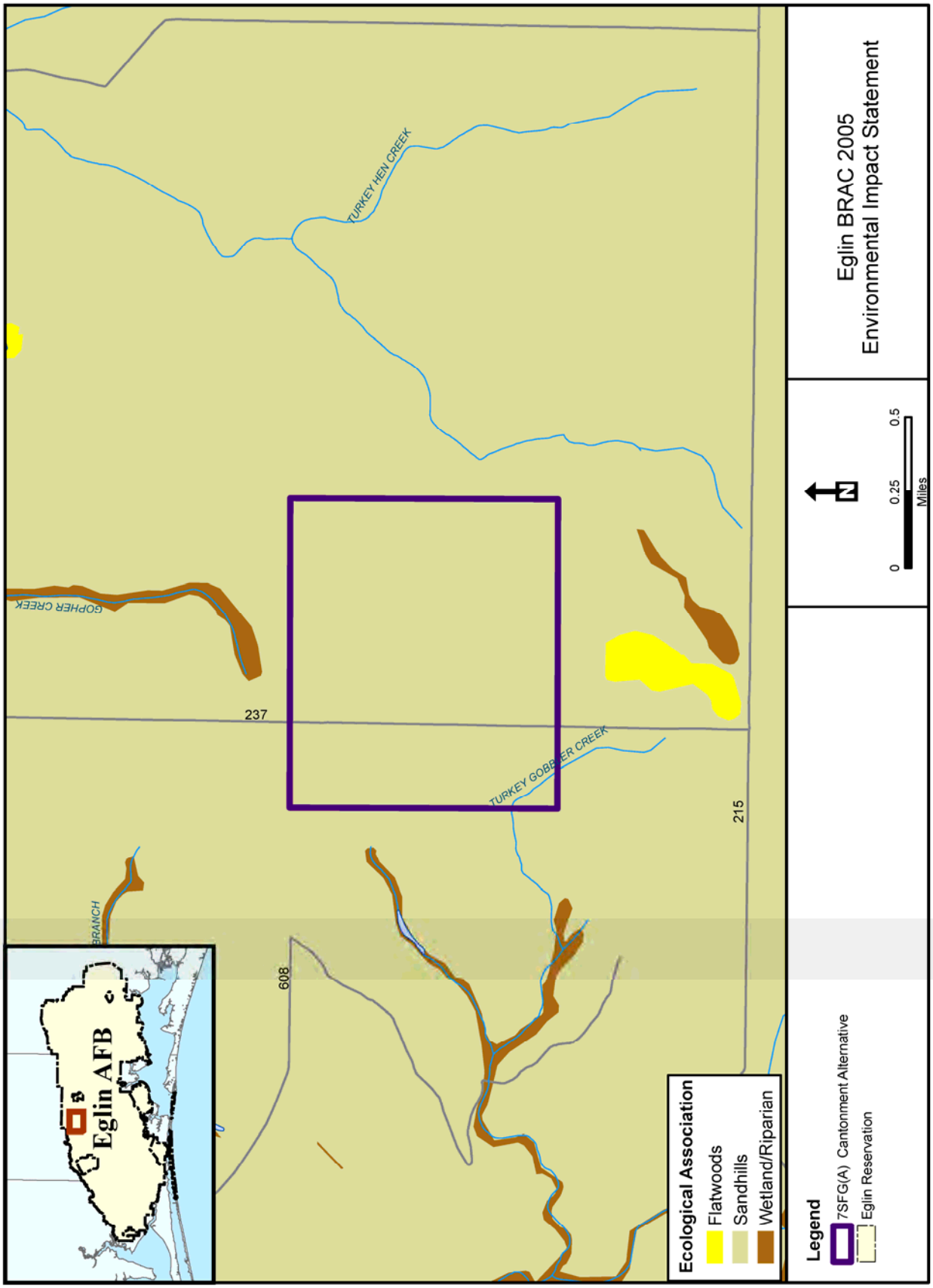

Figure 4-33. 7SFG(A) Cantonment Alternative 3 – Ecological Associations

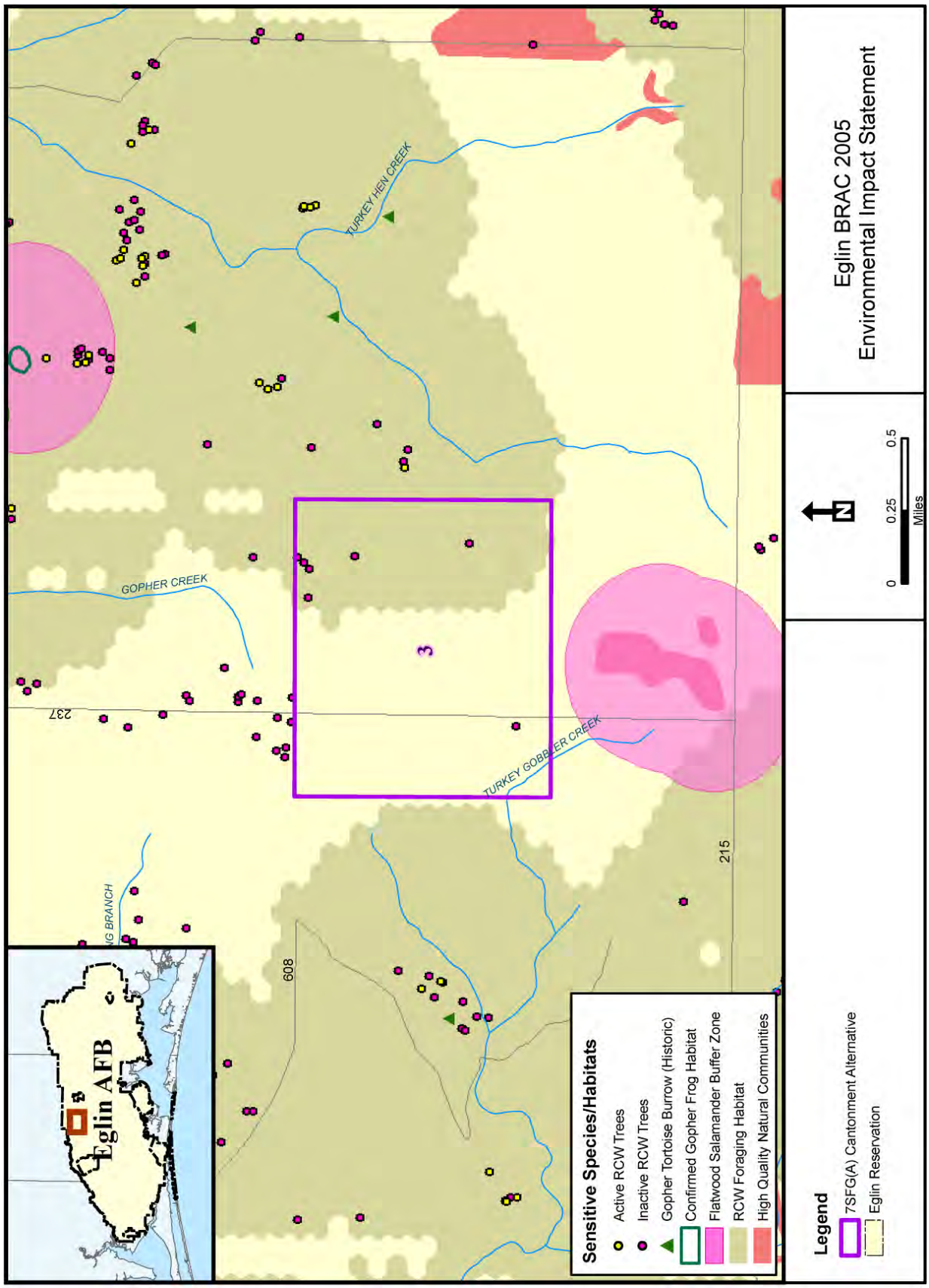

Figure 4-34. 7SFG(A) Cantonment Alternative 3 – Sensitive Habitats and Sensitive Species

Inactive federally endangered RCW trees are scattered across the site, and one active tree is located 150 meters east of the 7SFG(A) Cantonment Alternative 3 site (Figure 4-34). The eastern portion of the 7SFG(A) Cantonment Alternative 3 site overlaps with RCW foraging habitat (Figure 4-34). Road widening and the access control point may impact small portions of RCW foraging habitat as well. Potential flatwoods salamander habitat is located just south of the site and within the area designated for the access control point and road improvements. Gopher tortoises have been sighted in surrounding areas (Figure 4-34), and gopher tortoise burrows occur in close proximity to road widening along RR 215. The southeastern American kestrel, Florida pine snake, eastern indigo snake, and Florida black bear may pass through the project area. Appendix H, *Biological Resources*, offers a more detailed natural history description of these species.

4.12.3.2 Environmental Consequences (Biological Resources – 7SFG(A) Cantonment Alternative 3)

This section discusses potential impacts to biological resources located within and adjacent to the 7SFG(A) Cantonment Alternative 3 action area, which is the Preferred Alternative. 7SFG(A) Cantonment Alternative 3 includes the same MSA site as 7SFG(A) Cantonment Alternative 2, thus all MSA impacts and potential mitigations are the same. Analysis focuses on assessing the potential for impacts to biological resources from land clearing, construction, and daily cantonment activities, and on identifying methods to reduce the potential for negative impacts to biological resources from these activities. An ESA Section 7 consultation with the USFWS on federally listed species is required for this alternative (the Preferred Alternative) (Appendix H, *Biological Resources*). Consultation includes any form of communication between the Federal action agency and the USFWS to determine if listed species may occur in the action area and what effects the action may have on such species. Biological surveys conducted by FNAI for sensitive species have been completed and the results of these surveys revealed no notable changes to current data. The FNAI surveys provided a more thorough knowledge of state-listed species and can be found in Appendix H, *Biological Resources*.

Sensitive Habitats

No High Quality Natural Communities, Outstanding Natural Areas, or Significant Botanical Sites are located on or near the 7SFG(A) Cantonment Alternative 3 site, so no impacts would occur to sensitive habitats at the actual cantonment site; however, road widening along the southern route would result in clearing some High Quality Natural Community habitat. Only a small amount of High Quality Natural Community would be cleared for the road widening (53 acres). A greater potential exists for impacts from reductions in prescribed fire near the road due to an increased traffic load, making it

difficult to close the roads for fires. The High Quality Natural Communities would likely be affected due to fire suppression, primarily from changes in vegetation due to lack of fire. Although there would be a reduction in acreage and degradation of High Quality Natural Communities along the southern route, similar habitats exist on other portions of Eglin and would continue to be maintained. Overall, impacts to these sensitive habitats would not be significant for the 7SFG(A) Cantonment Alternative 3.

Range road improvements and widening may directly impact surface waters and wetlands along RRs 211, 237, and 215 from excess sedimentation and hydrologic alteration, which may degrade aquatic habitats and negatively affect the health of aquatic species. Clearing for road widening may temporarily increase sediment deposition into surface waters; erosion control measures such as silt fencing and turbidity curtains would reduce impacts from excess sedimentation. Once roads are upgraded from dirt to paved or rock surfaces, the long-term impacts of the road improvements would be positive due to decreased erosion. Road improvements over streams and through wetlands would likely require new infrastructure, with possible alterations in hydrology. When determining the type of road crossing to be used, consideration would be given to the maximum flow level of each stream such that bridges and/or culverts are of sufficient size to allow natural flow. Overall, impacts to stream and wetland habitats would not be significant for the 7SFG(A) Cantonment Alternative 3.

Sensitive Species

RCW. Development of the 7SFG(A) Cantonment Alternative 3 area and road improvements may affect active RCW clusters due to habitat loss, habitat degradation, and increased traffic. Land clearing for the Alternative 3 cantonment area may require the cutting of up to four inactive RCW cavity trees (Figure 4-34). If tree clearing were to occur during nesting season, Eglin would screen each inactive cavity tree during the breeding season to verify no trees had been recolonized.

Based on the calculations from the Eglin model and the location of 7SFG(A) Cantonment Alternative 3 in reference to foraging habitat, the habitat loss to cluster 0103L from the tree clearing would be up to 173 acres. Of the 173 acres, 47 acres would be optimal habitat and 23 acres would be considered marginal habitat (Eglin GIS, 2007b). Cluster 0103L has approximately 428 acres of foraging habitat according to Eglin NRS RCW foraging habitat model. Even though the majority of the acres to be removed from cluster 103L would be optimal habitat, 7SFG(A) Cantonment Alternative 3 would still leave 255 acres of foraging habitat, which is above the managed stability standard and the recovery standard (Eglin GIS, 2007b; U.S. Air Force, 2006l). All criteria

would be above the recovery standards set for the Eglin RCW population (U.S. Air Force, 2006l); however, the tree removal associated with 7SFG(A) Cantonment Alternative 3 would be considered a "May Affect" determination to the RCW and its habitat according to the Eglin NRS (Gault, 2006) based on the analysis (USFWS, 2005c) and the Threatened and Endangered Species Component Plan (U.S. Air Force, 2006l). Consultation with the USFWS, including detailed RCW foraging habitat analysis, is required for this alternative (the Preferred Alternative) (Appendix H, *Biological Resources*). Although a small amount of additional foraging habitat may be taken with the sewer line easement to the north of RR 211 and road improvements along RR 213, the NRS believes this clearing would have no effect on the clusters to the north and south of the road. Cumulatively, this has been included in the ESA Section 7 consultation for potential impacts to the RCW (Appendix H, *Biological Resources*). Final site plans would not require all of the trees within the proposed cantonment area boundaries to be removed, thus impacts would be less than analyzed in this EIS.

A direct physical impact to a bird would be considered remote; however, indirect impacts to RCWs could occur from the physical presence and noise associated with personnel, vehicles, or equipment within foraging habitat. Indirect impacts could include changes in nesting behavior, changes in feeding, and long-term alterations to the habitat. Activities at the cantonment area would follow the restrictions detailed in Chapter 2 (Section 2.4.2.1), particularly those related to activities allowed within 200 feet of active RCW trees. To minimize potential impacts, the 7SFG(A) would follow the Management Guidelines for RCWs on Army Installations (U.S. Army, 2006). Additional potential mitigations are included in Table 4-53 at the end of this Section 4.12.

Development of the 7SFG(A) cantonment area and road improvements in the middle of fire-dependent Sandhills habitat would limit the ability of the NRS to conduct prescribed burns in the area (Furman, 2007b). Eglin NRS would not be able to burn the area as frequently or as well due to smoke management problems with the cantonment area and roads. The Eglin NRS would prioritize prescribed fire as resources allow, however, the quality of the RCW foraging habitat around the 7SFG(A) cantonment area and access roads would likely degrade if there is fire suppression and no alternative means (herbicides or mechanical) to control midstory vegetation. A decrease in the frequency of prescribed fires (to reduce fuel loads) may also lead to an increase in the number and severity of wildfires surrounding the cantonment area and access roads, which have the potential to damage RCW cavity trees.

Although the proposed action may limit the ability of the NRS to conduct prescribed burns in the area, through coordination with 7SFG(A) and mission personnel, it may be possible to conduct enough burns in the area to continue RCW habitat maintenance

(Hagedorn, 2007). Additional manpower would be required to burn these areas and to coordinate with 7SFG(A) personnel at the cantonment area. Alternate means of controlling undergrowth are also available and could be used here. These methods include using specific herbicides that target understory or midstory vegetation, and mechanical means. To minimize the harmful effects of fire suppression, Eglin would maintain some sort of habitat management (prescribed fire, chemicals, and/or mechanical) to benefit the RCW. Individual or more discrete impacts may affect the RCW but not to a degree that the NRS believes would cause a Likely to Adversely Affect determination based on criteria established in the Eglin AFB Threatened and Endangered Species Component Plan (U.S. Air Force, 2006l). However, land clearing, construction, and increased troop and vehicle traffic produce a combination of impacts (direct physical impacts, foraging habitat loss, fire suppression, wildfires, noise, and human presence) that the NRS believes to be considered Likely to Adversely Affect the RCW.

Flatwoods Salamander. Potential habitat for the federally listed flatwoods salamander is located to the south of the cantonment area, within the access control point area, and along portions of the northern and southern road widening routes on both sides. Clearing for road widening and the access control point would affect 26 acres of low quality potential salamander habitat; the flatwoods and pond areas are northeast of the proposed action. Development of the access control point and widening of the road through potential flatwoods salamander habitat would introduce barriers to flatwoods salamander movements from the ponds to upland areas on the opposite side of the road. However, many acres of appropriate upland habitat would still be available and accessible on the same side of the road. During clearing and construction, silt fences and other erosion control measures would be required for storm water runoff control; these fences would help to ensure excess sediment did not reach the potential salamander habitat. Due to concerns regarding hydrologic alteration to the ponds, drainage patterns would be an important factor to consider when planning the road improvements.

Daily cantonment activities should not directly impact the potential habitat area provided vehicles, personnel, and equipment remain on current roads. However, the increased traffic load and presence of the access control point in the middle of potential salamander habitat would reduce the frequency of prescribed fire in adjacent areas. With a reduction in prescribed fire, the potential habitat would become degraded due to an increase in shrubby vegetation and resulting changes in hydrology. Due to the sensitivity of salamanders to chemicals, mechanical means would be the only option for the removal of understory vegetation. Any such operations would need to be very careful to avoid soil disturbance and accompanying hydrologic alteration. Also, if any wildfires were to occur in the area, precautions would need to be taken to avoid or

minimize plow lines and other soil-disturbing fire suppression activities in potential salamander habitat.

7SFG(A) Cantonment Alternative 3 would be considered a "May Affect" determination to the salamander and its habitat, according to the Eglin NRS (Gault, 2006). Consultation with the USFWS is required for this alternative (the Preferred Alternative) (Appendix H, *Biological Resources*). Although habitat may be taken with the access control point and road improvements, the NRS believes this is Not Likely to Adversely Affect the flatwoods salamander.

Other Sensitive Species. Potential impacts to the federally threatened eastern indigo snake, and state-listed Florida pine snake, southeastern American kestrel, gopher tortoise, and Florida black bear would be the same as those for 7SFG(A) Cantonment Alternative 2 (Section 4.12.2.2).

Conclusion. 7SFG(A) Cantonment Alternative 3 and road widening would result in the loss of up to 681 acres of Sandhills habitat, 1 acre of Flatwoods, and 1 acre of Wetland/Riparian habitat, but many acres of similar habitat would continue to be maintained on other portions of Eglin. With the relocation of any individuals found during pre-construction surveys, indigo snakes are not likely to be adversely affected. Use of erosion control measures, appropriate wetland road crossings, efforts to continue prescribed burning, and the limitation of vehicles to established roads would minimize the potential for negative impacts to potential flatwoods salamander habitat, thus 7SFG(A) cantonment activities at the Alternative 3 location are not likely to adversely affect the flatwoods salamander. RCWs would be subjected to the combination of land clearing, fire suppression, noise, and human presence. The NRS believes the impacts from these may be great enough to warrant "take" of the species and formal consultation, thus stating that 7SFG(A) Cantonment Alternative 3 activities are likely to adversely affect the RCW. Although negative impacts may occur to sensitive species at this site, overall impacts to biological resources would not be of a magnitude to be considered significant. An ESA Section 7 consultation with the USFWS is required to address potential impacts to the RCW, flatwoods salamander, and Eastern indigo snake from 7SFG(A) Cantonment Alternative 3.

Invasive Nonnative Species

Potential impacts from invasive nonnative plant species would be the same as those for 7SFG(A) Cantonment Alternative 2 (Section 4.12.2.2). Impacts from invasive nonnative plant species to biological resources would not be significant.

4.12.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.12.4.1 Existing Conditions (Biological Resources – 7SFG(A) Cantonment Alternative 4)

Flora and Fauna

Of Eglin's major ecological associations, only the Sandhills (497 acres) and Open Grasslands/Shrublands (3 acres) ecological associations are found within or adjacent to the project areas (Figure 4-35). No invasive nonnative plant species have been documented within the 7SFG(A) Cantonment Alternative 4 location (Eglin GIS, 2007c).

Sensitive Habitats and Sensitive Species

One High Quality Natural Community is located south of 7SFG(A) Cantonment Alternative 4, but no Outstanding Natural Areas or Significant Botanical Sites exist near the site (Figure 4-36).

Based on existing, available information, the species documented to occur or that may potentially be present at the 7SFG(A) Cantonment Alternative 4 location are identified in Table 4-51 and Figure 4-36. The Okaloosa darter is the only sensitive species documented to occur within the project area (Figure 4-36). The indigo snake, Florida pine snake, and Florida black bear may pass through the project area. Black bear have been documented near the site along Hwy 123 (Figure 4-36). No sensitive plant species are within the boundaries of 7SFG(A) Cantonment Alternative 4. Appendix H, *Biological Resources*, offers a more detailed natural history description of these species.

Table 4-51. 7SFG(A) Cantonment Alternative 4 – Potentially Occurring Sensitive Species Within or Adjacent to the Site

Scientific Name	Common Name	Status
Fish		
Etheostoma okaloosae	Okaloosa darter	FE, SE
Reptiles and Amphibians		
Drymarchon corais couperi	Eastern indigo snake	FT, ST
Pituophis melanoleucus	Florida pine snake	SSC
Mammals		
Ursus americanus floridanus	Florida black bear	ST

Source: Eglin GIS, 2007a; U.S. Air Force, 2002a
FE = Federally Endangered; FT = Federally Threatened; SE = State Endangered; ST = State Threatened; SCC = State Species of Special Concern

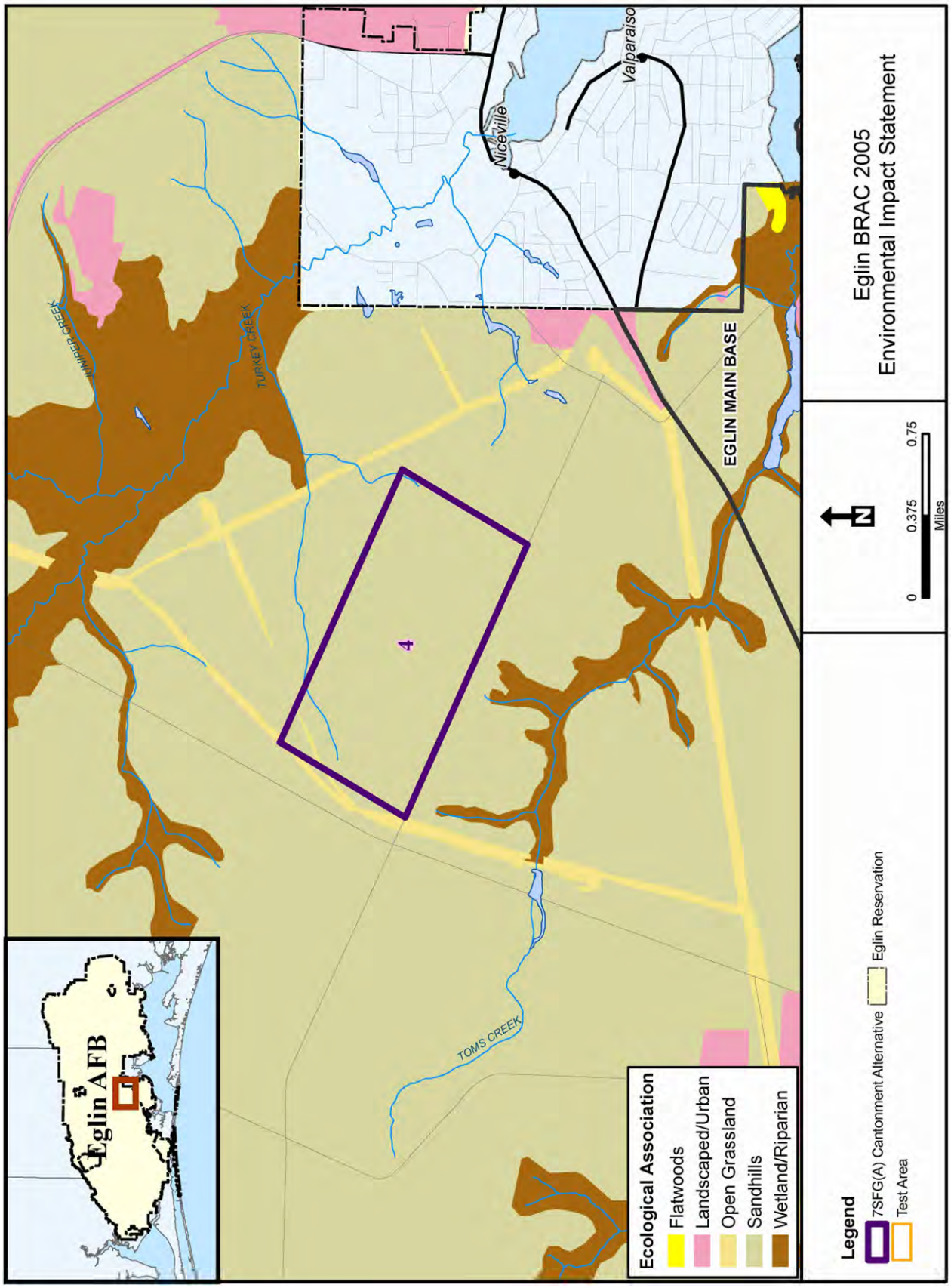

Figure 4-35. 7SFG(A) Cantonment Alternative 4 – Ecological Associations

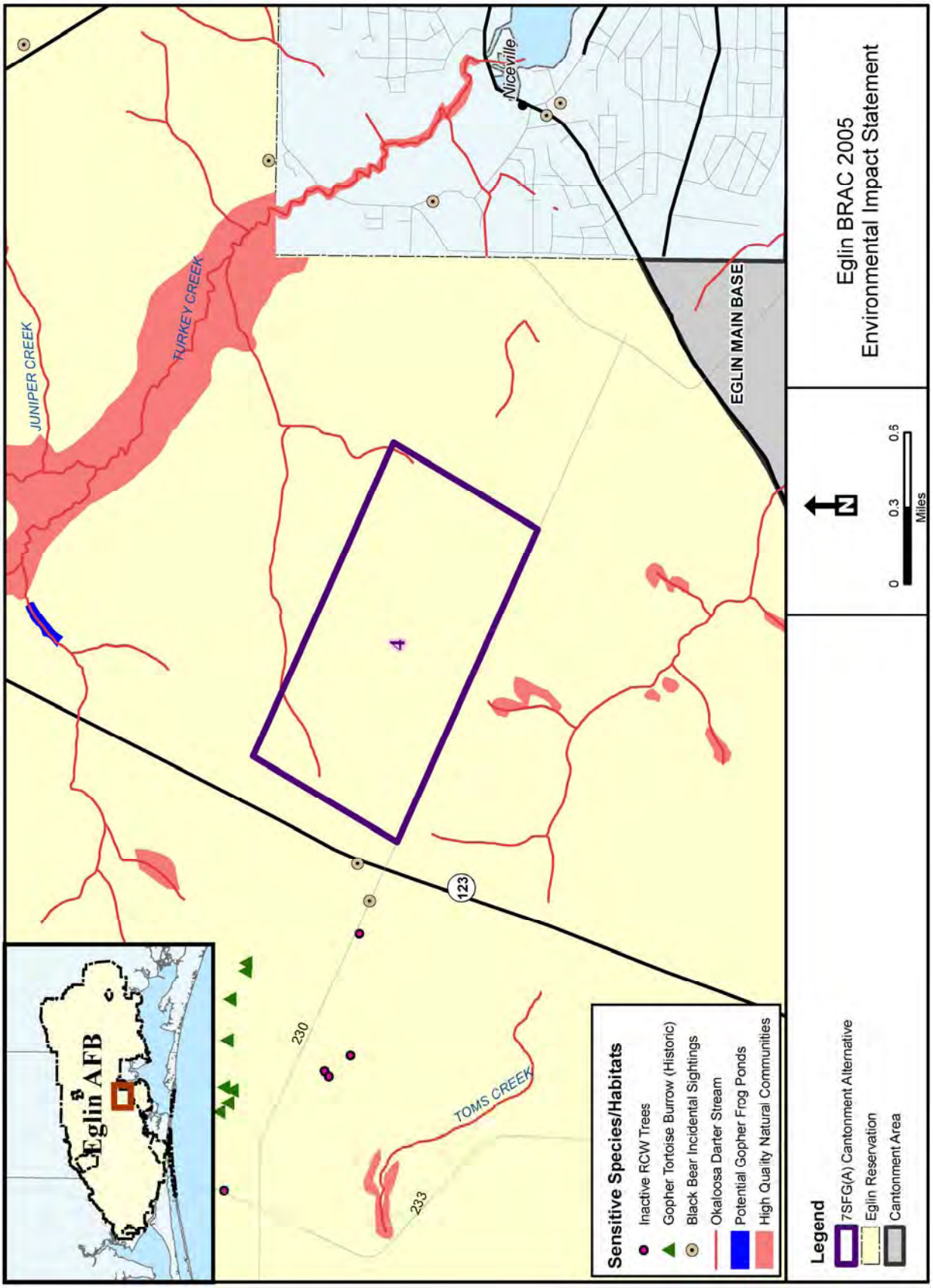

Figure 4-36. 7SFG(A) Cantonment Alternative 4 – Sensitive Habitats and Sensitive Species

4.12.4.2 Environmental Consequences (Biological Resources – 7SFG(A) Cantonment Alternative 4)

This section discusses potential impacts to biological resources located within and adjacent to the action area. 7SFG(A) Cantonment Alternative 4 includes the same MSA site as 7SFG(A) Cantonment Alternative 1, thus all MSA impacts and potential mitigations are the same. Analysis focuses on assessing the potential for impacts to biological resources from land clearing, construction, and daily cantonment activities, and on identifying methods to reduce the potential for negative impacts to biological resources from these activities.

Sensitive Habitats and Sensitive Species

The High Quality Natural Community south of the site is associated with the headwaters of a stream, and could be impacted by erosion from construction activities (Figure 4-36). Other stream habitats in the northern portion of the action area also would be susceptible to excess sedimentation. It is likely that construction permits would require vegetative buffers around the streams and erosion control measures to lessen potential runoff, thus protecting water quality at this High Quality Natural Community. Buffer size considerations are discussed in Section 4.12.1.2.

The federally threatened eastern indigo snake, and state-listed Florida pine snake and Florida black bear may pass through the project area; however, the habitat in the area is degraded due to fire suppression, with a dense understory and sand pine encroachment. Even though the habitat is degraded, black bears still cross Hwy 85 and Hwy 123 and a number of black bears have been killed by cars near the proposed project site. Siting of the cantonment area at the 7SFG(A) Cantonment Alternative 4 location would lead to an increase in traffic on Hwy 85 and Hwy 123, thereby increasing the potential of bear mortalities from vehicles. However, the fencing that would surround the cantonment area (preferably electric fencing) should prevent bears from entering the area, thereby reducing the likelihood of bears crossing Hwy 85 and Hwy 123 and related bear-automobile incidents. Potential impacts to and mitigations for the indigo snake, Florida pine snake, and Florida black bear would be the same as those for 7SFG(A) Cantonment Alternative 1 (Section 4.12.1.2).

The headwater portions of two federally endangered Okaloosa darter streams occur in the northern portion of the 7SFG(A) Cantonment Alternative 4 site and the headwaters of two other Okaloosa darter streams begin within 0.25 mile of the site (Figure 4-36). These darter streams would potentially be affected by sedimentation and runoff from construction and daily cantonment activities. There is no standard guidance for vegetative buffers along Okaloosa darter streams, but a 100-foot buffer would provide the following benefits: (1) maintenance of stream temperature,

(2) contribution of large woody debris habitat, (3) maintenance of diverse stream invertebrates, and (4) removal of excess sediment, nitrogen, phosphorus, and other contaminants (USFWS, 2001). Site designs would be modified to avoid aquatic habitats and to provide as much riparian buffer as possible; clearing and construction operations would observe all buffer requirements and erosion control measures resulting from permits (Section 4.12.1.2).

7SFG(A) Cantonment Alternative 4 would result in the loss of up to 497 acres of degraded sandhills habitat, but many acres of high quality Sandhills habitat would continue to be maintained on other portions of Eglin. The High Quality Natural Community wetlands to the south of the 7SFG(A) Cantonment Alternative 4 site and the streams within the cantonment area boundaries would be protected by buffers and erosion control measures required during construction. Increased traffic on Hwy 123 and Hwy 85 would increase the potential of bear mortalities from vehicles, but not to a significant degree. Given the relocation of any individuals found during pre-construction surveys, indigo snakes are not likely to be adversely affected. Cantonment layout would be modified such that riparian areas near Okaloosa darter streams would not be impacted, thus cantonment activities are not likely to adversely affect the Okaloosa darter. Overall impacts to biological resources would not be significant.

Invasive Nonnative Species

Potential impacts from invasive nonnative plant species would be the same as those for 7SFG(A) Cantonment Alternative 2 (Section 4.12.2.2). Impacts from invasive nonnative plant species to biological resources would not be significant.

4.12.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.12.5.1 Existing Conditions (Biological Resources – 7SFG(A) Cantonment Alternative 5)

Flora and Fauna

Of Eglin's major ecological associations, only the Sandhills (476 acres) and Wetland/Riparian (24 acres) ecological associations are found within or adjacent to the project area (Figure 4-37). Clearing for the access control point, substation, and road widening/improvements would occur within Sandhills (48 acres) and Grasslands/Shrublands (1 acre). No invasive nonnative plant species have been documented within the Alternative 5 location (Eglin GIS, 2007c).

Sensitive Habitats and Sensitive Species

Based on existing information, the species documented to occur or that may potentially be present within the 7SFG(A) Cantonment Alternative 5 location are identified in Table 4-52 and Figure 4-38. No sensitive habitats or sensitive animal species occur on the 7SFG(A) Cantonment Alternative 5 site or areas where clearing for the access control point, substation, and road widening/improvements would occur; however, two sensitive plant species exist along Bullhide Creek, and there is a High Quality Natural Community south of the site (Figure 4-38). Gopher tortoises have been sighted east of the site (Figure 4-38). The indigo snake, Florida pine snake, and Florida black bear may pass through the project area. Appendix H, *Biological Resources*, offers a more detailed natural history description of these species.

Table 4-52. 7SFG(A) Cantonment Alternative 5 – Potentially Occurring Sensitive Species Within or Adjacent to the Site

Scientific Name	Common Name	Status
Reptiles and Amphibians		
Drymarchon corais couperi	Eastern indigo snake	FT, ST
Gopherus polyphemus	Gopher tortoise	ST
Pituophis melanoleucus	Florida pine snake	SSC
Mammals		
Ursus americanus floridanus	Florida black bear	ST
Plants		
Carex baltzellii	Baltzell's sedge	ST
Stewartia malacodendron	Silky camellia	SE

Source: Eglin GIS, 2007a; Eglin GIS, 2007c; U.S. Air Force, 2002a
FT = Federally Threatened; ST = State Threatened; SE = State Endangered;
SCC = State Species of Special Concern

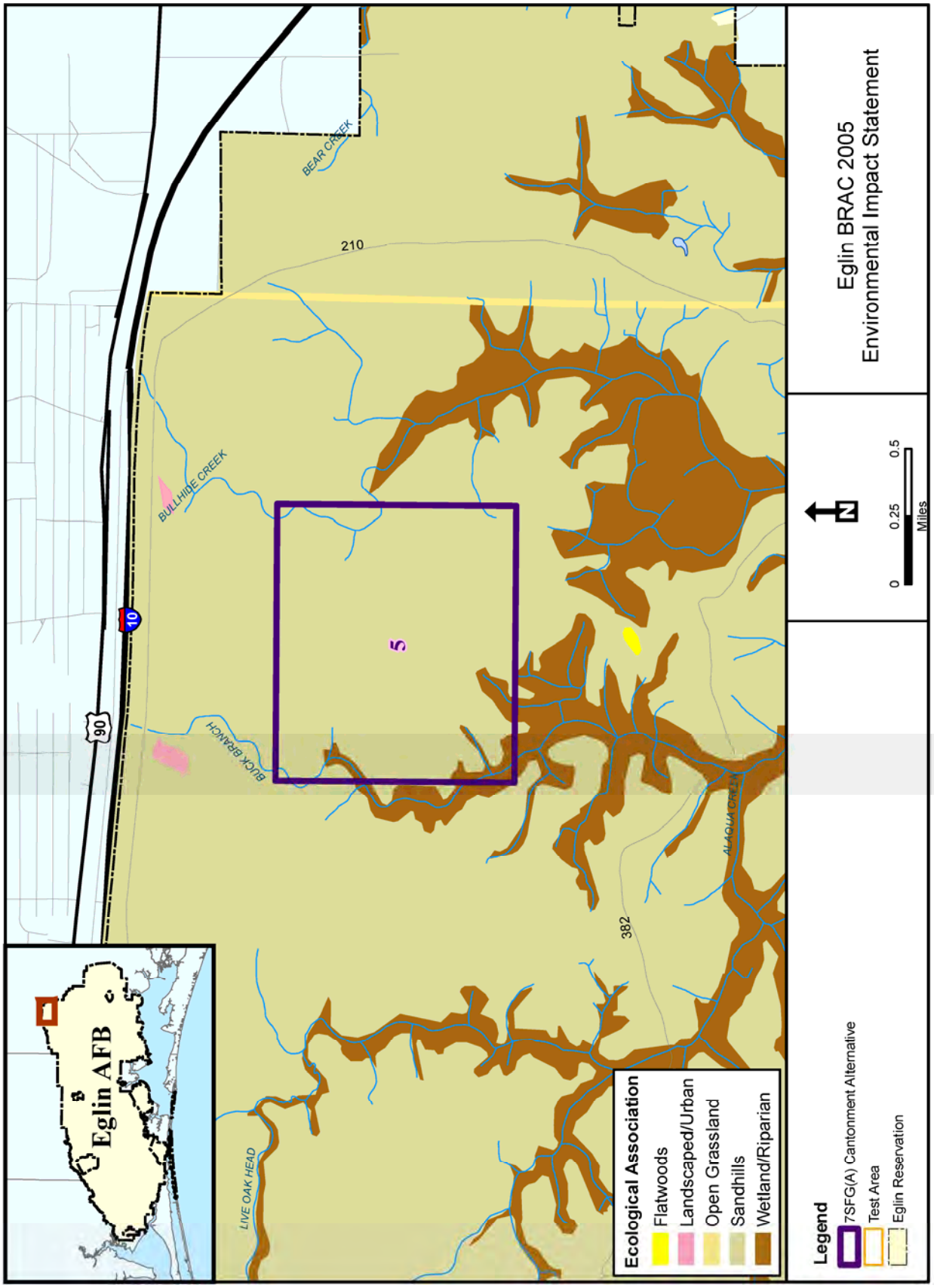

Figure 4-37. 7SFG(A) Cantonment Alternative 5 – Ecological Associations

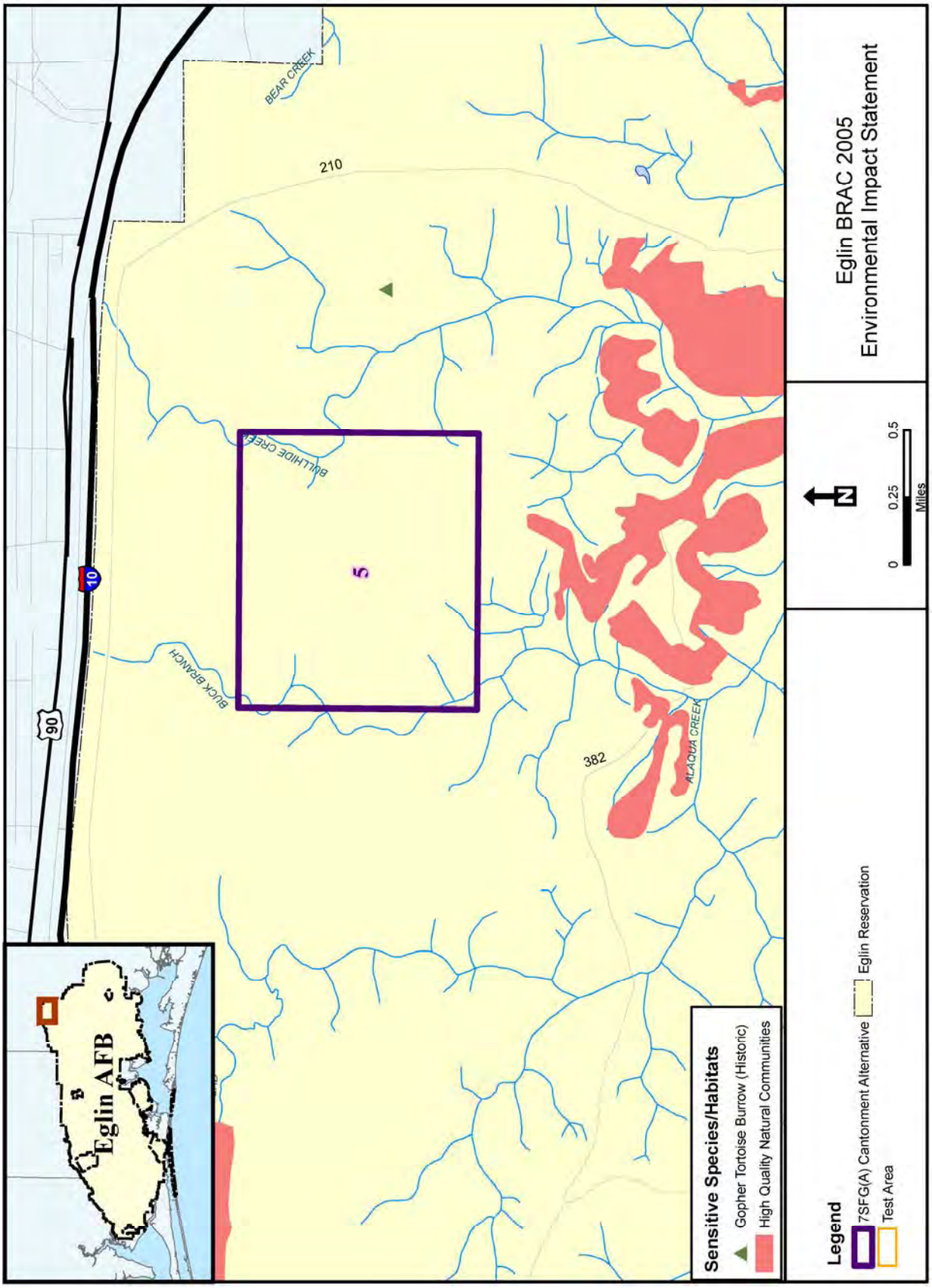

Figure 4-38. 7SFG(A) Cantonment Alternative 5 – Sensitive Habitats and Sensitive Species

4.12.5.2 Environmental Consequences (Biological Resources – 7SFG(A) Cantonment Alternative 5)

This section discusses potential impacts to biological resources located within and adjacent to the action area. 7SFG(A) Cantonment Alternative 5 includes the same MSA site as 7SFG(A) Cantonment Alternative 2, thus all MSA impacts and mitigations are the same. Analysis focuses on assessing the potential for impacts to biological resources from land clearing, construction, and daily cantonment activities, and on identifying methods to reduce the potential for negative impacts to biological resources from these activities.

Sensitive Habitats and Sensitive Species

The High Quality Natural Communities to the south of 7SFG(A) Cantonment Alternative 5 are Sandhills; thus, they are fire-adapted communities. As discussed for 7SFG(A) Cantonment Alternative 2 (Section 4.12.2.2), development of a cantonment area adjacent to a fire-dependent High Quality Natural Community would make it much more difficult to maintain a regular prescribed fire rotation due to smoke management problems. The High Quality Natural Community would likely be affected due to fire suppression, primarily from changes in vegetation due to lack of fire.

Potential impacts to the federally listed eastern indigo snake, and state-listed gopher tortoise, Florida black bear, and Florida pine snake would be the same as those for 7SFG(A) Cantonment Alternative 2 (Section 4.12.2.2).

Streams run along the east and west boundaries of the 7SFG(A) Cantonment Alternative 5 site. Buffers of 100 feet would provide the following benefits: (1) maintenance of stream temperature, (2) contribution of large woody debris habitat, (3) maintenance of diverse stream invertebrates, and (4) removal of excess sediment, nitrogen, phosphorus, and other contaminants (USFWS, 2001). Site designs would be modified to avoid aquatic habitats and to provide as much riparian buffer as possible; clearing and construction operations would observe all buffer requirements and erosion control measures resulting from permits (Section 4.12.1.2). The two sensitive plant species associated with a stream-side area would be protected within the riparian buffer. Road improvements along RR 210 would cross Bullhide Creek; the potential impacts (i.e., sedimentation, hydrologic alteration) and mitigations would be the same as those for 7SFG(A) Cantonment Alternative 3 (Section 4.12.3.2).

7SFG(A) Cantonment Alternative 5 and road widening would result in the loss of up to 524 acres of Sandhills habitat and the degradation of the Sandhills in the High Quality Natural Communities to the south, but many acres of Sandhills habitat would continue to be maintained on other portions of Eglin. The streams and nearby state-listed plant species would be protected by riparian buffers. Given that any indigo snakes found

during pre-construction surveys would be relocated, indigo snakes are not likely to be adversely affected. Overall impacts to biological resources would not be significant.

Invasive Nonnative Species

Potential impacts from invasive nonnative plant species would be the same as those for Alternative 2 (Section 4.12.2.2). Impacts from invasive nonnative plant species to biological resources would not be significant.

4.12.6 No Action Alternative

The No Action Alternative would involve activities on Eglin Main Base, D-51, and Duke Field. The majority of Eglin Main Base and Duke Field is Landscaped/Urban, with smaller areas of Sandhills. Almost all of D-51 is degraded Sandhills that have been invaded by sand pine. On Eglin Main Base, inactive RCW trees and one Okaloosa darter stream are present. The only sensitive species documented at Duke Field is the gopher tortoise. No sensitive species have been documented at D-51, but the headwaters of one Okaloosa darter stream begins to the north of the site.

Under the No Action Alternative, impacts to biological resources from clearing, construction, and daily operations of the 7SFG(A) cantonment area and MSA would not occur. The predictable actions that are to occur at Eglin through the year 2015 are all to be located either on Eglin Main Base or at established test areas, where wildlife habitat quality is poor. Activities by the FLARNG at D-51 would occur in an area degraded by sand pine, and construction on Eglin Main Base would occur primarily in areas that are already developed. The realignment of the Air Force Reserve's 919 SOW located at Duke Field would reduce noise and activity levels in the Duke Field area, reducing disturbance to wildlife and potentially allowing an increase in prescribed burning in the area. Impacts to biological resources from the No Action Alternative would not be significant.

4.12.7 Potential Mitigations

As stated in Chapter 2 (Section 2.4.2.1), there are certain operating constraints based on current agreements with the USFWS for threatened and endangered (T&E) species protection. Additionally, all Terms and Conditions resulting from the current BRAC Section 7 consultation with the USFWS would be implemented. Below are potential additional mitigations to reduce or remove impacts to biological resources from 7SFG(A) Cantonment Alternative activities.

Table 4-53. 7SFG(A) Cantonment Alternatives – Potential Mitigations for Biological Resources

Biological Resource	Potential Mitigation	7SFG(A) Cantonment Alternative										
		1A	1B	1C	2A	2B	2C	2D	2E	3	4	5
High Quality Natural Community	Employ erosion control measures such as silt fences near High Quality Natural Communities associated with wetland/riparian areas.					√	√	√	√			
	Avoid construction in the High Quality Natural Communities at the Alternative 2C and 2D sites.						√	√				
	Continue prescribed burning as much as possible in High Quality Natural Communities.				√			√	√			
Outstanding Natural Area	Employ erosion control measures such as silt fences near Outstanding Natural Areas associated with wetland/riparian areas.							√	√			
	Maintain vegetative buffers around depression wetlands within the Spenser Flats Wetland Outstanding Natural Area.							√	√			
	Avoid construction in the Outstanding Natural Area at the Alternative 2D site.							√				
	Continue prescribed burning as much as possible in Outstanding Natural Areas.							√	√			
Significant Botanical Site	Employ erosion control measures such as silt fences near Significant Botanical Sites associated with wetland/riparian areas.							√	√			
	Maintain vegetative buffers around depression wetlands within the Blue Spring Creek Lakes Significant Botanical Site.							√	√			
	Avoid construction in the Significant Botanical Site at the Alternative 2D site.							√				
	Continue prescribed burning as much as possible in Significant Botanical Sites.							√	√			

Table 4-53. 7SFG(A) Cantonment Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	7SFG(A) Cantonment Alternative										
		1A	1B	1C	2A	2B	2C	2D	2E	3	4	5
Stream and Wetland Species/Habitats	Maintain stream and wetland buffers of at least 100 feet, with larger buffers whenever possible (300 to 1,000 feet).	√	√	√	√	√	√	√	√	√	√	√
	For road improvements crossing streams or wetlands, minimize sedimentation to the water body using erosion control measures.							√	√	√		√
	For road improvements crossing streams or wetlands, minimize hydrologic alteration by ensuring that road crossing structures (i.e., bridges, culverts) allow for the maximum flow volume to pass under the road unimpeded.							√	√	√		√
Red-cockaded Woodpecker	Continue monitoring of RCWs in the area by the Eglin NRS.				√					√		
	If tree clearing were to occur during nesting season, screen each inactive cavity tree during the breeding season to verify no trees have been recolonized.									√		
	Continue prescribed burning as much as possible in RCW foraging habitat.				√			√	√	√		
Flatwoods Salamander	Employ erosion control measures such as silt fences near potential flatwoods salamander habitat.							√	√	√		
	Observe the following restrictions from the Final Rule for federal listing of the flatwoods salamander: Timber harvesting in pine flatwoods habitat is allowed within a 164-meter (538-foot) radius buffer zone surrounding known flatwoods salamander breeding ponds by using selective harvest only during dry periods; within an outer secondary zone extending from 164 meters (538 feet) to 450 meters (1,476 feet) out from the edge of the breeding pond, a mixture of clear-cutting and selective harvesting is allowed. The rule allows clear-cutting of up							√	√			

Table 4-53. 7SFG(A) Cantonment Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	7SFG(A) Cantonment Alternative										
		1A	1B	1C	2A	2B	2C	2D	2E	3	4	5
Flatwoods Salamander, Cont'd	to 25 percent of this secondary zone at any give time, as long as 75 percent of the secondary zone remains in pine flatwoods habitat at a basal area of 4.2 to 4.7 square meters per hectare.											
	Avoid construction in the potential flatwoods salamander habitat at the Alternative 2D site.							√				
	Consider drainage patterns near potential flatwoods salamander ponds when conducting road improvements and construction within salamander buffers.							√	√	√		
	Continue prescribed burning as much as possible in potential flatwoods salamander habitat.							√	√	√		
	Any mechanical operations to remove hardwoods in potential salamander habitat must avoid soil disturbance and hydrologic alteration.							√	√	√		
	Soil disturbing wildfire suppression activities (i.e., plow lines) should be avoided in potential salamander habitat.							√	√	√		
	Chemical and mechanical means of understory control must be closely supervised by wildlife biologists with the Natural Resources Section.							√	√	√		
	Vehicles, personnel, and equipment would remain on existing roads when moving within or near potential flatwoods salamander habitat.							√	√	√		
Okaloosa Darter	During land clearing and construction, utilize erosion control measures such as silt fencing near Okaloosa darter steams.	√	√	√	√						√	
	Maintain at least a 100-foot vegetated buffer along Okaloosa darter streams.	√	√	√	√						√	

Table 4-53. 7SFG(A) Cantonment Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	7SFG(A) Cantonment Alternative										
		1A	1B	1C	2A	2B	2C	2D	2E	3	4	5
Eastern Indigo Snake	Cease vehicular activity if an indigo snake is sighted, and wait until the animal is out of harm's way before resuming activity. The NRS should be notified.	√	√	√	√	√	√	√	√	√	√	√
	Follow the Standard Protection Measures for the Eastern Indigo Snake (U.S. Air Force, 2004f).	√	√	√	√	√	√	√	√	√	√	√
	For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., indigo snake). Use video cameras to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.	√	√	√	√	√	√	√	√	√	√	√
Florida Black Bear	Cease vehicular activity if a black bear is sighted, and wait until the animal is out of harm's way before resuming activity. The NRS should be notified.	√	√	√	√	√	√	√	√	√	√	√
	Use electric fencing around the cantonment area.	√	√	√	√	√	√	√	√	√	√	√
	Responsibly handle waste, utilizing measures such as installing bear-proof dumpsters, bear-resistant garbage cans, and implementing proper disposal measures of oil waste from dining facilities.	√	√	√	√	√	√	√	√	√	√	√
	Provide residents in the cantonment areas with information materials regarding bears and how to successfully live/coexist in bear country. Include deterrent measures such as (a) placing garbage on curb the morning of pick-up, (b) removing wildlife feeders, (c) using bear-resistant garbage containers, (d) using electric fencing, (e) securing pet food, (f) cleaning and securing barbeque grills, etc.	√	√	√	√	√	√	√	√	√	√	√

Table 4-53. 7SFG(A) Cantonment Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	7SFG(A) Cantonment Alternative										
		1A	1B	1C	2A	2B	2C	2D	2E	3	4	5
Gopher Tortoise	Cease vehicular activity if a gopher tortoise is sighted, and wait until the animal is out of harm's way before resuming activity. The NRS should be notified.	√	√	√	√	√	√	√	√	√	√	√
	Avoid active, inactive, and abandoned gopher tortoise burrows by a minimum of 25 feet.	√	√	√	√	√	√	√	√	√	√	√
	Should a gopher tortoise burrow be identified within the proposed path of construction, cease work near the burrow until NRS personnel have investigated the burrow and relocated any gopher tortoise or commensals to a suitable location in accordance with the *Gopher Tortoise Permitting Guidelines* (FWC, 2008).	√	√	√	√	√	√	√	√	√	√	√
Florida Bog Frog	Employ erosion control measures such as silt fences near bog frog habitat.								√			
	Avoid construction in the bog frog habitat at the Alternative 2E site.								√			
Florida Pine Snake	For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., pine snake). Use video cameras to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.	√	√	√	√	√	√	√	√	√	√	√
Gopher Frog	Employ erosion control measures such as silt fences near gopher frog ponds.							√				
	For any gopher tortoise burrows requiring relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., gopher frog). Use video cameras to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.	√	√	√	√	√	√	√	√	√	√	√

Table 4-53. 7SFG(A) Cantonment Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	7SFG(A) Cantonment Alternative										
		1A	1B	1C	2A	2B	2C	2D	2E	3	4	5
Invasive Nonnative Species	To reduce potential seed sources, treat areas with known INS problems.	√	√	√	√	√	√	√	√	√	√	√
	Use native plants in landscaping.	√	√	√	√	√	√	√	√	√	√	√
	To avoid spreading invasive nonnative plant species, do not drive vehicles in areas with known invasive nonnative plant species problems. If a vehicle is driven in such an infested area, clean the vehicle before it is driven to a noninfested area.	√	√	√	√	√	√	√	√	√	√	√

INS = invasive, nonnative species; NRS =Natural Resources Section; RCW = red-cockaded woodpecker

4.13 CULTURAL RESOURCES

4.13.1 7SFG(A) Cantonment Alternative 1: Eglin Main Base

4.13.1.1 Existing Conditions (Cultural Resources – 7SFG(A) Cantonment Alternative 1)

7SFG(A) Cantonment Alternative 1A: The Triangle

The APE for cultural resources under 7SFG(A) Cantonment Alternatives 1A, 1B, and 1C is depicted by Figure 2-2 and Figure 4-39. Three previous archaeological surveys were conducted within the 404-acre Area of Potential Effects (APE) for 7SFG(A) Cantonment Alternative 1A (Mallory and Campbell, 2003, 2005; Thomas and Campbell, 1992). No known archaeological sites have been identified within this alternative area. In addition, no historic cemeteries have been previously documented within this alternative area. In consultation with the State Historic Preservation Office/ Tribal Historic Preservation Office (SHPO/THPO), 96th Civil Engineering Group/ Cultural Resources Branch (96 CEG/CEVH) has determined that no additional archaeological survey is required within this area (96 CEG/CEVH, 2006). The Strategic Air Command (SAC) Alert Historic District, encompasses 4.6 acres within the MSA under this alternative (Figure 4-39). The SAC Alert District is a Cold War Military resource that is not listed on, but still considered eligible for, listing on the National Register of Historic Places (NRHP). Appendix F, *Cultural Resources* contains a full listing of historic properties and survey areas for each alternative.

7SFG(A) Cantonment Alternative 1B: Eglin West Gate

Four previous archaeological surveys were conducted within the 571-acre APE for 7SFG(A) Cantonment Alternative 1B (Figure 2-4; Mallory and Campbell, 2003, 2004a; Thomas and Campbell, 1992). No known archaeological sites or cemeteries are located within this alternative area. In consultation with the State Historic Preservation Office/Tribal Historic Preservation Office (SHPO/THPO), Eglin's Cultural Resources Branch has determined that no additional archaeological survey is required within this area (96 CEG/CEVH, 2006). The southern portion of the SAC Alert Historic District is located in the northern portion of this alternative area (Figure 4-39). A portion of the SAC Alert Historic District is also located within the MSA under this alternative.

7SFG(A) Cantonment Alternative 1C: North Poquito

Three previous archaeological surveys were conducted within the 314-acre APE for 7SFG(A) Cantonment Alternative 1C (Mallory and Campbell, 2003). No historic cemeteries are identified within this alternative area. Past surveys identified two archaeological resources within the area proposed for the 7SFG(A) Cantonment Alternative 1C (Mallory and Campbell, 2003). The SAC Alert Historic District is located within the MSA under this alternative (Figure 4-39).

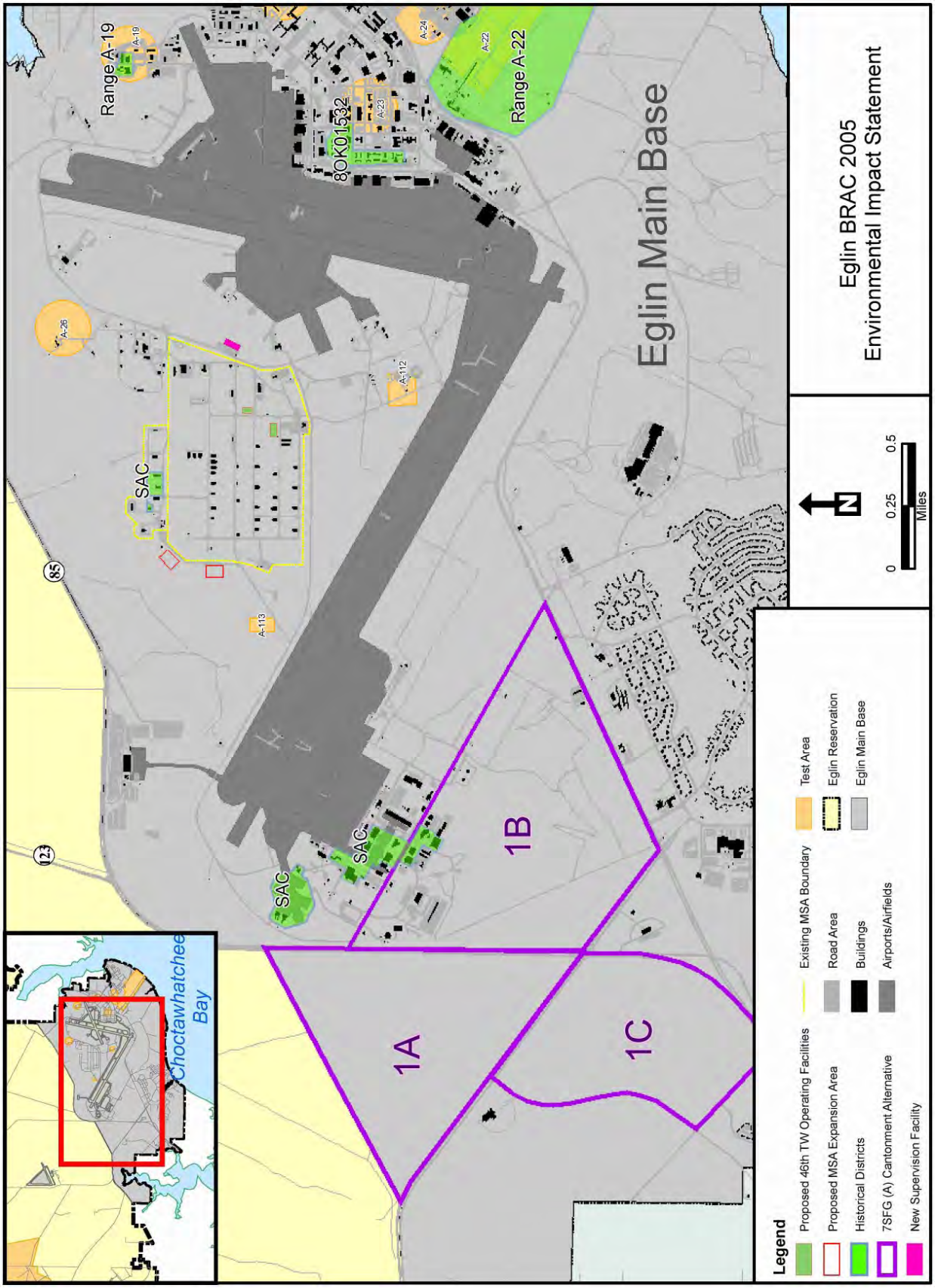

Figure 4-39. Historic Districts on Eglin Main Base

These two archaeological sites are 8OK1835 and 8OK1836. Both sites are related components representing the remains of the Manuel Brown Homestead. The presence of this homestead is recorded in early property deeds and records of the area, as well as recounted by local informants as to the owner and location. All available information suggests that these sites represent components of a late nineteenth to early twentieth century regional homestead. Due to their importance in local history, these sites are considered eligible for listing on the NRHP (96 CEG/CEVH, 2006).

4.13.1.2 Environmental Consequences (Cultural Resources – 7SFG(A) Cantonment Alternative 1)

7SFG(A) Cantonment Alternative 1A: The Triangle

No known archaeological sites or historic cemeteries have been previously located within this alternative area. Within the MSA, no demolition or renovation is planned to structures which make up the SAC Alert Historic District. As a result, no cultural resources would be adversely effected by the selection of this alternative.

7SFG(A) Cantonment Alternative 1B: Eglin West Gate

No cultural resources would be adversely effected by the selection of this alternative. No archaeological sites or historic cemeteries have been identified within this area. Within the main alternative area and MSA, no demolition or renovation is planned to structures which make up the SAC Alert Historic District. As such, no adverse impacts are expected from the implementation of the MSA portion of the alternatives.

7SFG(A) Cantonment Alternative 1C: North Poquito

Survey and subsequent testing of this alternative location identified two archaeological sites (8OK1835 and 8OK1836) related to a historic homestead, which are considered eligible for listing on the NRHP. Any site concept for this area would need to recognize the existence of these two eligible sites (8OK1835 and 8OK1836) within the northern portion of the property and any building improvement plan would need to account for these resources. If adverse effects are expected to occur on one or both of these archaeological sites, additional consultation under provisions of the project-specific programmatic agreement (in Appendix F, *Cultural Resources*) will be conducted to devise a plan to protect the site(s) or otherwise mitigate for adverse effects. Mitigation might include data recovery excavation. Within the MSA, no demolition or renovation is planned to structures which make up the SAC Alert Historic District. As such, no adverse impacts are expected from the implementation of the MSA portion of the alternatives.

4.13.2 7SFG(A) Cantonment Alternative 2: Near Duke Field

4.13.2.1 Existing Conditions (Cultural Resources – 7SFG(A) Cantonment Alternative 2)

7SFG(A) Cantonment Alternative 2A: Southeast of Duke Field

The APE for cultural resources under 7SFG(A) Cantonment Alternatives 2A, 2B, 2C, 2D and 2E is depicted by Figure 2-7. Eglin's Cultural Resources Branch, in consultation with SHPO/THPO, determined that an archaeological survey was required for the entire 472-acre 7SFG(A) Cantonment Alternative 2A APE to identify whether cultural resources are present within the study area. Three survey tracts were assigned which covered the alternative area and some of the surrounding landscape. No archaeological sites considered eligible for listing on the NRHP were identified as a result of these surveys (Mallory and Campbell, 2006).

No known significant historic structures, historic districts, or historic cemeteries are located within this alternative area, or within the MSA associated with these alternatives. Additional descriptions of archaeological sites and survey units discussed in this section can be found in Appendix F , *Cultural Resources*.

7SFG(A) Cantonment Alternative 2B: Northwest of Duke Field

Eglin's Cultural Resources Branch, in consultation with SHPO/THPO, determined that an archaeological survey was required for this 535-acre 7SFG(A) Cantonment Alternative 2B APE to identify whether cultural resources are present within the study area. Three survey tracts were assigned which covered the alternative area and some of the surrounding landscape. No archaeological sites considered eligible for listing on the NRHP were identified as a result of these surveys (Mallory and Campbell, 2006; Mallory and Campbell, 2007a). No known significant historic structures, historic districts, or historic cemeteries are located within this alternative area.

7SFG(A) Cantonment Alternative 2C: Northeast of Duke Field

Eglin's Cultural Resources Branch, in consultation with SHPO/THPO, determined that additional archaeological survey was required for this 1022-acre 7SFG(A) Cantonment Alternative 2C APE to identify whether cultural resources are present within the study area. Five survey tracts were assigned which covered the alternative area and some of the surrounding landscape.

There are two archaeological sites located within this alternative area. Both of these sites (8OK2497 and 8OK335) are small, prehistoric artifact scatters considered ineligible for listing on the NRHP due to their limited capacity to produce additional information important to regional history (Mallory and Campbell, 2007c; Thomas and Campbell, 1992; see Appendix F, *Cultural Resources*, for additional description). No known significant historic structures, historic districts, or historic cemeteries are located within this alternative area.

7SFG(A) Cantonment Alternative 2D: East of Duke Field

Eglin's Cultural Resources Branch, in consultation with SHPO/THPO, determined that an archaeological survey was required for this 1,280-acre 7SFG(A) Cantonment Alternative 2C APE to identify whether cultural resources are present within the study area. Five survey tracts were assigned which covered the alternative area and some of the surrounding landscape (see Appendix F, *Cultural Resources*, for survey unit descriptions).

There are two archaeological sites located within this alternative area (8OK2588 and 8OK2611). Both of these sites are diffuse, prehistoric artifact scatters considered ineligible for listing on the NRHP due to their limited capacity to produce additional information important to regional history (Mallory and Campbell, 2007). No known significant historic structures, historic districts, or historic cemeteries are located within this alternative area.

7SFG(A) Cantonment Alternative 2E: Eglin North Border near Duke Field

Four previous archaeological surveys were conducted within the 715-acre APE for 7SFG(A) Cantonment Alternative 2E (Campbell et al., 1997; Thomas and Campbell, 1992). Four archaeological sites were identified as a result of these surveys, 8OK2591, 8OK1211, 8OK1212, and 8OK1213. Sites 8OK1211, 8OK1212, and 8OK1213 are prehistoric artifact scatters evaluated as ineligible for listing on the NRHP. Site 8OK2591 is an historic artifact scatter considered potentially eligible to the NRHP. If adverse effects are expected to occur at this archaeological site, additional consultation under provisions of the project-specific programmatic agreement (Appendix F, *Cultural Resources*) will be conducted to devise a plan to protect the site or otherwise mitigate for adverse effects.

Eglin's Cultural Resources Branch, in consultation with the SHPO/THPO, determined that no additional archaeological surveys are required for Cantonment Alternative 2E for the 7SFG(A). No known significant historic structures, historic districts, or historic cemeteries are located within this alternative area.

4.13.2.2 Environmental Consequences (Cultural Resources – 7SFG(A) Cantonment Alternative 2)

7SFG(A) Cantonment Alternative 2A: Southeast of Duke Field

No resources within this location were identified as eligible for listing on the NRHP and no historic structures, historic districts, or historic cemeteries are located within this alternative area or the MSA. Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.

7SFG(A) Cantonment Alternative 2B: Northwest of Duke Field

No resources within this location or the MSA were identified as eligible for listing on the NRHP and no historic structures, historic districts, or historic cemeteries are located within this alternative area. Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.

7SFG(A) Cantonment Alternative 2C: Northeast of Duke Field

No resources within this location were identified as eligible for listing on the NRHP and no historic structures, historic districts, or historic cemeteries are located within this alternative area or the MSA. Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.

7SFG(A) Cantonment Alternative 2D: East of Duke Field

No resources within this location were identified as eligible for listing on the NRHP and no historic structures, historic districts, or historic cemeteries are located within this alternative area or the MSA. Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.

7SFG(A) Cantonment Alternative 2E: Eglin North Border near Duke Field

Within this alternative area, there is one archaeological site (8OK2591) considered potentially eligible for listing on the NRHP. The site contains evidence of an early historic period occupation on Eglin AFB. If adverse effects are expected to occur at this archaeological site, additional consultation under provisions of the project-specific programmatic agreement (Appendix F, *Cultural Resources*) will be conducted to devise a plan to protect the site or otherwise mitigate for adverse effects. No known significant historic structures, historic districts, or historic cemeteries are located within this alternative area or the MSA.

4.13.3 7SFG(A) Cantonment Alternative 3: West of Duke Field (Preferred Alternative)

4.13.3.1 Existing Conditions (Cultural Resources – 7SFG(A) Cantonment Alternative 3)

The APE for cultural resources under 7SFG(A) Cantonment Alternative 3 is depicted by Figure 2-9. Portions of three previously surveyed areas, overlap this 500-acre study area (Thomas and Campbell, 1992). Additional details on sites and survey areas presented under this alternative are discussed in Appendix F, *Cultural Resources*.

Eglin's Cultural Resources Branch, in consultation with the SHPO/THPO, determined that additional archaeological survey was required within 7SFG(A) Cantonment Alternative 3 to identify whether cultural resources are present within the study area. This survey has not been completed. Its completion, and any necessary evaluations of significance of findings, assessment of effects, and mitigation for adverse effects will be implemented under provisions of the project-specific programmatic agreement provided in Appendix F, *Cultural Resources*.

No other significant cultural resources were identified as a result of these surveys within the alternative area or MSA. No known historic structures, historic districts, or historic cemeteries are located within this alternative area.

4.13.3.2 Environmental Consequences (Cultural Resources – 7SFG(A) Cantonment Alternative 3)

No archaeological sites, historic structures, historic districts, or historic cemeteries located within this alternative area or MSA are considered eligible for nomination to the NRHP. The Air Force has not identified any adverse effects to cultural resources under this alternative. Additional information on this alternative, including the project-specific programmatic agreement provisions, can be found in Appendix F, *Cultural Resources*.

4.13.4 7SFG(A) Cantonment Alternative 4: North of Eglin Main

4.13.4.1 Existing Conditions (Cultural Resources – 7SFG(A) Cantonment Alternative 4)

The APE for cultural resources under 7SFG(A) Cantonment Alternative 4 is depicted by Figure 2-10. Portions of two previously survey units overlap this 500-acre study area (Campbell, 1999; Mallory and Campbell, 2006). Additional details on sites and survey areas presented under this alternative are discussed in Appendix F, *Cultural Resources*.

Eglin's Cultural Resources Branch, in consultation with the SHPO/THPO, determined that additional archaeological survey was required within 7SFG(A) Cantonment Alternative 4 to identify whether cultural resources are present within the study area. This area was subject to intensive survey in the summer of 2007.

No archaeological sites considered as eligible for listing on the NRHP were identified within the alternative project area as a result of these surveys (Mallory and Campbell, 2007j). In addition, no known historic structures, historic districts, or historic cemeteries are located within this alternative area. The SAC Alert Historic District is located within the MSA under this alternative (Figure 4-39).

4.13.4.2 Environmental Consequences (Cultural Resources – 7SFG(A) Cantonment Alternative 4)

No archaeological resources within this location were identified as eligible for listing on the NRHP, and no historic structures, historic districts, or historic cemeteries are located within this portion of the alternative area. Within the MSA, no demolition or renovation is planned to structures which make up the SAC Alert Historic District (Figure 4-39). Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.

4.13.5 7SFG(A) Cantonment Alternative 5: DeFuniak Springs

4.13.5.1 Existing Conditions (Cultural Resources – 7SFG(A) Cantonment Alternative 5)

The APE for cultural resources under 7SFG(A) Cantonment Alternative 5 is depicted by Figure 2-11. Portions of four previous archaeological surveys (X-345, X-182, X-491, and X-639), were conducted within the 500-acre APE for the 7SFG(A) Cantonment Alternative 5 (Thomas and Campbell, 1992). Past surveys identified six archaeological resources within the area proposed for the 7SFG(A) Cantonment Alternative 5 (Thomas and Campbell, 1992). Additional details on sites and survey areas presented under this alternative are discussed in Appendix F, *Cultural Resources*.

Eglin's Cultural Resources Branch, in consultation with the SHPO/THPO, determined that additional archaeological survey was required within 7SFG(A) Cantonment Alternative 5 to identify whether cultural resources are present within the study area. These survey tracts X-924 and X-925 were subject to intensive survey in the summer of 2007 (Mallory and Campbell, 2007k).

One new site was identified by the 2007 surveys in tract X-924. This site, 8WL2217 is a prehistoric lithic scatter evaluated as ineligible for the NRHP. Six additional archaeological sites identified by previous surveys include 8WL1116, 8WL1117, 8WL1121, 8WL1122, 8WL1540, and 8OK0147. All six sites are prehistoric lithic scatters with no temporally diagnostic material and were identified as ineligible for the NRHP (Thomas and Campbell, 1992). In addition, no known historic structures, historic districts, or historic cemeteries are located within this alternative area. The MSA under this alternative contains no identified cultural resources.

4.13.5.2 Environmental Consequences (Cultural Resources – 7SFG(A) Cantonment Alternative 5)

No resources within this location were identified as eligible for listing on the NRHP and no historic structures, historic districts, or historic cemeteries are located within this alternative area or the MSA. Therefore, the Air Force does not anticipate adverse effects to cultural resources under this alternative.

4.13.6 No Action Alternative

Under the No Action Alternative for the 7SFSG(A) Cantonment, the actions described in Chapter 2, Section 2.7, would not occur. If BRAC-related activities were not to occur at Eglin, if the 33 FW were to depart, and the list of predicted projects were to occur, no adverse effects to cultural resources would be expected under the No Action Alternative for the 7SFG(A) Cantonment.

5. 7SFG(A) RANGE TRAINING – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

5.1 INTRODUCTION

This chapter describes the affected environment and the environmental consequences associated with each alternative range location and configuration for the 7SFG(A) at Eglin Air Force Base (AFB). Table 5-1 provides an overview of the resources potentially affected by this action and respective analyses conducted. Some resource areas were not evaluated; the rationale for elimination is also identified in Table 5-1.

Table 5-1. Resource Areas Analyzed for Environmental Consequences Associated With the 7SFG(A) Range Alternatives

Resource Area	Section	Brief Description of Scope of Analysis
Airspace	N/A	Airspace was not analyzed since there are minimal airborne actions associated with the 7SFG(A) range training activities.
Noise	5.2	Analyses focused on potential noise impacts associated with construction activities and munitions usage (small and large arms). Army air and surface vehicle usage would be similar to existing usage and was not analyzed in detail.
Land Use	5.3	Analysis determined whether the alternatives would change the existing land use in the affected area or have any direct or indirect impacts on any surrounding land use, including potential impacts to recreational use and hunting on Eglin AFB.
Socioeconomics	5.4	Analysis focused on the effects of the range-related construction and the effects on the availability of recreational activities on Eglin AFB.
Transportation	N/A	Transportation was not analyzed because no or very limited data are currently available regarding range roadways, nor are these roadways included in any of the transportation models. Accurately forecasting and quantifying impacts to these facilities would be very difficult given the nature of activities that occur on the range areas and the lack of existing traffic data for these facilities.
Utilities	5.5	Analysis addressed the current and potential for potable water, wastewater treatment, and electricity and natural gas at the sites proposed for 7SFG(A) Special Operations Forces (SOF) ranges. The proposed aircraft operations, water operations, and ground maneuvers would not require utility support and are not discussed in this section.
Air Quality	5.6	Air quality emissions were analyzed for construction, vehicular, and munitions activities.
Safety	5.7	Analyses focused on issues with a potential to affect safety and the degree to which the activity would increase or decrease safety risks to military personnel, the public, and property.

Continued on the next page…

Table 5-1. Resource Areas Analyzed for Environmental Consequences Associated With the 7SFG(A) Range Alternatives, Cont'd

Resource Area	Section	Brief Description of Scope of Analysis
Solid Waste	5.8	Analysis focused on identifying the types and quantities of solid wastes generated from government actions and requiring disposal, including municipal solid waste, C&D waste, and munitions debris. Land-clearing waste was not calculated as these wastes, which include soils and vegetative material, would be either used as fill, sold for wood product production, or burned under a burn permit and would not require disposal.
Hazardous Materials	5.9	Analysis focused on identifying the type of materials and wastes that would be associated with proposed activities. These data were evaluated against the base capability for managing these materials/wastes. The analysis also evaluated impact of proposed activities on ERP sites.
Physical Resources	5.10	Analysis focused on the potential impacts of troop movements, munitions wastes, and construction activities on soils, groundwater, surface waters, wetlands, floodplains, and stormwater.
Biological Resources	5.11	Analysis focused on impacts to flora, fauna, sensitive species, associated habitats, and the potential for introduction and spread of invasive species from construction activities, ground maneuvering, water operations, air operations, pyrotechnics, and munitions use.
Cultural Resources	5.12	Analysis focused on identified and unidentified cultural resources within the area of potential effects that would be affected by the Proposed Action.

SOF = Special Operations Forces; C&D = construction and demolition

5.2 NOISE

7SFG(A) range training operations would generate noise from several sources including munitions, construction (during range construction), and vehicles. This analysis focused on munitions and construction noise. These noise sources would generate relatively loud noise that would be concentrated in defined areas. Noise generated by 7SFG(A) surface vehicles was not analyzed in detail because such noise would be widely distributed throughout relatively remote areas within Eglin Range and nearby areas and would be similar to noises currently occurring in these areas. 7SFG(A) would utilize aircraft already based at and near Eglin AFB. As these aircraft currently operate in range airspace as well as at Eglin Main, Duke, and Choctaw, noise levels would not be expected to change substantially from baseline conditions.

This section addresses general noise impacts on humans and structures as described in Chapter 3, Definition of Affected Resources, while subsequent sections discuss the impacts of noise on land use, environmental justice, biological resources, and cultural resources.

5.2.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.2.1.1 Existing Conditions (Noise – 7SFG(A) Range Alternative 1)

Figure 5-1 shows the configuration of training areas in the eastern portion of Eglin Range. The figure also shows current CDNL noise levels calculated using current levels of explosives usage in and near proposed 7SFG(A) training areas. In total, 51,514 acres are currently exposed to noise levels exceeding 62 dB CDNL, and 16,352 acres are exposed to noise levels louder than 70 dB CDNL. These elevated noise levels are contained entirely within the boundaries of Eglin Range. High-explosives detonations are associated with explosive ordnance disposal (EOD) activities, air-to-ground weapons training, and ground-to-ground weapons training. In 2006, out of 77 total noise complaints received by the Eglin AFB Public Affairs Office, 14 were attributed to explosives noise and 27 were attributed to loud booms, which were probably explosives but could also have been sonic booms (Walsh, 2007).

The Noise Assessment and Prediction System is used at Eglin Range to predict ordnance-generated noise intensities in surrounding communities, given a vertical profile of wind, temperature, and humidity (Smith et al., 1992). As discussed in Chapter 3, meteorological conditions often influence propagation of munitions noise and may cause noise to focus in certain areas. These predictions are used to inform decision makers on the risk of noise complaints resulting from a particular planned mission or exercise. Munitions regularly cause peak noise levels above 130 dB outside range boundaries. This noise level has been associated with a moderate risk of noise complaints but not damage to hearing or structures.

Inert munitions are also used on the Eglin Range. While the noise from certain aerial gunnery events may be audible off-range, the intensity and intrusiveness of this type of noise is generally much lower than high-explosive events taking place nearby on the range.

TA C-52. The noise environment in the vicinity of Test Area (TA) C-52 consists of by long, quiet periods punctuated by periods of intense noise from military sources. Detonations of net explosive weight (NEW) > 20 pounds regularly occur at this training area. Military noise events include detonation of high-explosive weapons, overflight by military aircraft, and the firing of small arms. In this area, overflights by military aircraft contribute to overall noise levels. Small-arms munitions are used infrequently at TA C-52, with 96 rounds of 9-millimeter (mm) ammunition having been fired in 2005 (U.S. Air Force, 2005e).

TA C-53. Dominant noise sources in the vicinity of TA C-53 are similar in to those at TA C-52. Time-averaged munitions noise levels in this area are less than 62 dB CDNL. In this area, overflights by military aircraft also contribute to overall noise levels. Small arms are not typically used at TA C-53 (U.S. Air Force, 2005e).

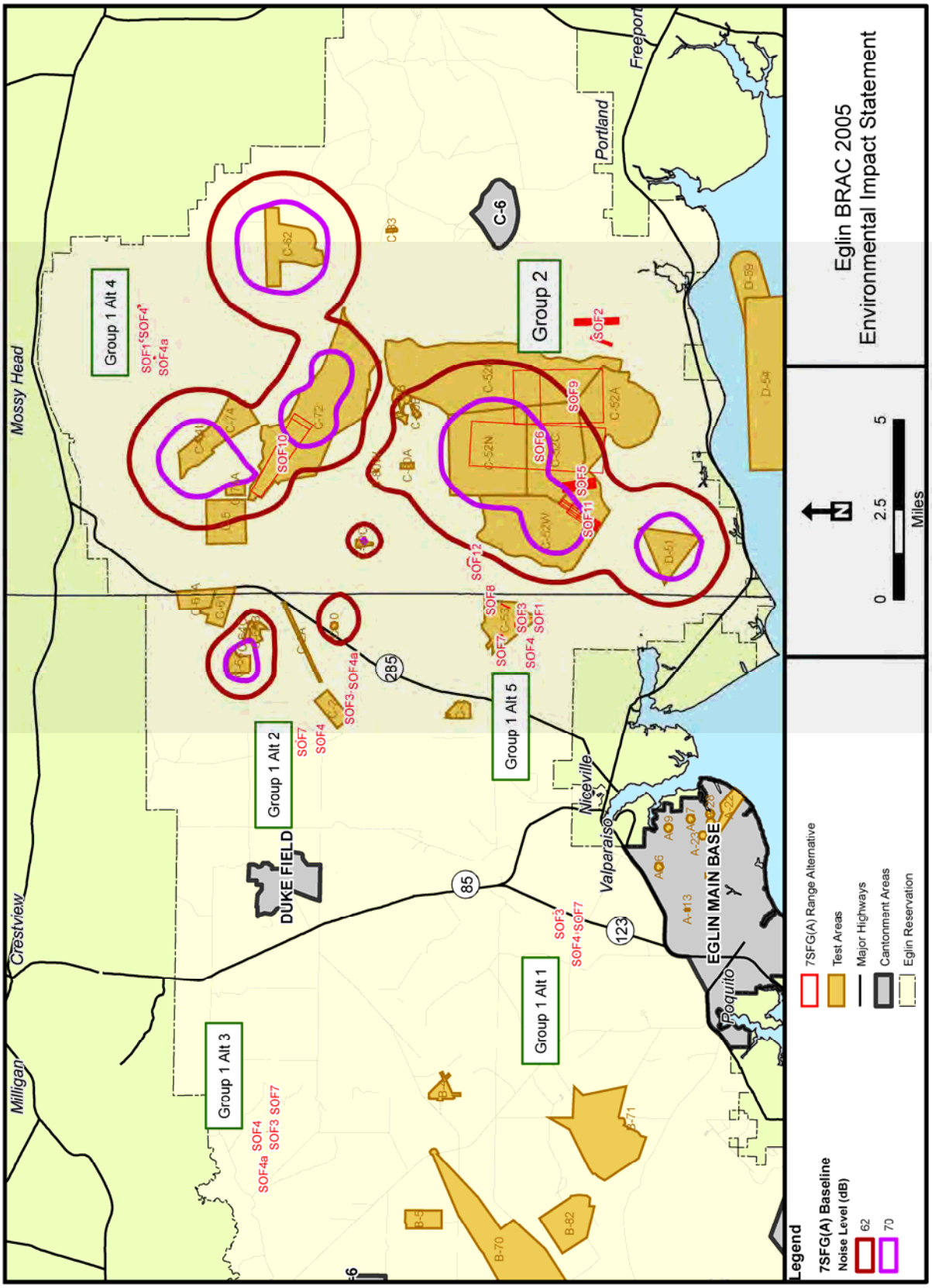

Figure 5-1. Areas Exposed to Elevated High-Explosives Munitions Noise Levels Under Baseline Conditions

TA C-72. Dominant noise sources in the vicinity of TA C-53 are similar to those described for C-52. Time-averaged munitions noise levels in this area range between less than 62 dB CDNL and greater than 70 dB CDNL. In this area, overflights by military aircraft also contribute to overall noise levels. Small arms are not typically used at TA C-72 (U.S. Air Force, 2005j).

Interstitial Areas. Portions of Eglin Range not designated as training areas are exposed to noise from nearby ranges, aircraft overflights, ground training activities, vehicles, hunting, and other assorted noise sources. In general, these areas are relatively quiet in comparison to the training areas. However, high-explosive detonation events on Eglin training areas occasionally generate loud noise in these areas.

5.2.1.2 Environmental Consequences (Noise – 7SFG(A) Range Alternative 1)

Construction

Construction of the proposed facilities on the Eglin Range is expected to take place between CY 2008 and CY 2011. Types of construction equipment used for range construction would be similar to those used in construction of the 7SFG(A) cantonment area. Noise generated would be similar in type and intensity to noise described in Chapter 4 (Section 4.2.1.2, Environmental Consequences). The closest residences to ranges proposed to be constructed under 7SFG(A) Range Alternative 1 are approximately 2 miles away. As no sensitive human receptors are impacted by high noise levels, no impacts would occur.

Weapons Training

Weapons proposed to be used by 7SFG(A) would include rifles, machine guns, grenade launchers, demolition charges, and mortars. The majority of 7SFG(A) munitions use would be in designated "Group 1" and "Group 2" Ranges. Group 1 Ranges would include the Special Operations Forces (SOF) Shoot House (SOF 1), the Breach Facility (SOF 3), the Shotgun Range (SOF 4), and the Hand Grenade Qualification Course (SOF 7). The location of Group 1 Ranges (Figure 5-1) would be different under each alternative. Group 2 Ranges would be in the same locations under all alternatives (Figure 5-1) and would consist of the Sniper Range Suite (SOF 2), the MK19/M203 Grenade Launcher Range (SOF 5), the Mortar Weapons Systems Range (SOF 6), the Urban Assault Course (SOF 8), the Battle Area Complex (SOF 9), the Anti-Armor Tracking and Live Fire (SOF 10), the Qualification Training Range (SOF 11), and the Light Demolition Range (SOF 12). Under all action alternatives, between 24 percent and 45 percent of 7SFG(A) weapons training firing events (depending on the SOF) would occur at night (10:00 PM to 7:00 AM).

Blank small-arms ammunition, hand flares, smoke grenades, and other training ordnance would also be expended in interstitial areas during maneuvers training to increase training realism. Munitions noise generated during maneuvers training would be similar in nature to past activities that have occurred in these areas and would be widely distributed in remote areas. Activities would not be concentrated near residences or any known sensitive receptors.

Under 7SFG(A) Range Alternative 1, small-arms noise (weapons .50-caliber and smaller) generated at Group 1 and Group 2 Ranges would impact an estimated 4,960 acres at greater than 65 dB DNL [A-weighted decibel day-night level]. Noise levels of greater than 87 PK_{15}(met) generated by 7SFG(A) training would affect 39,562 acres. Areas impacted by small-arms noise at greater than 65 dB DNL or 87 PK_{15}(met) are located entirely within Eglin Range boundaries. In general, impacted areas have been exposed to only limited small-arms noise in past years (hunting and some ground training) but are regularly exposed to aircraft overflights and explosives noise from ongoing operations. While small-arms noise would increase dramatically in some areas of the range under 7SFG(A) Range Alternative 1, impacted areas do not contain known sensitive receptors.

Large-arms (weapons larger than .50-caliber and explosives) use by the 7SFG(A) would occur at SOFs 5, 6, 9, 10, and 12. The hand grenade course would utilize training grenades only. Noise generated during 7SFG(A) large-arms training is centered in the areas near training areas C-52 and C-72 as well as at Group 1 Ranges (Figure 5-2). Acreage impacted by large-arms noise levels of greater than 62 dB CDNL in the vicinity of proposed 7SFG(A) training ranges would increase from 51,514 to 71,284 acres, and acreage impacted by noise at greater than 70 dB CDNL would increase from 16,352 to 24,307 acres.

Impacted acreage would include 43 acres of privately owned land located north of Choctawhatchee Bay and immediately south of Eglin Range. Of the 43 acres impacted at greater than 62 dB CDNL, 31 acres are currently residential and can be considered noise-sensitive. The U.S. Army's Center for Health Promotion and Preventative Medicine recommends that noise-sensitive land uses not be located within 62 dB CDNL noise levels (USACHPPM, 2005). People living in these areas are expected to notice an increase in munitions noise, which was previously less than 62 dB CDNL. This increase in noise is expected to be noticeable and may cause annoyance to residents of affected areas. Noise effects under this alternative would be limited to moderate annoyance for residents exposed to 62 dB CDNL.

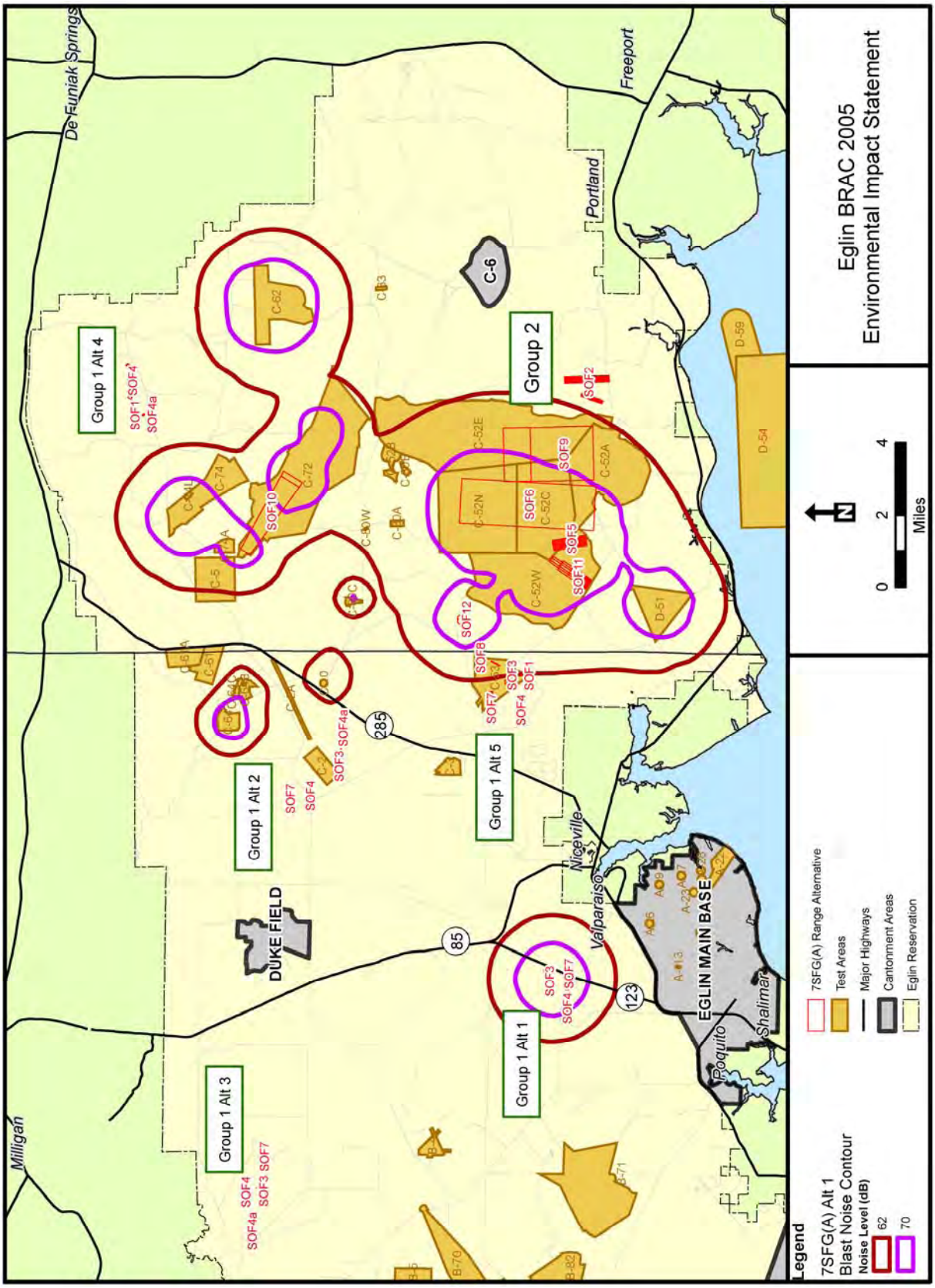

Figure 5-2. Areas Exposed to Elevated High-Explosives Munitions Noise Levels Under 7SFG(A) Range Alternative 1

7SFG(A) high-explosives munitions include 40-, 60-, 81-, and 84-mm rounds as well as mines, demolition charges, rockets, and miscellaneous explosives. Each type of explosive is assigned a NEW value based on the quantity of TNT required to deliver an equivalent explosive force. The highest NEW explosive proposed to be used by the 7SFG(A) is the 81-mm mortar. Rounds commonly used in the 81-mm mortar have a NEW of approximately 3 pounds. In 2005, explosives with NEW greater than 20 pounds were detonated 346 times per year, and several detonations of more than 100 pounds were carried out. 7SFG(A) high-explosives munitions would not cause any increase in maximum peak noise levels on or near Eglin Range. Peak-noise levels would not exceed 140 dB PK_{15}(met) at locations outside of Eglin Range. Peak noise levels would continue to exceed 130 dB at locations off range.

Vehicles

Vehicles training would be the same under all action alternatives. To avoid redundancy, discussion of vehicles training will be discussed for 7SFG(A) Range Alternative 1 and will not be repeated under each subsequent alternative. Proposed 7SFG(A) vehicle use is described in Chapter 2 (Section 2.4, Operational Requirements for 7SFG(A) Range Training). Specifically, Table 2-6 (*Estimated Annual Requirements for 7SFG(A) Aircraft Operations*) describes aircraft operations, which would include rotary and fixed-wing aircraft. These aircraft would not be assigned to the 7SFG(A). Rather the 7SFG(A) would make use of Air Force Special Operations Command aircraft already operating in the area. Aircraft would be used to insert and extract troops from existing and proposed drop zones and a variety of other mission training activities. These operations would be similar to activities currently ongoing on the range. While 7SFG(A) operations would often take place at night, the operations would be distributed across large areas. In addition, the decrease in aircraft operations resulting from the departure of the 919 SOW from Duke Field is expected to negate increases in air operations in support of 7SFG(A).

Surface vehicles used by the 7SFG(A) would include HMMWVs, all-terrain vehicles (ATVs), Zodiac boats (rubber raiding craft), and assorted other military vehicles. These operations would be similar to activities currently underway on the range and in nearby bodies of water.

Noise impacts due to 7SFG(A) vehicle operations are not expected. Impacts of vehicle operations would be the same under all alternatives and are not discussed in Sections 5.2.2 through 5.2.5.

5.2.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.2.2.1 Existing Conditions (Noise – 7SFG(A) Range Alternative 2)

7SFG(A) Range Alternative 2 differs from 7SFG(A) Range Alternative 1 only in the location of Group 1 Ranges. Therefore, only current noise levels around C-2, the training area located nearest to the Alternative 2, Group 1 Ranges, is discussed.

TA C-2. This test range has not been used for an extended period of time (U.S. Air Force, 2001b). When it was most recently used, it was used as a ground forces tactical training area. Noise in the vicinity of this test area would consist primarily of natural sounds punctuated by periodic man-made noises from training operations. The test area is located within one of the aircraft approach patterns for Duke Field and is therefore subject to frequent aircraft overflight noise. The time-averaged munitions noise levels in this area is less than 62 dB CDNL.

5.2.2.2 Environmental Consequences (Noise – 7SFG(A) Range Alternative 2)

Construction

Construction methods would be the same under 7SFG(A) Range Alternative 2 as under 7SFG(A) Range Alternative 1. The nearest residences to the construction sites are more than 4 miles away. No adverse impacts are expected.

Weapons Training

Under this alternative, 5,009 acres, all of which are located on the Eglin Range, would be exposed to 7SFG(A) small-arms noise at greater than 65 dB DNL. Noise levels louder than 87 PK_{15}(met) generated by 7SFG(A) small-arms training would affect 39,287 acres. Areas exposed to high-explosives munitions noise at levels higher than 62 dB CDNL would increase from 51,514 acres to 80,589 acres. Acreage impacted by noise at more than 70 dB CDNL would increase from 16,352 to 26,283 acres. Areas affected by elevated high-explosives munitions are depicted in Figure 5-3. The off-range acreage impacted by munitions noise above 62 dB CDNL is the same acreage that would be affected under 7SFG(A) Range Alternative 1. This is because the noise events that cause this increase from baseline noise levels would be occurring in Group 2 Ranges, which are at the same locations under all 7SFG(A) range alternatives. Noise events at greater than 115 SPL would continue to occur beyond range boundaries, but detonations would not occur that would cause noise at greater than 140 dB off-range. Maximum PK_{15}(met) high-explosives noise would not increase under this alternative. Noise effects under this alternative would be limited to moderate annoyance for residents exposed to 62 dB CDNL.

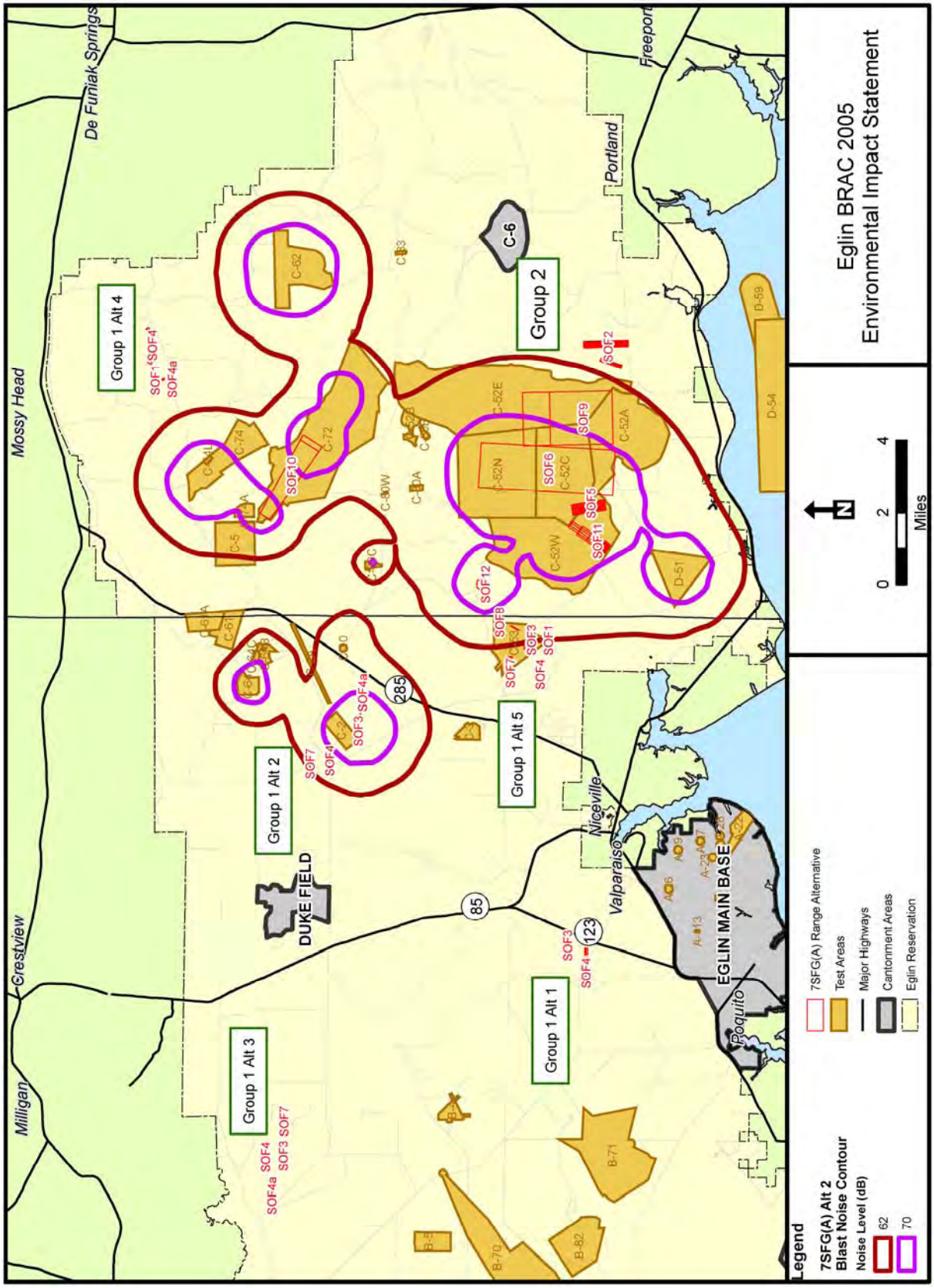

Figure 5-3. Areas Exposed to Elevated High-Explosives Munitions Noise Levels Under 7SFG(A) Range Alternative 2

5.2.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.2.3.1 Existing Conditions (Noise – 7SFG(A) Range Alternative 3)

Under 7SFG(A) Range Alternative 3, the Group 1 Ranges would be located in the northern portion within an interstitial area. The noise environment in this portion of the interstitial area consists of natural sounds punctuated by occasional sounds related to military training.

5.2.3.2 Environmental Consequences (Noise – 7SFG(A) Range Alternative 3)

Construction

Construction methods would be the same under 7SFG(A) Range Alternative 3 as under 7SFG(A) Range Alternative 1. The nearest residences to the construction sites are more than 1.25 miles away. No adverse impacts are expected.

Weapons Training

Under this alternative, 4,891 acres would be exposed to 7SFG(A) small-arms noise at greater than 65 dB DNL. Noise levels of greater than 87 PK_{15}(met) generated by 7SFG(A) small-arms training would affect 36,749 acres. Neither 65 dB DNL nor 87 PK_{15}(met) noise contours would extend beyond range boundaries. Some minor annoyance could potentially occur as a result of small-arms training.

Areas affected by elevated high-explosives munitions noise are depicted in Figure 5-4. Under this alternative, acreage impacted by noise levels of greater than 62 dB CDNL in the vicinity of proposed 7SFG(A) training ranges would increase from 51,514, to 71,042 acres. Acreage impacted by noise at greater than 70 dB CDNL would increase from 16,352 to 24,295 acres. The same off-range area impacted by munitions noise above 62 dB CDNL under 7SFG(A) Range Alternative 1 would be impacted by noise levels above 62 dB CDNL under 7SFG(A) Range Alternative 3. Peak high-explosives munitions noise levels would not increase over current levels. Noise levels louder than 115 SPL would continue to occur beyond range boundaries, but no detonations would cause noise above 140 dB off-range. Noise effects under this alternative would be limited to moderate annoyance for residents exposed to 62 dB CDNL.

5.2.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.2.4.1 Existing Conditions (Noise – 7SFG(A) Range Alternative 4)

As with 7SFG(A) Range Alternative 3, under 7SFG(A) Range Alternative 4, Group 1 Ranges would be located in the northern portion of the range within an interstitial area. The existing noise environment in this portion of the interstitial area consists of natural sounds punctuated by occasional sounds related to military training.

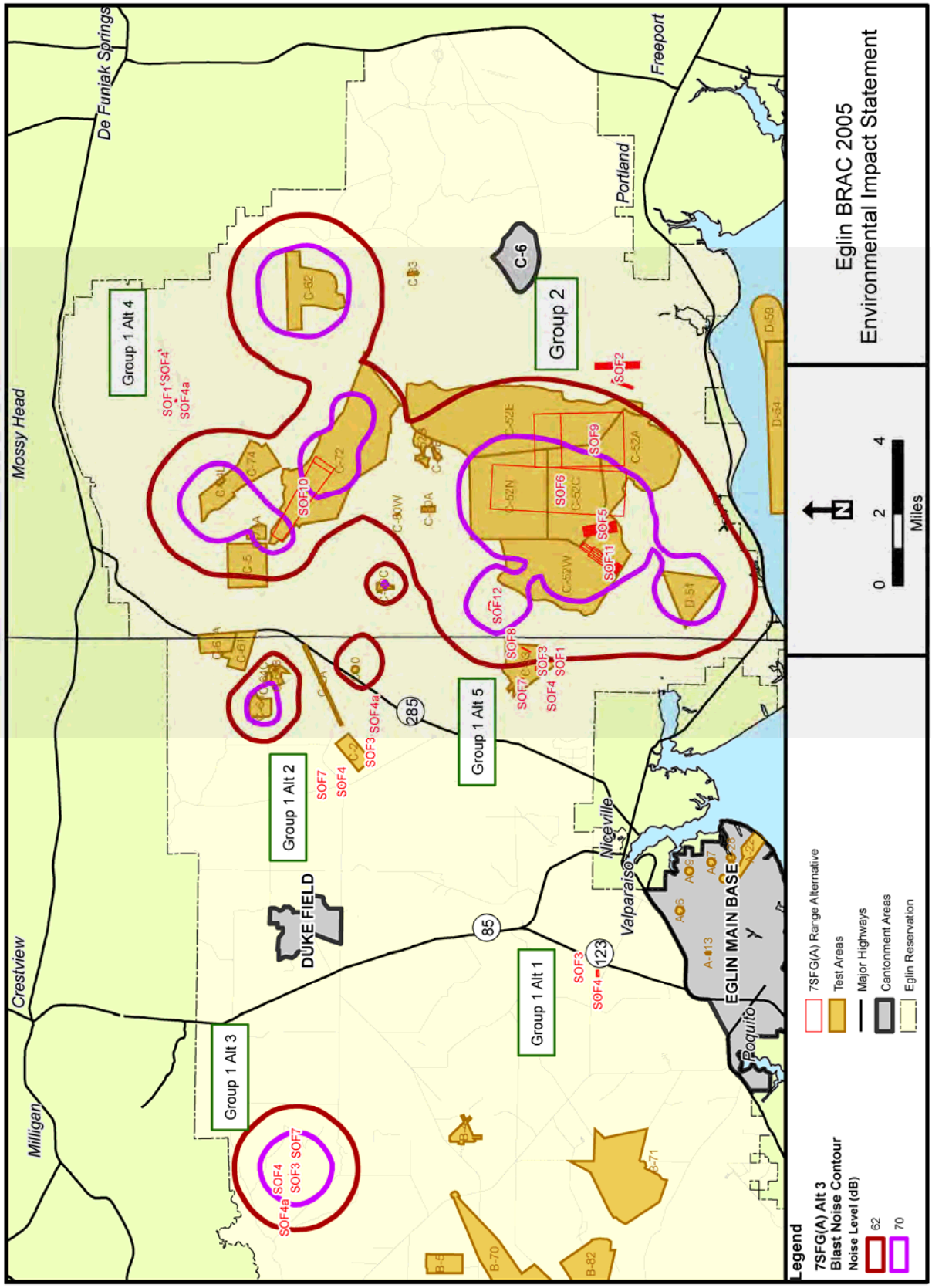

Figure 5-4. Areas Exposed to Elevated High-Explosives Munitions Noise Levels Under 7SFG(A) Range Alternative 3

5.2.4.2 Environmental Consequences (Noise – 7SFG(A) Range Alternative 4)

Construction

Construction methods would be the same under 7SFG(A) Range Alternative 4 as under 7SFG(A) Range Alternative 1. The nearest residences to the construction sites are more than 4 miles away. No adverse impacts are expected.

Weapons Training

Under this alternative, 5,073 acres would be exposed to 7SFG(A) small-arms noise at levels above 65 dB DNL. The 65 dB DNL noise contour would not extend beyond the boundary of Eglin Range. Under this alternative, 38,948 acres would be regularly exposed to instantaneous noise levels of greater than 87 PK_{15}(met). While the 65 dB DNL noise contour would not extend beyond the boundary of Eglin Range, the 87 PK_{15}(met) noise contour would extend beyond the northern border of the range by approximately 500 feet. The off-range area that is within the 87 PK_{15}(met) contour includes 39 acres. However, the entire off-range area impacted by noise at greater than 87 PK_{15}(met) is within the Highway I-10 easement and, as a result, no noise impacts are expected. Areas affected by elevated high-explosives munitions noise are depicted in Figure 5-5. Under this alternative, acreage impacted by noise levels exceeding 62 dB CDNL in the vicinity of proposed 7SFG(A) training ranges would increase from 51,514 to 79,618 acres. Acreage impacted by noise above 70 dB CDNL would increase from 16,352 to 24,295 areas**.** The same off-range area impacted by munitions noise above 62 dB CDNL under 7SFG(A) Range Alternative 1 would be impacted noise levels exceeding 62 dB CDNL under 7SFG(A) Range Alternative 4.

Peak high-explosives munitions noise levels would not increase above what is currently experienced. Noise levels louder than 115 SPL would continue to occur beyond range boundaries, but detonations would not occur that would cause noise at greater than 140 dB off-range. Noise effects under this alternative would be limited to moderate annoyance for residents exposed to 62 dB CDNL.

5.2.5 7SFG(A) Range Alternative 5: East Side Training

5.2.5.1 Existing Conditions (Noise – 7SFG(A) Range Alternative 5)

Under 7SFG(A) Range Alternative 5, Group 1 Ranges would be located near Group 2 Ranges. The existing noise environment in this area is discussed in Section 5.2.1.1.

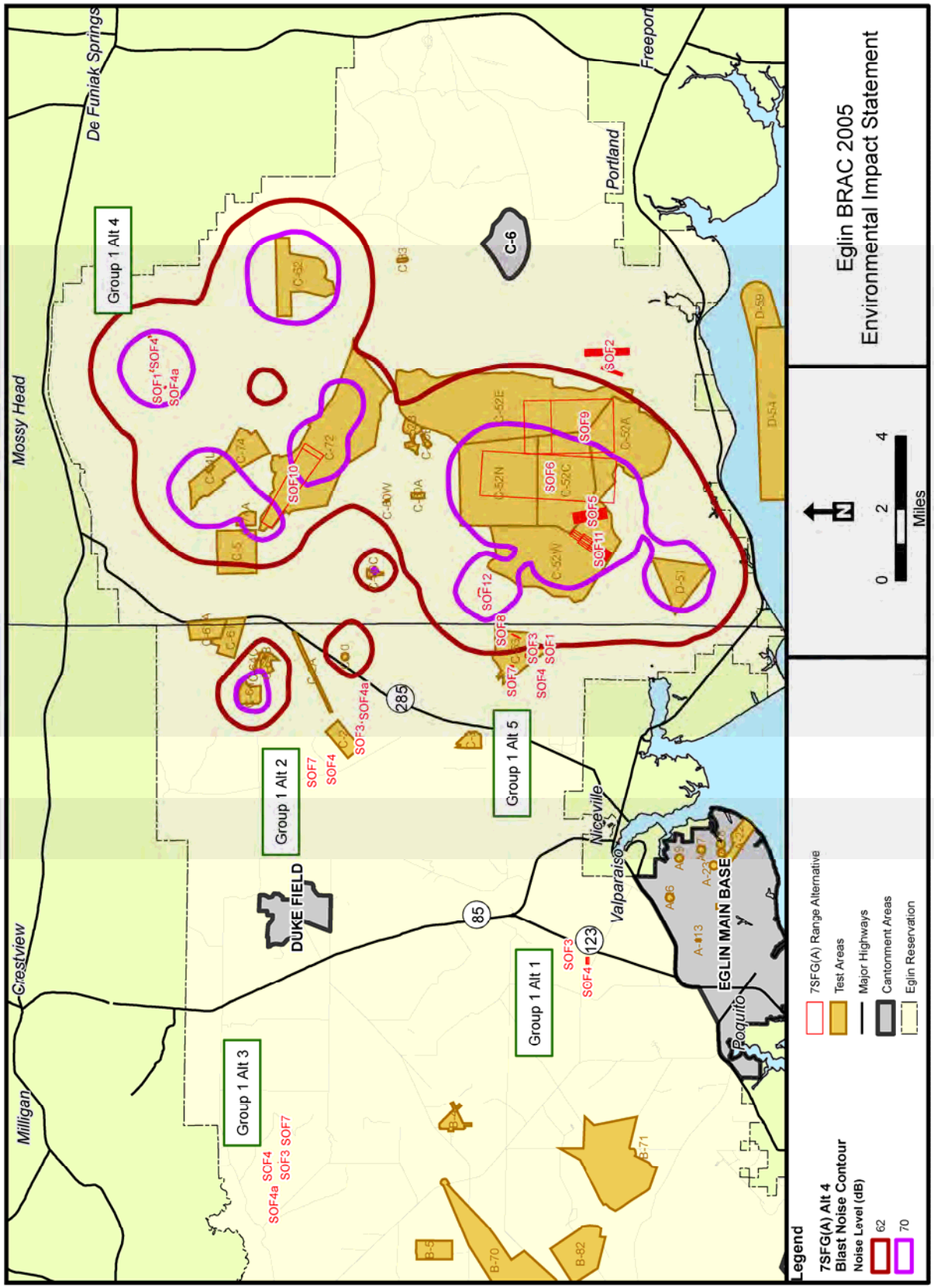

Figure 5-5. Areas Exposed to Elevated High-Explosives Munitions Noise Levels Under 7SFG(A) Range Alternative 4

5.2.5.2 Environmental Consequences (Noise – 7SFG(A) Range Alternative 5)

Construction

Construction methods would be the same under 7SFG(A) Range Alternative 2 as under 7SFG(A) Range Alternative 1. The nearest residences to the construction sites are more than 1 mile away. No adverse impacts are expected.

Weapons Training

Under this alternative, 4,961 acres would be exposed to 7SFG(A) small-arms noise at levels exceeding 65 dB DNL. The 65 dB DNL noise contour would not extend beyond the boundary of Eglin Range. 7SFG(A) small-arms noise at greater than 87 PK_{15}(met) would regularly affect 33,875 acres on the Eglin Range. The 87 PK_{15}(met) noise contours would not extend beyond Eglin Range boundaries. Areas affected by elevated high-explosives munitions noise are depicted in Figure 5-6. Under this alternative, acreage impacted by noise levels above 62 dB CDNL in the vicinity of proposed 7SFG(A) training ranges would increase from 51,514 to 77,741 acres. Acreage impacted by noise levels above 70 dB CDNL would increase from 16,352 to 27,128 acres. In addition to the off-range area impacted by munitions noise above 62 dB CDNL under 7SFG(A) Range Alternative 1, an off-range area located to the northeast of Valparaiso would be impacted with levels above 62 dB CDNL under 7SFG(A) Range Alternative 5.

Of the 201 total off-range acres that would be impacted by noise levels exceeding 62 dB CDNL under 7SFG(A) Range Alternative 5, 31 acres are currently residential. This increase in noise level would be noticeable in affected areas and may annoy residents. However, these areas are already exposed to a number of military noise sources, and noise effects under this alternative would be limited to moderate annoyance for residents exposed to 62 dB CDNL. Maximum peak noise levels would not increase.

5.2.6 No Action Alternative

Under the No Action Alternative, none of the construction, demolition, or renovation projects discussed above would take place. Noise on Eglin AFB would decrease from current levels due to the drawdown of aircraft and manpower (decreased vehicle use) from Eglin AFB scheduled for 2007 through 2015. F-15Cs currently based at Eglin have an air-to-air mission. These aircraft primarily train in airspace located over the Gulf of Mexico and drop very little ordnance on the Eglin Range. Noise on the range would decrease somewhat as a result of departure of the 919 SOW from Duke Field.

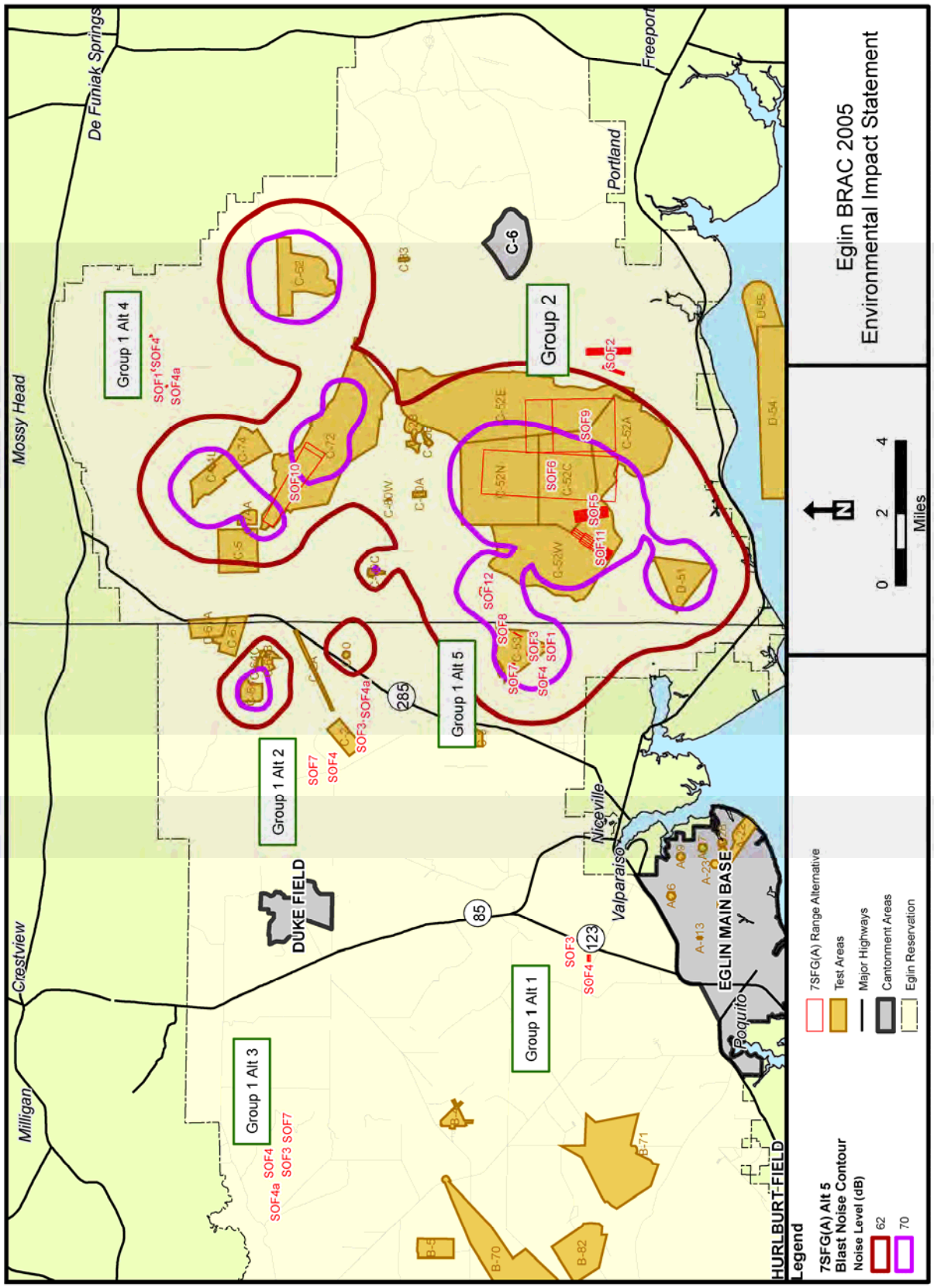

Figure 5-6. Areas Exposed to Elevated High-Explosives Munitions Noise Levels Under 7SFG(A) Range Alternative 5

5.3 LAND USE

5.3.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.3.1.1 Existing Conditions (Land Use – 7SFG(A) Range Alternative 1)

As described in Chapter 2 (Section 2.4.2.1, Common Elements Among Alternatives) the 7SFG(A) would require utilization of the Eglin Range in three areas: (1) Firing Ranges (Group 1 and Group 2), (2) Aircraft Operations, and (3) Water Operations and Ground Maneuvers. 7SFG(A) aircraft operations would be conducted over the Eglin Range (land and coastal areas) and the helicopter landing zones (HLZs) and drop zones (DZs) would be located within the interstitial area. Water operations would occur within the waters and adjacent shoreline of five major water bodies: Choctawhatchee Bay, Santa Rosa Sound, the Yellow River, East Bay, and East Bay River. The 7SFG(A) Firing Ranges and ground maneuver areas would primarily be around TA C-52, TA C-72, TA C-53, TA C-2, and the interstitial area (see Chapter 2, Figure 2-14, Proposed 7SFG(A) DZs, Closed Maneuver Areas, and Infiltration Locations).

Existing land uses in the interstitial area consist mainly of military and recreational use. Land use also includes natural resources management, which is discussed in the *Eglin Integrated Natural Resources Management Plan* (INRMP) (U.S. Air Force, 2002a). Other nonmilitary activities include road and trail maintenance; natural resources management activities and studies; archaeological investigations; forestry planting, logging, or prescribed burning; or wastewater spray fields (U.S. Air Force, 2002a, U.S. Air Force, 2004d, and U.S. Air Force, 1999).

Military training activities occurring in the interstitial area include combat survival training, assault operations, parachute drops, air-to-ground tactical training, and major force-on-force and force employment exercises. Generally, the training involves the movement of dismounted soldiers through wooded areas of the interstitial area. Aircraft and ground support vehicles are occasionally used to deliver and retrieve the participating troops or provide support and logistics. Ground vehicle movement is normally restricted to the existing road and trail network, but some training utilizes all-terrain vehicles (ATVs) or small trucks. Troops use a number of different bivouac scenarios that include tents on concrete pads and primitive camping (U.S. Air Force, 2005c).

The interstitial area is also used for missions that cannot be wholly accommodated within the footprints of individual test areas or may serve as a safety buffer for certain activities on established test areas. The primary function of the safety buffer land use is to restrict incompatible activities during testing operations and to support test and evaluation activities as needed basis (U.S. Air Force, 2005d).

Public recreational activities including hunting, fishing, hiking, and camping and take place within approximately 275,056 acres of interstitial area on Eglin AFB. Public access onto Eglin AFB for recreational activities is permitted from two hours before sunrise until two hours after sunset. All recreational users receive a map and the current regulations, which reflects legal entry and exist times and any exceptions. Within the interstitial area, there are 15 management units, each having its own regulations associated with seasons, mission activities, and access to the public and Department of Defense (DoD)-affiliated persons. Entry into "closed" and "seasonally closed" areas is prohibited unless special permission has been granted by Eglin AFB. Areas designated as "open" are available for all types of outdoor recreation or limited activities based on specific regulations. Certain management units are closed to motor vehicle use, either annually or seasonally. Motor vehicle use within Management Units (MUs) 1, 4, 8, 8A, 9B, 10, and 11 is prohibited year-round. MUs 2, 6N, 7, 7A, 9, and 9A are closed to motorized vehicle access except during designated hunting seasons. Hunting is allowed in designated areas during the various hunting seasons. These hunting seasons include archery, hunting dog training, muzzle-loading gun, general gun, late archery/muzzle-loading gun, small game, spring turkey, trapping, small game, and migratory game birds (U.S. Air Force, 2005d).

In fiscal year (FY) 2005, applicants purchased over 6,000 outdoor recreation permits from the Eglin AFB Natural Resources Office (Jackson Guard) (U.S. Air Force, 2006d). Approximately 3,500 fishing permits and 5,000 hunting permits were also purchased in that time period. For all three types of permits, approximately 75 percent or more were purchased by non-DoD personnel. The management units that maintain the recreational areas are self-sufficient, using the funds earned from the permit sales for operating costs.

Under 7SFG(A) Range Alternative 1, two large areas on the Eglin Range would be directly impacted to accommodate the 7SFG(A) training activities. The larger of the two areas (53,590 acres) would include the Group 2 Firing Ranges and surface danger zones (SDZs), a new DZ, and ground maneuver areas. This area would be impacted by all the 7SFG(A) range training alternatives. The affected MUs within this area include 7, 8A, 9, 9A, 9B, 11, 13, and 14 (Figure 5-7).

MU 7 is open for outdoor recreation and hunting but is closed to motor vehicle access except during designated hunting seasons. MU 8A is open to public access/recreation on weekends and federal holidays only during designated hunting seasons, and all motorized vehicles are prohibited. MU 9 is open year-round to public access/recreation but motorized vehicles are prohibited outside of the designated hunting seasons. MU 9A is also open year-round to public access/recreation, but motorized vehicles are prohibited outside designated hunting seasons (archery only except during spring turkey season). MU 9B is open to public access/recreation on weekends and federal holidays only during designated hunting seasons, and all motorized vehicles are prohibited. MU 11 is open to public access/recreation on weekends and federal holidays only during designated hunting seasons, and motorized vehicles are restricted to Range Road (RR) 208 and RR 370. The area is also subject to additional closures due to mission activity. MU 13 is open to public access/recreation year-round. Hunting occurs during designated seasons. MU 14 is open to public access/recreation year-round, but motorized vehicle use is restricted to certain areas within the unit.

The proposed 7SFG(A) Range Alternative 1 Group 1 Firing Ranges and SDZs would be located within a separate 5,620-acre area west of Hwy 123. Portions of MU 6N and MU 6S are located within this area (Figure 5-8). MU 6N and MU 6S are open to public access/recreation year-round but seasonal hunting is limited and requires a special permit. MU 6N is closed to motorized vehicle access except during designated hunting seasons.

5.3.1.2 Environmental Consequences (Land Use – 7SFG(A) Range Alternative 1)

There would be no impact to military land use because the primary land use would continue to be military training, testing, and evaluation. As a displaced action, the Navy explosive ordnance disposal (EOD) activities that presently occur on TA C-52W would be relocated to the proposed SOF 12 location.

Water operations associated with the 7SFG(A) training activities would not result in a permanent change in land use, since the proposed infiltration/exfiltration areas would only be used periodically and they are located on Eglin AFB property. Water operations training activities would have minimal impacts on recreational users since the affected infiltration/exfiltration areas are not heavily used by the public. Some military/public interactions could occur, and areas could possibly be closed temporarily until the training activity is completed. However, impacts would not be adverse.

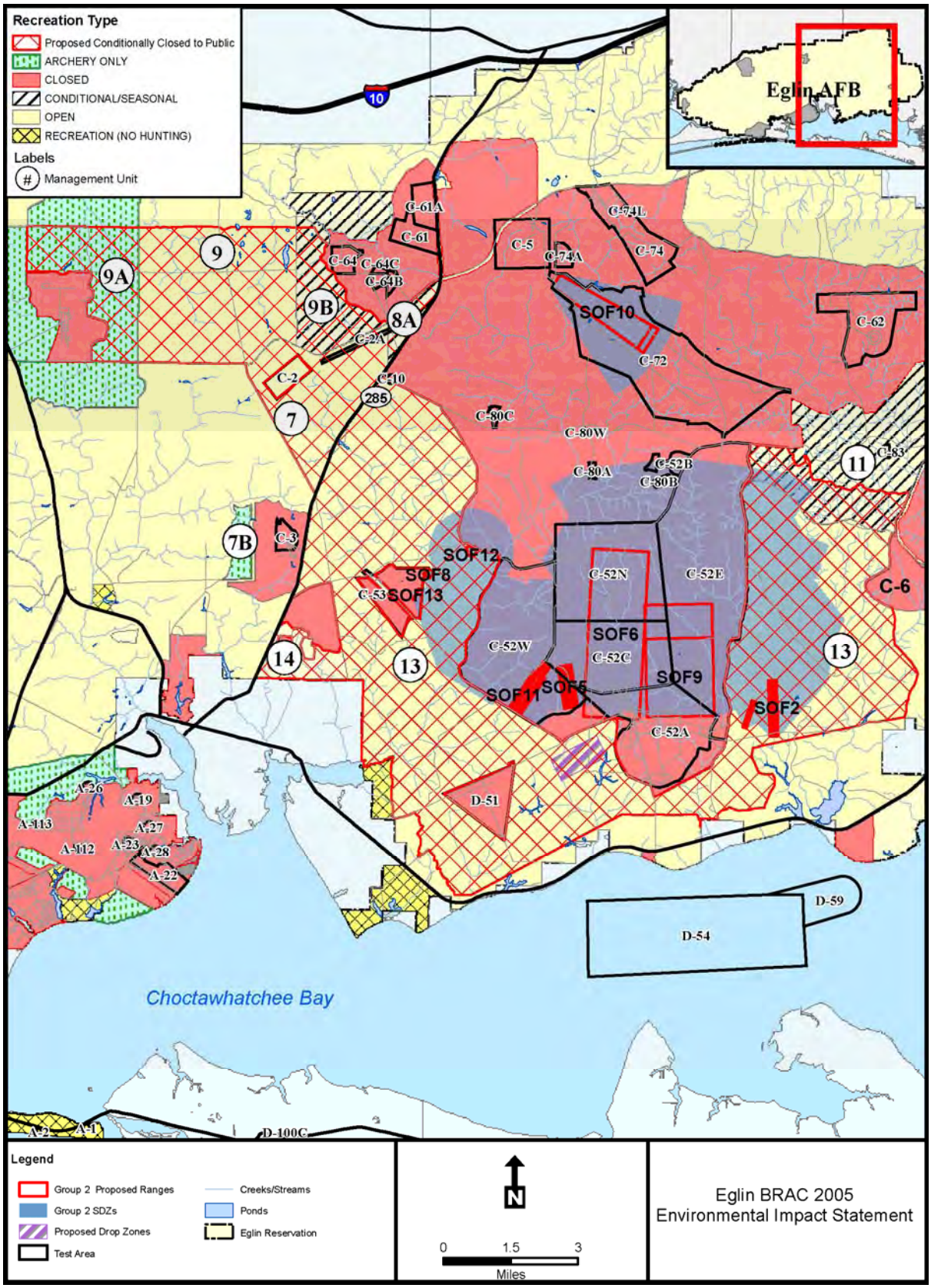

Figure 5-7. 7SFG(A) Range Alternatives 1 through 5 – Maneuver Area, Group 2 Ranges and SDZs, and Affected Management Units

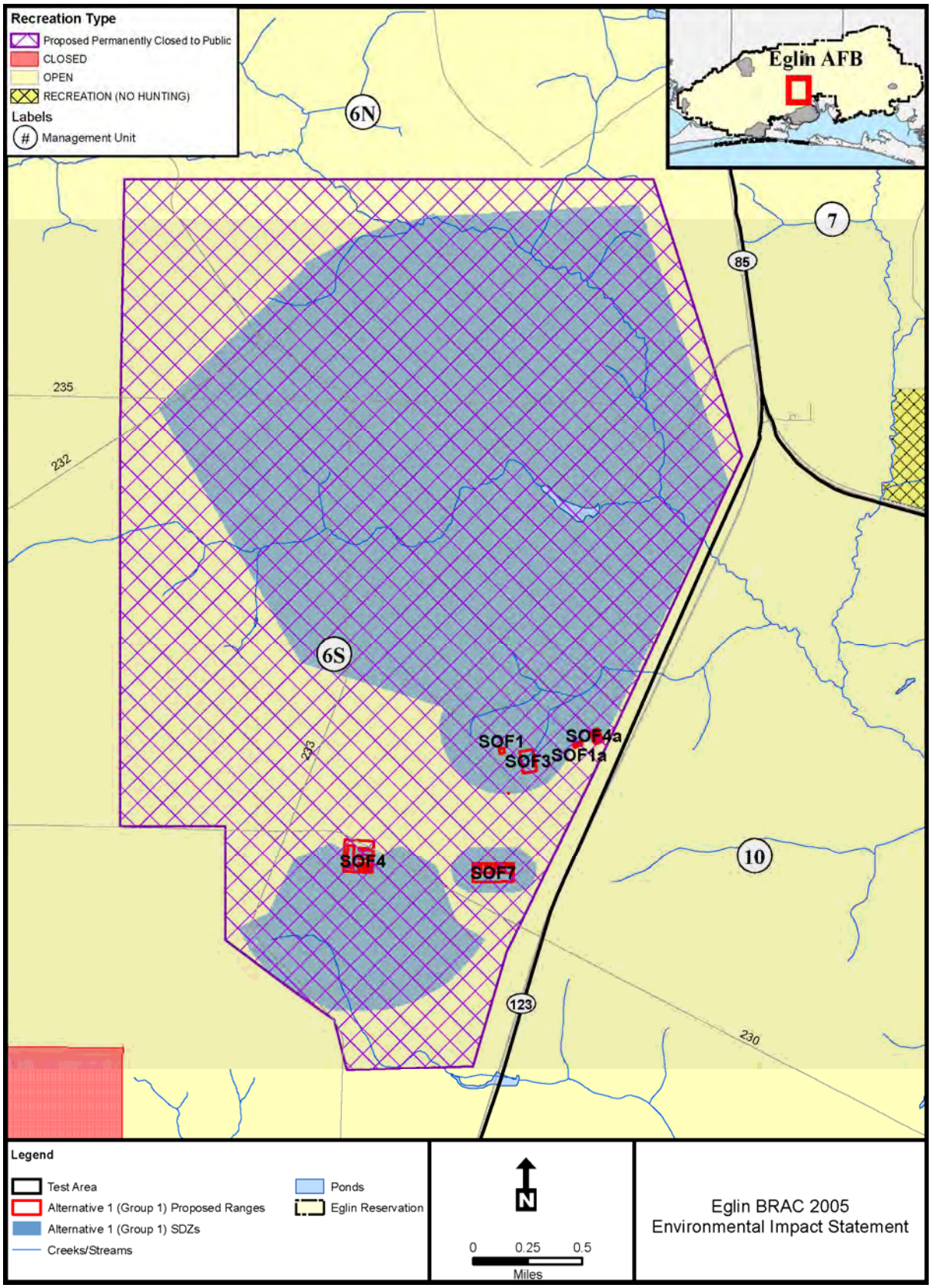

Figure 5-8. 7SFG(A) Range Alternative 1 – Group 1 Firing Ranges and SDZs and Affected Management Units

Aircraft operations conducted by the 7SFG(A) would also not have an adverse land use impact, since they would use existing HLZs and DZs except for two new DZs that would be cleared in the interstitial area. The new DZ, south of the TA C-52 Complex would be within the area that is proposed to be conditionally closed as part of the large maneuver area. The other new DZ would impact a portion of MUs 13 and 13A.

Large areas of the Eglin Range are presently closed to public access because of existing test areas and safety buffers. With the addition of the 7SFG(A) Firing Ranges, their associated SDZs, and the area needed to conduct ground maneuvers, some areas that have been historically open to public access and recreation would need to be permanently and conditionally closed. The closed areas would provide access to the Firing Ranges, allow safe troop movement to those ranges, and accommodate other 7SFG(A) training activities. The total acreage currently used for public access, including outdoor recreation and hunting, that would be closed under 7SFG(A) Range Alternative 1 is approximately 59,210 acres. Table 5-2 lists the MUs that would be impacted, the total acreage of each MU, the additional number of acres that would be permanently and conditionally closed, and the percent decrease in MU acreage for each of the closed areas.

The change in land use would not be adverse, since it would be compatible with the existing land uses that surround the area. However, the change would reduce the total amount of area open for public access and outdoor recreation within the interstitial area of the Eglin Range by approximately 22 percent and would adversely impact all the affected MUs except for MUs 6N and 14. MU 6S is a dog hunting area and it is used quite extensively during the hunting and dog training seasons. MU 7 and MU 9 are considered high-quality hunting areas. Recreational activities, especially hunting would be severely restricted and possibly eliminated within the affected MUs, and users would have to utilize other areas of the Eglin Range not affected by the Proposed Action or other available recreational resources outside Eglin AFB. Displaced hunters would disperse to other areas and increase hunter densities and competition in unaffected areas. Eglin wildlife management goals and activities would also need to be adjusted or changed to accommodate the additional closures.

The closed area associated with the 7SFG(A) Range Alternative 1 Group 1 Firing Ranges and SDZs would close public access to the bridge across Turkey Creek on RR 232, which is a popular canoe/kayak launch site on a major canoe trail that ends at the Niceville Turkey Creek Park. Closure of RR 232 would also close an important travel corridor for mission and public travel connecting Florida Highway (Hwy) 85 and RR 236 (Ranger Camp Road). Although a portion of MU 11 is within the proposed conditionally closed area associated with the Group 2 Firing Ranges, SDZs, and

maneuver area, the MU is already conditionally closed during the week and only open on weekends and holidays.

Table 5-2. Area Closed Under 7SFG(A) Range Alternative 1

Affected MU	Total Acreage	Permanently Closed (acres)	Percent Decrease	Conditionally Closed (acres)	Percent Decrease
Group 1 Ranges and SDZs					
6N	40,400	430	1	0	0
6S	13,018	5,190	40	0	0
Group 2 Ranges, SDZs, and Maneuver Area					
7	20,728	0	0	3,427	17
8A	1,719	0	0	506	29
9	10,315	0	0	6,495	63
9A	6,595	0	0	2,828	43
9B	1,979	0	0	1,824	92
11	5,842	351	6	1,536	26
13	75,670	9,219	12	26,641	35
14	23,309	0	0	763	3

MU = management unit; SDZ = surface danger zone

Depending on which alternative is selected, the size of the conditionally closed area could change. The final boundary of the conditionally closed areas would be further refined after detailed design plans were developed for the Firing Ranges. In addition, the usage of the conditionally closed areas would be evaluated in two years as the mission of the 7SFG(A) matures. As a result of the evaluation, closed areas could be reopened for recreational use.

Although the loss of such a large area for public access and recreation on Eglin AFB is adverse, especially in the eastern portion of the Eglin Range, the impact to recreational opportunities in the tri-county region would be minimal. Within Santa Rosa, Okaloosa, and Walton Counties, more than 319,800 acres of public land is available for hunting, fishing, wildlife viewing, hiking, biking, camping, swimming, horseback riding, and paddling. The majority of the available land is located within the following wildlife management areas (WMAs):

- Blackwater WMA (includes the 590-acre Carr Unit and 5,243-acre Hutton Unit) – 191,148 acres
- Choctawhatchee River WMA – 57,299 acres

- Point Washington WMA – 15,247 acres
- Escambia River WMA – 34,476 acres
- Yellow River WMA – 18,555 acres
- Lafayette Creek WMA – 3,160 acres

Additional recreational areas include the Gulf Islands National Seashore, Henderson Beach Recreation Area, Fred Gannon Rocky Bayou State Recreation Area, and Grayton Beach State Recreation Area.

5.3.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.3.2.1 Existing Conditions (Land Use – 7SFG(A) Range Alternative 2)

The area and land use of the Eglin Range potentially impacted by 7SFG(A) Range Alternative 2 is the same 53,590-acre area described under 7SFG(A) Range Alternative 1. This area includes the Group 2 Firing Ranges and SDZs, a new DZ, and ground maneuver areas. Additionally, under 7SFG(A) Range Alternative 1, the Group 1 Firing Ranges and SDZs would be located within this area near TA C-2 and C-2A; no additional areas would be needed (see Chapter 2, Figure 2-12, 7SFG(A) Proposed Range Training Locations, Alternatives 1–5).

5.3.2.2 Environmental Consequences (Land Use – 7SFG(A) Range Alternative 2)

The total acreage currently used for public access including outdoor recreation and hunting that would be closed under 7SFG(A) Range Alternative 2 (Figure 5-9) is approximately 53,590 acres, which would reduce the amount of area open for public access and outdoor recreation within the interstitial area of the Eglin Range by approximately 19 percent. Approximately 12,689 acres of the total 53,590 acres affected would be permanently closed for the Group 1 and Group 2 firing ranges and SDZs.

Table 5-3 lists the MUs that would be impacted, the total acreage of each MU, the additional number of acres that would be permanently and conditionally closed, and the percent decrease in MU acreage for each of the closed areas. Impacts on hunting would be similar to those described for 7SFG(A) Range Alternative 1. There would be no impacts to any surrounding community land use outside the Eglin Reservation.

Table 5-3. Area Closed Under 7SFG(A) Range Alternative 2

Affected MU	Total Acreage	Permanently Closed (acres)	Percent Decrease	Conditionally Closed (acres)	Percent Decrease
Group 1 Ranges and SDZs					
7	20,728	1,570	8	0	0
8A	1,719	29	6	0	0
9	10,315	314	3	0	0
9B	1,979	1,206	61	0	0
Group 2 Ranges, SDZs and Maneuver Area					
7	20,728	0	0	1,857	9
8A	1,719	0	0	477	28
9	10,315	0	0	6,181	60
9A	6,595	0	0	2,828	43
9B	1,979	0	0	618	31
11	5,842	351	6	1,536	26
13	75,670	9,219	12	26,641	35
14	23,309	0	0	763	3

MU = management unit; SDZ = surface danger zone

Land use impacts under 7SFG(A) Range Alternative 2 would be the same as those described for 7SFG(A) Range Alternative 1, except there would be no separate closed area for any of the Group 1 Firing Ranges and SDZs.

5.3.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.3.3.1 Existing Conditions (Land Use – 7SFG(A) Range Alternative 3)

The area and land use of the Eglin Range potentially impacted by 7SFG(A) Range Alternative 3 would be the same as 7SFG(A) Range Alternatives s 1 and 2, except that the 7SFG(A) Range Alternative 3 Group 1 Ranges and SDZs would be located on 8,630 acres of interstitial area east of Camp Rudder. The area also includes a portion of MU 6N (Figure 5-10). MU 6N is open to public access/recreation year round but closed to motorized vehicle access except during designated hunting seasons. Seasonal hunting is limited and requires a special permit. The area also contains a new section of the Florida National Scenic Trail and the camping area located at Duck Pond.

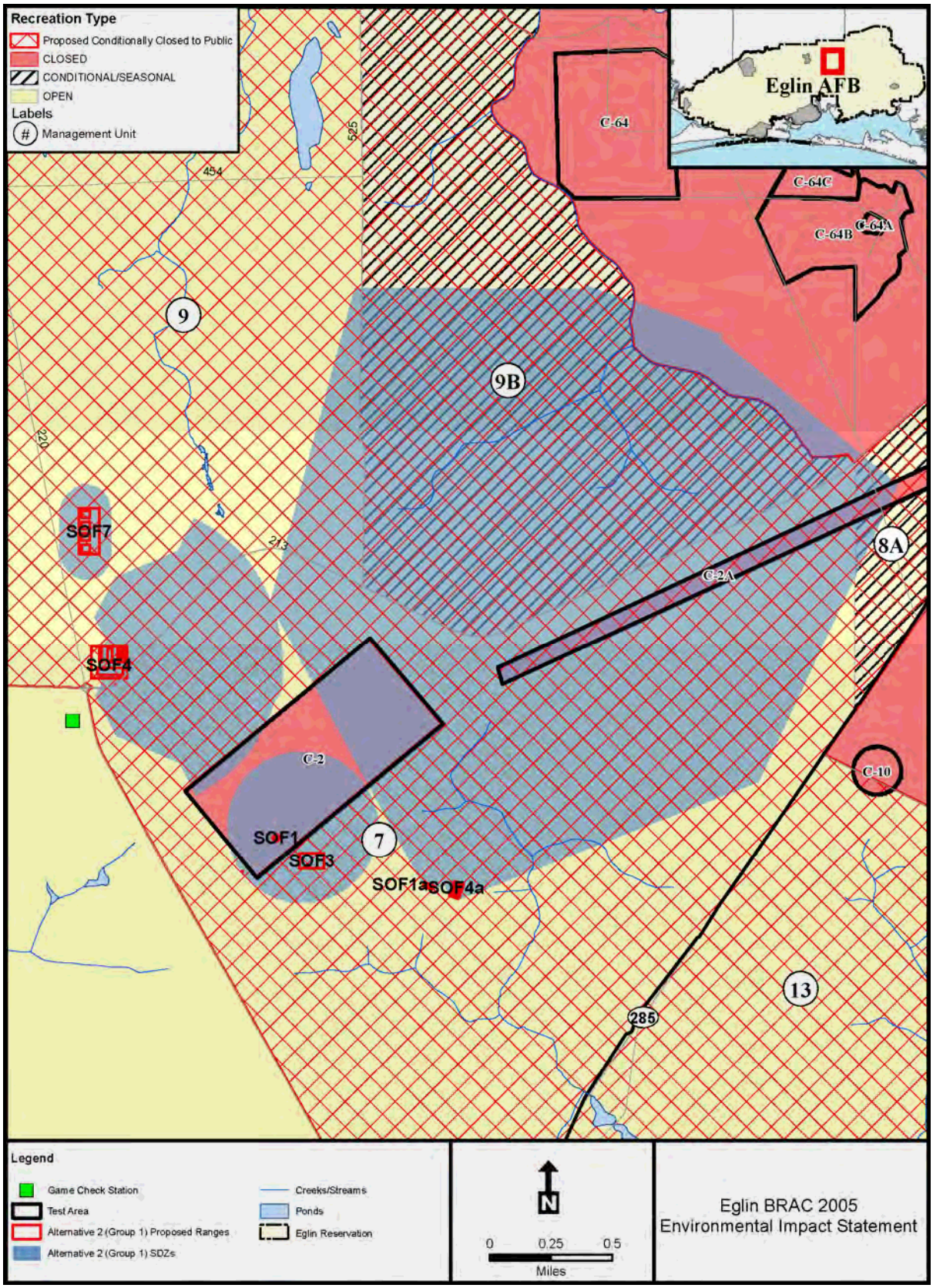

Figure 5-9. 7SFG(A) Range Alternative 2 – Group 1 Firing Ranges and SDZs and Affected Management Units

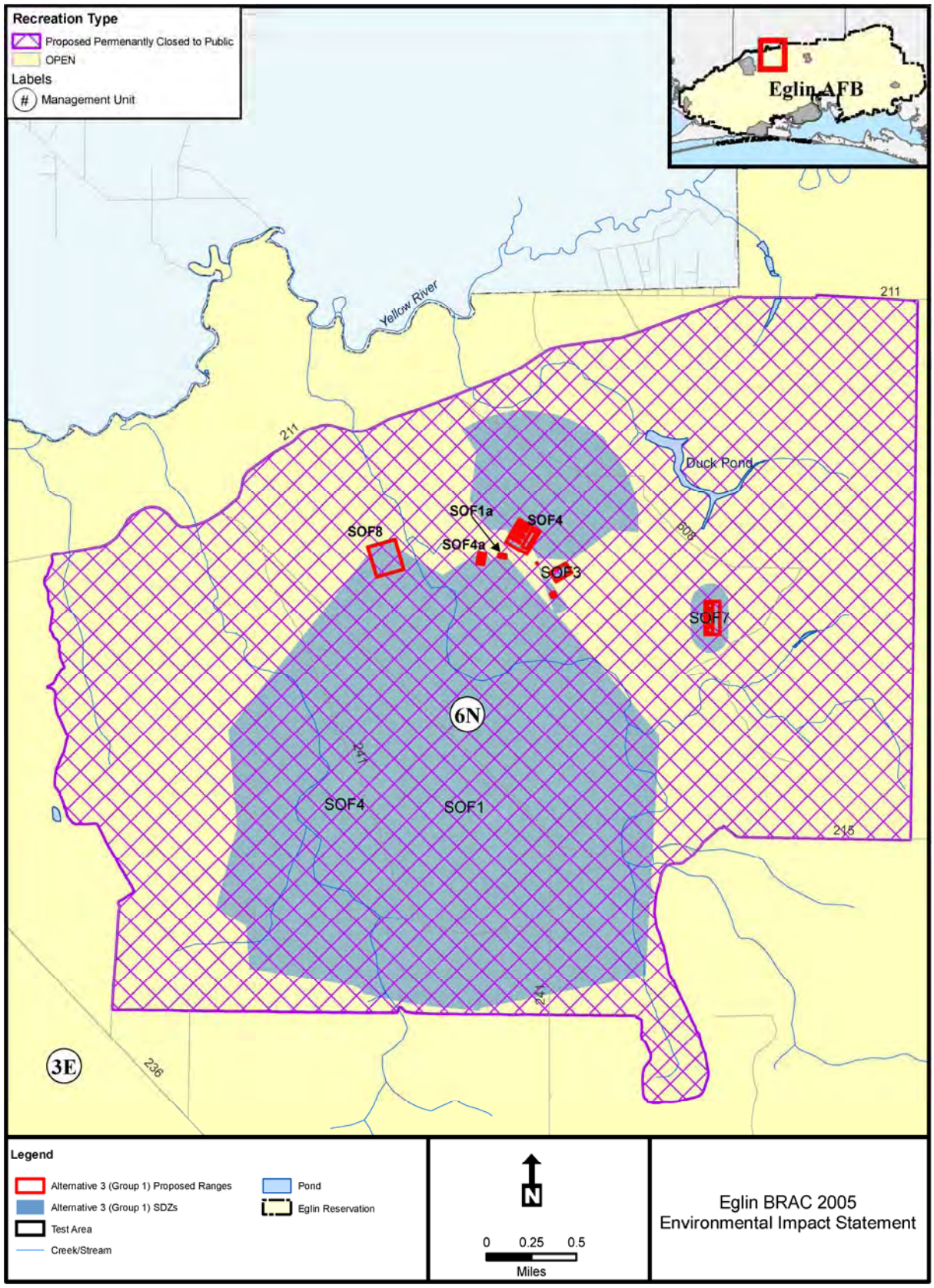

Figure 5-10. 7SFG(A) Range Alternative 3 – Group 1 Firing Ranges and SDZs and Affected Management Units

5.3.3.2 Environmental Consequences (Land Use – 7SFG(A) Range Alternative 3)

The total acreage, currently used for public access including outdoor recreation and hunting that would be closed for 7SFG(A) Range Alternative 3 is approximately 62,220, which would reduce the amount of area open for public access and outdoor recreation within the interstitial area of the Eglin Range by approximately 23 percent. Table 5-4 presents the MUs that would be impacted, the total acreage of each MU, the additional number of acres that would be permanently and conditionally closed, and the percent decrease in MU acreage for each of the closed areas. Like 7SFG(A) Range Alternative 1, there would also be no impacts to any surrounding community land use outside the Eglin Reservation.

Table 5-4. Area Closed Under 7SFG(A) Range Alternative 3

Affected MU	Total Acreage	Permanently Closed (acres)	Percent Decrease	Conditionally Closed (acres)	Percent Decrease
Group 1 Ranges and SDZs					
6N	40,400	8,630	21	0	0
Group 2 Ranges, SDZs, and Maneuver Area					
7	20,728	0	0	3,427	17
8A	1,719	0	0	506	29
9	10,315	0	0	6,495	63
9A	6,595	0	0	2,828	43
9B	1,979	0	0	1,824	92
11	5,842	351	6	1,536	26
13	75,670	9,219	12	26,641	35
14	23,309	0	0	763	3

MU = management unit; SDZ = surface danger zone

Land use impacts under 7SFG(A) Range Alternative 3 would be the same as those described for 7SFG(A) Range Alternative 1. Locating the Group 1 Ranges and SDZs near Camp Rudder would have a minor military land use impact because it would require the 6th Ranger Training Battalion (6 RTB) to modify their current maneuver area on the east side of Camp Rudder. However, the 6 RTB has sufficient maneuver areas to the west of Camp Rudder. The permanently closed area for the Group 1 Ranges and SDZs would adversely impact MU 6N, since it is a dog training area and used quite extensively during the hunting and dog training seasons. Additional measures could be necessary to ensure that free-ranging hunting dogs do not encroach into the Group 1 Range area. Additionally, the closed area for the 7SFG(A) Range Alternative 1 Firing Ranges and SDZs would have an adverse impact on a new section of the Florida National Scenic Trail and the use of Duck Pond and the associated campground area. The Duck Pond area is popular and heavily used by hunters, fishermen, and other recreational users due to its easy access from Hwy 85 and close proximity to the city of Crestview. To mitigate the impact to the Florida National Scenic Trail, a new section of

trail would be constructed north of the closed area associated with the Group 1 Ranges, along RR 211. The campground would be closed if it could not be relocated.

5.3.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.3.4.1 Existing Conditions (Land Use – 7SFG(A) Range Alternative 4)

The areas and land use of the Eglin Range potentially impacted by the 7SFG(A) Range Alternative 4 would be the same as 7SFG(A) Range Alternative s 1, 2, and 3 except that the Group 1 Ranges and SDZs would be located on 7,582 acres of interstitial area located in the northeastern portion of the Eglin Range. The location is within portions of MU 13 and MU 13A (Figure 5-11). MU 13 is open to public access/recreation year-round and hunting occurs during designated seasons. MU 13A is open to public access/recreation only during designated hunting seasons and motorized vehicles are prohibited. A section of the Florida National Scenic Trail is also located in this portion of the Eglin Range.

5.3.4.2 Environmental Consequences (Land Use – 7SFG(A) Range Alternative 4)

The total acreage currently used for public access, including outdoor recreation and hunting, that would be closed under 7SFG(A) Range Alternative 4 is approximately 61,172 acres, which would reduce the amount of area open for public access and outdoor recreation within the interstitial area of the Eglin Range by approximately 22 percent. Table 5-5 lists the MUs that would be impacted, the total acreage of each MU, the additional number of acres that would be permanently and conditionally closed, and the percent decrease in MU acreage for each of the closed areas. There would be no impacts to any surrounding community land use located beyond the Eglin Reservation.

Table 5-5. Area Closed Under 7SFG(A) Range Alternative 4

Affected MU	Total Acreage	Permanently Closed (acres)	Percent Decrease	Conditionally Closed (acres)	Percent Decrease
Group 1 Ranges and SDZs					
13	75,670	5,697	8	0	0
13A	1,906	1,885	99	0	0
Group 2 Ranges, SDZs, and Maneuver Area					
7	20,728	0	0	3,427	17
8A	1,719	0	0	506	29
9	10,315	0	0	6,495	63
9A	6,595	0	0	2,828	43
9B	1,979	0	0	1,824	92
11	5,842	351	6	1,536	26
13	75,670	9,219	12	26,641	35
14	23,309	0	0	763	3

MU = management unit; SDZ = surface danger zone

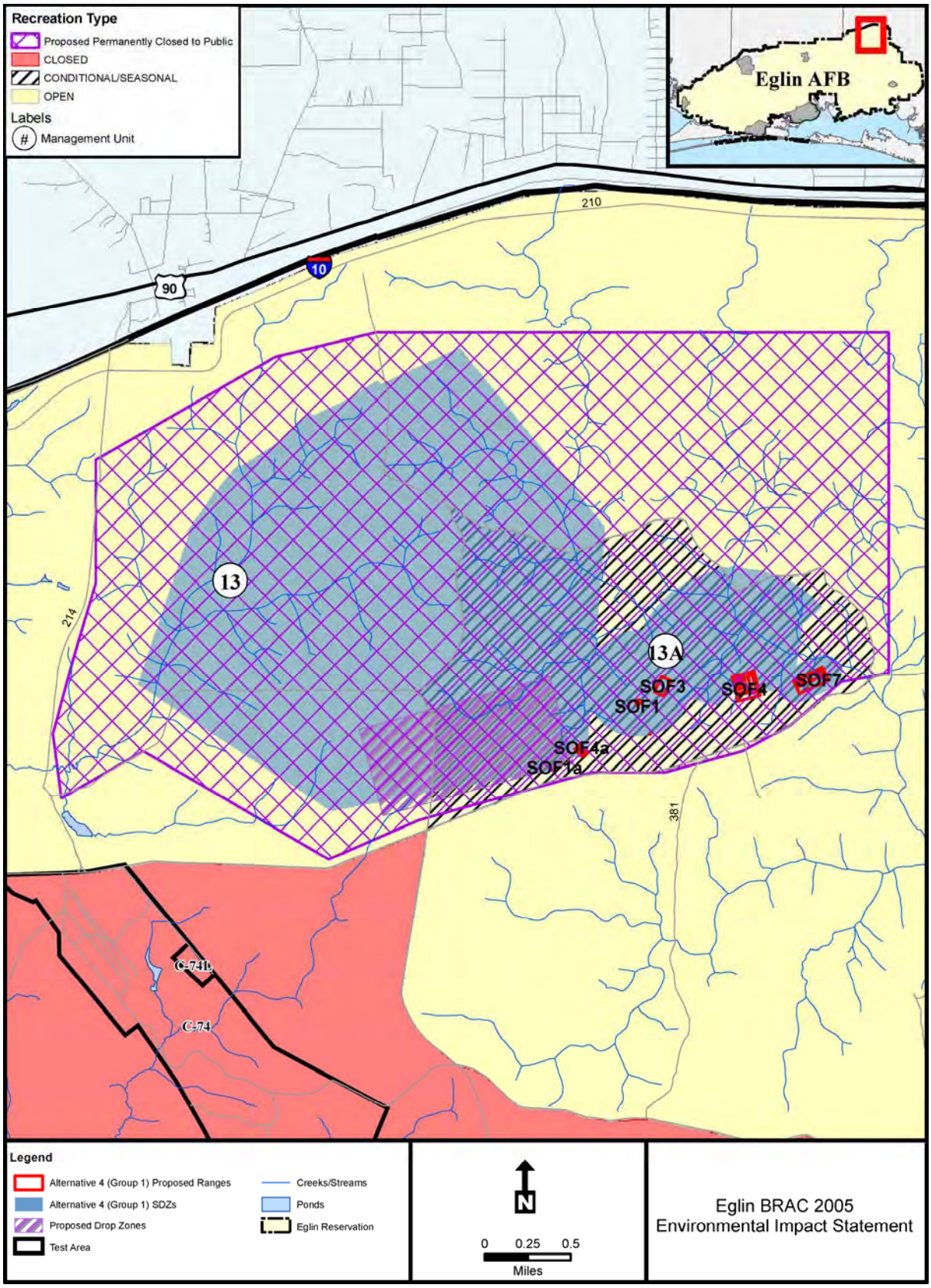

Figure 5-11. 7SFG(A) Range Alternative 4 – Group 1 Firing Ranges and SDZs and Affected Management Units

Land use impacts under 7SFG(A) Range Alternative 4 would be the same those described for 7SFG(A) Range Alternative 1. However, the addition of the Group 1 Ranges and SDZs in MU 13 would have an additional impact on the unit since it would also be impacted by the Group 2 Ranges, SDZs, and maneuver area. MU 13 and MU 13A are both dog hunting areas that are heavily used during the hunting and dog training seasons. Additional measures could be needed to ensure that free-ranging hunting dogs do not encroach into the Group 1 range area. Two small sections of the Florida National Scenic Trail would be affected by the closed area associated with the Group 1 Ranges. The boundary of the closed area would be adjusted, and new sections of trail would be constructed to avoid adverse impacts to the trail.

5.3.5 7SFG(A) Range Alternative 5: East Side Training

5.3.5.1 Existing Conditions (Land Use – 7SFG(A) Range Alternative 5)

The area and land use of the Eglin Range potentially impacted by 7SFG(A) Range Alternative 5 would be the same 53,590-acre area impacted under 7SFG(A) Range Alternatives 1, 2, 3, and 4. This area includes the Group 2 Firing Ranges and SDZs, a new DZ, and ground maneuver areas. Under this alternative, the area would also include the Group 1 Ranges and SDZs near TA C-52W and TA C-53; no additional areas would be needed (see Chapter 2, Figure 2-12, 7SFG(A) Proposed Range Training Locations, Alternatives 1-5).

5.3.5.2 Environmental Consequences (Land Use – 7SFG(A) Range Alternative 5)

The total acreage currently used for public access, including outdoor recreation and hunting, that would be closed under 7SFG(A) Range Alternative 5 (Figure 5-12) is approximately 53,590 acres, which would reduce the amount of area open for public access and outdoor recreation within the interstitial area of the Eglin Range by approximately 19 percent.

Table 5-6 lists the MUs that would be impacted, the total acreage of each MU, the additional number of acres that would be permanently and conditionally closed, and the percent decrease in MU acreage for each of the closed areas. There would be no impacts to any surrounding community land use outside the Eglin Reservation.

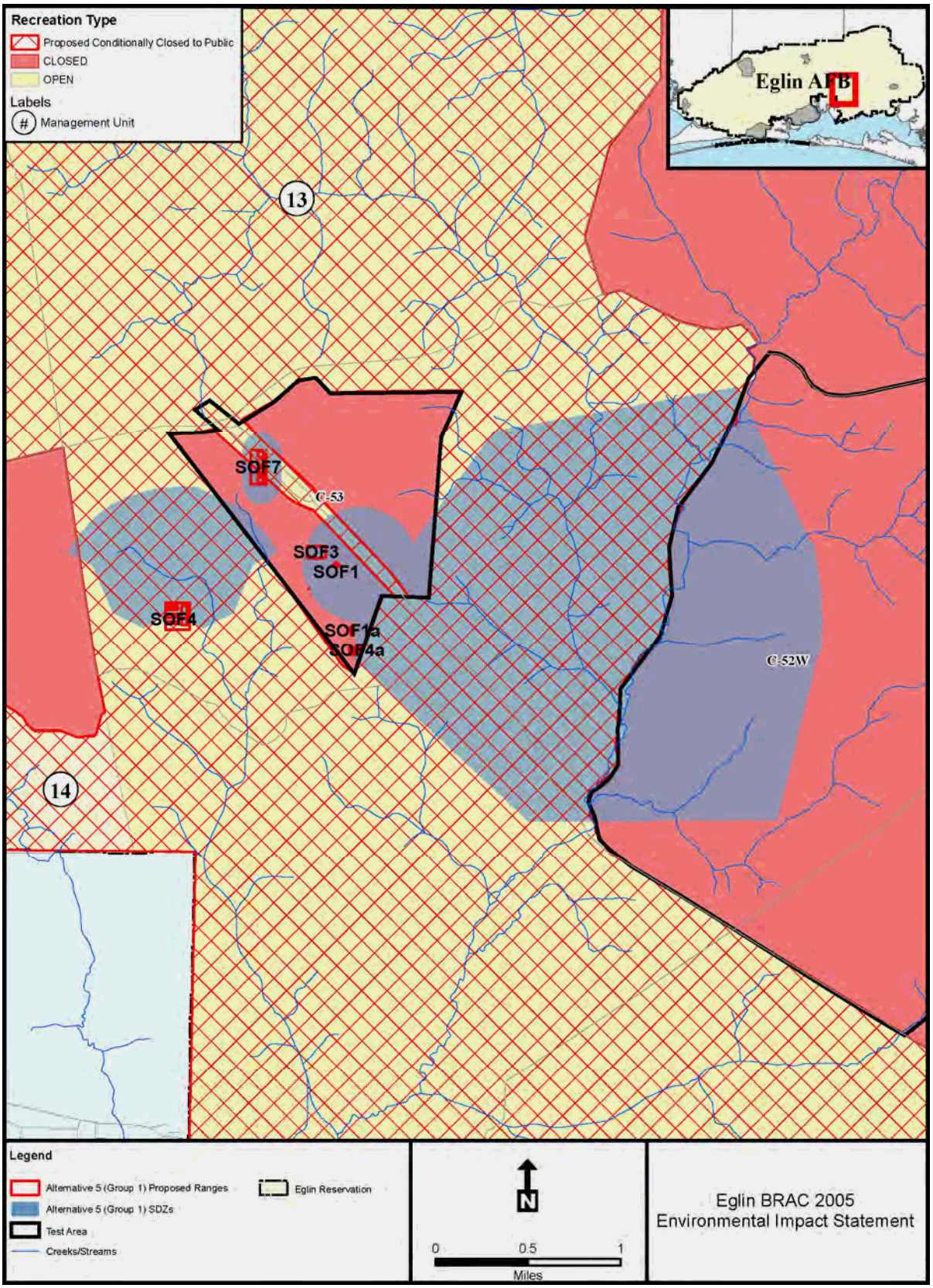

Figure 5-12. 7SFG(A) Range Alternative 5 – Group 1 Firing Ranges and SDZs and Affected Management Units

Table 5-6. Area Closed Under 7SFG(A) Range Alternative 5

Affected MU	Total Acreage	Permanently Closed (acres)	Percent Decrease	Conditionally Closed (acres)	Percent Decrease
Group 1 and Group 2 Ranges, SDZs, and Maneuver Area					
7	20,728	0	0	3,427	17
8A	1,719	0	0	506	29
9	10,315	0	0	6,495	63
9A	6,595	0	0	2,828	43
9B	1,979	0	0	1,824	92
11	5,842	351	6	1,536	26
13	75,670	10,755	14	25,105	33
14	23,309	0	0	763	3

MU = management unit; SDZ = surface danger zone

Land use impacts under 7SFG(A) Range Alternative 5 would be the same as those described for 7SFG(A) Range Alternative 1, except there would be no separate closed area for any of the Group 1 Firing Ranges and SDZs. MU 13 is a dog hunting area that is heavily used during the hunting and dog training seasons. Additional measures could be needed to ensure that free-ranging hunting dogs do not encroach into the Group 1 range area.

5.3.6 No Action Alternative

None of the listed actions under the No Action Alternative (see Chapter 2, Section 2.7) would have any direct or indirect land use impacts. The listed actions, if implemented, would occur in areas where the existing land use is already compatible with the actions. Under the No Action Alternative, the test areas would continue to support existing and planned test and evaluation activities and military training. Public access and recreation would also be unchanged from the existing conditions. No additional land use impacts would occur beyond those associated with other ongoing activities and approved actions.

5.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

5.4.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.4.1.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 1)

Existing conditions for socioeconomics, environmental justice, and special risks to children are the same as those described in Chapter 3 (Section 3.4.2, Socioeconomics, and Section 3.4.6, Environmental Justice).

5.4.1.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 1)

Socioeconomic effects on the population, employment, schools, and public services are primarily determined by where the incoming personnel will reside. The location of the ranges would not be a significant factor in military members' choice of residence. Additional employment would be generated as a result of the construction activities associated with establishing the ranges in each of the locations. However, the additional construction employment would be temporary, lasting only until construction is completed. Also, the construction workers hired to complete the range construction would most likely be hired from the local region, minimizing any additional effects on schools and public services. Additional jobs and incomes may also be created from the long-term operations and maintenance involved in sustaining the ranges, which could have a beneficial effect on the region.

Effects on environmental justice and special risks to children would be minimal, as factors such as noise and safety would not disproportionately affect minorities, impoverished individuals, or children. Construction noise would be intermittent and temporary. Time-averaged small-arms noise levels greater than 65 dB DNL would not occur beyond Eglin Range boundaries as a result of 7SFG(A) training. High-explosive munitions noise would exceed 62 dB CDNL in off-range locations comprising 43 acres in the vicinity of Big Hammock Point and Sharon Lake, of which 31 acres are zoned for residential use. Residents of areas affected by increased high-explosive noise levels may experience annoyance and/or activity interruption from the noise.

5.4.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.4.2.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 2)

The existing conditions for the socioeconomic and environmental justice resources are the same as the conditions described in Chapter 3 (Section 3.4.2, Socioeconomics, and Section 3.4.6, Environmental Justice) and in Section 5.4.1.1 for 7SFG(A) Range Alternative 1.

5.4.2.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 2)

The effects of locating the 7SFG(A) range to the east side and north-south corridor training areas would the same as that for 7SFG(A) Range Alternative 1 (Section 5.4.1.2). The construction of the range facilities would contribute to a temporary increase in the number of jobs in the area, but these jobs would only last until the construction is completed. The long-term operations and maintenance involved in sustaining the ranges could have a beneficial effect on the region through additional jobs and incomes.

Noise from the training activities on the Group 1 and Group 2 Ranges would primarily be contained to base property. However, the same 43 acres and the included communities near Big Hammock Point and Sharon Lake that were impacted by high-explosive munitions noise above 62 dB CDNL under 7SFG(A) Range Alternative 1 would also be affected by high time-averaged munitions noise levels under this alternative. The noise levels are expected to cause annoyance and activity interruption for residents.

5.4.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.4.3.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 3)

Chapter 3 (Section 3.4.2, Socioeconomics, and Section 3.4.6, Environmental Justice) and Section 5.4.1.1 summarize the existing conditions applicable to the 7SFG(A) Range Alternative 3.

5.4.3.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 3)

Construction of the ranges would contribute to job growth in the area, as the number of construction jobs would increase. These jobs would be temporary and only last for the term of the construction, and local workers would likely fill these jobs. The operation and maintenance of the ranges could also have a beneficial economic effect by creating permanent jobs and by providing additional sources of income.

Small-arms noise levels from the Group 1 Ranges of 65 dB DNL or greater would not extend beyond the Eglin Reservation boundaries. High-explosive munitions noise would exceed 62 dB CDNL in off-range locations comprising 43 acres in the vicinity of Big Hammock Point and Sharon Lake under this alternative. Residents of areas affected may experience annoyance and/or activity interruption as a result of the noise.

5.4.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.4.4.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 4)

Chapter 3 (Section 3.4.2, Socioeconomics, and Section 3.4.6, Environmental Justice) and Section 5.4.1.1 discuss the existing conditions for 7SFG(A) Range Alternative 4.

5.4.4.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 4)

The Group 2 Ranges for 7SFG(A) Range Alternative 4 would be located in the same area as the Group 2 Ranges for 7SFG(A) Range Alternatives 1 through 3.

There would be a benefit to local employment, as the construction related to the ranges would generate short-term jobs in the construction industry and the long-term operations and maintenance of the ranges could create permanent jobs and provide additional sources of income. The construction jobs, however, would only last for the term of the construction. Also, noise levels from the proposed location of the Group 1 range would be mostly contained on base property and away from inhabited areas. High-explosive munitions noise levels from the Group 2 Ranges would exceed 62 dB CDNL in 43 acres off-base. There are small communities near Big Hammock Point and Sharon Lake that have the potential to be exposed to these noise levels, posing an annoyance to residents.

5.4.5 7SFG(A) Range Alternative 5: East Side Training

5.4.5.1 Existing Conditions (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 5)

Existing conditions for socioeconomics, environmental justice, and special risks to children are the same as those described in Chapter 3 (Section 3.4.2, Socioeconomics, and Section 3.4.6, Environmental Justice) and in Section 5.4.1.1 for 7SFG(A) Range Alternative 1.

5.4.5.2 Environmental Consequences (Socioeconomics and Environmental Justice – 7SFG(A) Range Alternative 5)

Under 7SFG(A) Range Alternative 5, the Group 2 Ranges and the Group 1 Ranges would overlap and be located on the eastern portion of the ranges.

Construction of the facilities needed for operation of the range would benefit the local area as the additional construction would create jobs in the construction industry that would continue for the term of the construction. The long-term operations and maintenance involved in sustaining the ranges could have a beneficial effect on the region through additional jobs and incomes.

Small-arms noise levels of 62 dB DNL from the Group 1 Ranges would be contained within the base boundary. However, high-explosive munitions noise levels from the Group 2 Ranges would occur off-base at 62 dB CDNL. There are two communities near Big Hammock Point and Sharon Lake, as well as the northeastern portion of Niceville, that would be affected by the increased noise. However, of the total 201 acres affected, only 31 acres are zoned for residential use, which may result in annoyance.

5.4.6 No Action Alternative

The No Action Alternative would involve maintaining the ranges and test areas at Eglin AFB in their current configuration. The areas proposed for the 7SFG(A) ranges would

therefore remain as uncleared land and would remain open year-round for recreational use by hunters and campers. Other activities associated with the No Action Alternative, including the personnel loss from the President's 2007 Budget drawdown and the realignment of the 33rd Fighter Wing (33 FW) are further detailed in Chapter 4 (Section 4.4.6, No Action Alternative).

5.5 UTILITIES

The proposed ranges for the 7SFG(A) would all require basic utility support. This would include potable water, wastewater treatment, electricity, and potentially natural gas. Potable water and wastewater would be needed for latrines, drinking water, and hand washing. Electricity would be required for operating the range targets, lights, scoring and feedback systems, the public address system, cooling systems, etc. It is not known if natural gas would be used at the 7SFG(A) ranges; however, it has been specified as potentially required. The relocation of the Navy EOD School detonation site, currently located at C-52W, to the proposed SOF 12 Light Demolition Range would require similar utility support as described for the proposed 7SFG(A) ranges.

The proposed aircraft operations, water operations, and ground maneuvers conducted by the 7SFG(A) would not require utility support and would not have an impact on utilities. For this reason, they are not discussed further.

5.5.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.5.1.1 Existing Conditions (Utilities – 7SFG(A) Range Alternative 1)

The TAs that are part of this alternative (C-52, C-53, and C-72) have varying degrees of existing utility infrastructure for potable water, wastewater treatment, electricity, and natural gas (Table 5-7 and Figure 5-13). The proposed ranges that are not located within the boundaries of TAs are located in the interstitial areas in close proximity to the TAs. The interstitial areas of the Eglin Range do not specifically have utilities as do some of the designated TAs. However, the distribution lines for utilities crisscross the interstitial area and would potentially provide a point of service for proposed 7SFG(A) ranges in those areas.

Table 5-7. Existing Utility Infrastructure at 7SFG(A) Group 2 Ranges

Test Area	Potable Water	Wastewater	Electrical	Natural Gas
C-52	Yes	Yes (septic tank)	Yes	No
C-53	No	No	Yes	No
C-72	Yes	Yes (septic tank)	Yes	No

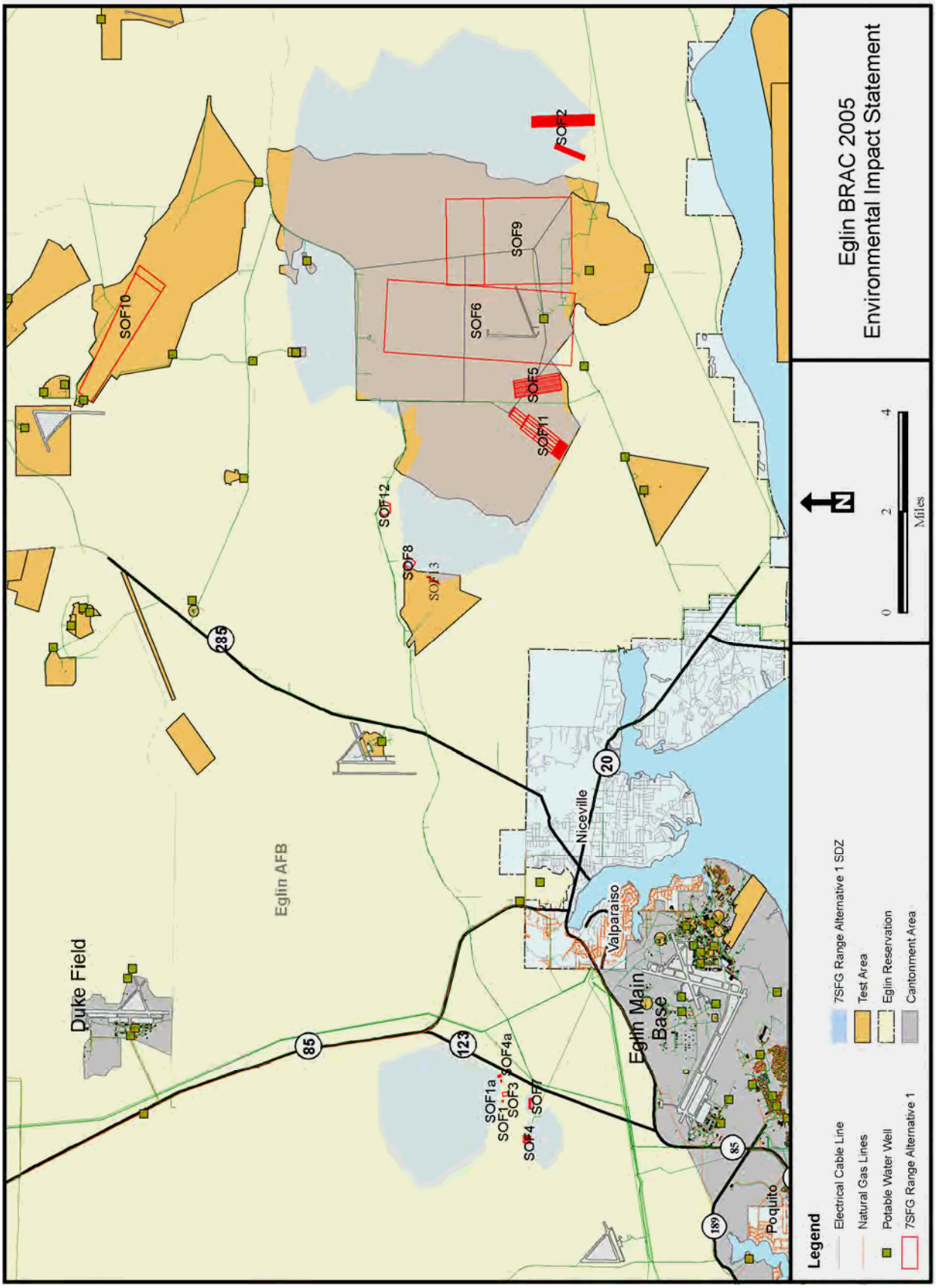

Figure 5-13. 7SFG(A) Range Alternative 1 – Utilities

Potable Water

The Main Base/Ammunition Area water system would be used to support potable water needs of the Group 1 Ranges at this location. The water system has enough remaining capacity to accommodate the 7SFG(A) (see the discussion for 7SFG(A) Cantonment Alternative 4 in Chapter 4, Section 4.6.4.1, Existing Conditions).

However, the Group 1 Ranges would still require the installation of water infrastructure, since this area is undeveloped.

Currently, four potable water systems are operated in the vicinity of the Group 2 Ranges (Table 5-8 and Figure 5-13). Two additional wells are located along Range Road 200 on the north end of TA C-52E, but these wells are nonpotable water. However, they do draw from the Floridan Aquifer (96 CEG/CEVC, 2006).

Table 5-8. Potable Water Systems in Vicinity of7SFG(A) Range Alternative 1 – Group 2 Ranges

Range Water Systems	Aquifer	Water Use	Number of wells
46 RANS Test Area (C-52A)	Floridan	Potable	1
Test Area C-52	Floridan	Potable	1*
Navy EOD School (D-51)	Floridan	Potable	1
Site C-6 Water Supply System	Floridan	Potable	2

Source: 96 CEG/CEVC, 2006
EOD = explosive ordnance disposal; 46 RANS = 46th Range Management Squadron
*TA C-52 may have as many as four potable water wells (U.S. Air Force, 2005e)

Two wells occur on TA C-72 (including C-7A) and are thought to be using the Floridan Aquifer for potable water (U.S. Air Force, 2006m). However, this information has not yet been confirmed. Additional wells are located near TA C-72 at TA C-74A and Auxiliary Field 1 (C-5). These wells are not confirmed to be potable water.

The only potable water well located near TA C-53 is approximately 2 miles to the northwest at TA C-3.

Wastewater

Either the Main Base Wastewater Treatment Facility or septic systems would be used to support the Group 1 Ranges at this location. Since the area proposed for the Group 1 Ranges is undeveloped, infrastructure would have to be established to support wastewater operations.

For the Group 2 Ranges, currently TAs C-52 and C-72 have septic tanks for handling domestic wastewater (U.S. Air Force, 2006m). This is the case with most of the wastewater treatment facilities at test areas across the Eglin Range. A closed loop wash rack wastewater system is located on TA C-52 associated with the 46th Range Management Squadron (46 RANS). TA C-53 currently does not have wastewater treatment facilities or wastewater infrastructure on-site (U.S. Air Force, 2006o).

Electricity

Several electrical distribution and transmission lines are located in the area of the proposed Group 1 Ranges. Distribution lines run along Hwy 123 with a short spur heading west into the proposed range area.

In support of the Group 2 Ranges, TAs C-52, C-53, and C-72 have existing electrical distribution lines (Figure 5-13). TA C-52 has distribution lines along Range Road 218, Range Road 217, and the northern boundary on Range Road 200. These lines supply power primarily to the developed portions of the test area clustered in the southern and northern areas (U.S. Air Force, 2006m). TA C-53 has an electrical distribution line along its northern boundary, which extends into the test area. Power is available in the fenced compound, which is located adjacent to the clay arenas and assault landing strip (U.S. Air Force, 1996c). TA C-72 has distribution lines primarily along the southern boundary leading to TA C-7A, along the northern boundary leading out to Sandy Mountain Tower and clustered around the buildings at the northwestern corner of the test area. Two additional lines feed into TA C-72 from the southeast, possibly supporting Hellfire missile targets (U.S. Air Force, 2006m).

Natural Gas

The Group 1 Ranges have a natural gas distribution line located within the right-of-way of Hwy 85 to the east and to the south. In addition, natural gas lines are located within a mile of the proposed Group 1 Ranges to the east in Valparaiso and to the south on Eglin Main Base.

For the Group 2 Ranges, the closest natural gas infrastructure is currently located at Navy EOD School at D-51 (Fleming, 2006). None of the test areas or the interstitial areas at which the proposed 7SFG(A) Group 2 Ranges are located (TAs C-52, C-53, and C-72) have natural gas infrastructure or service.

5.5.1.2 Environmental Consequences (Utilities – 7SFG(A) Range Alternative 1)

The analysis of utilities in Chapter 4 (7SFG(A) cantonment alternatives) addressed capacities of potable water and wastewater based on number of personnel expected to be part of the 7SFG(A). Since the total number of personnel associated with the 7SFG(A) remains the same, the capacity analysis would not change based on where the ranges would be established. In other words, the same total number of 7SFG(A) troops would be present whether they are in the cantonment area or on a range on any given day. What differs is the capability of each proposed range site to provide utilities, including potable water, wastewater treatment, electricity, and natural gas. Those capabilities are discussed in the following subsections.

Potable Water

Since the area proposed for the Group 1 Ranges contains no potable water wells, a potable water system would need to be established. Establishing potable water at the site will require a new CUP and a potable water system (PWS) permit and would have the same potential impacts as described for 7SFG(A) Cantonment Alternative 4 (Chapter 4, Section 4.6.4.2, Environmental Consequences).

In support of the proposed Group 2 Ranges, potable water systems and wells are already present at or near TAs C-52 and C-72. However, no potable water well is located at or near TA C-53. Establishing potable water in this area will require either an amended or a new Consumptive Use Permit (CUP) and a PWS permit.

For TAs C-52 and C-72, no adverse impacts would occur on the existing potable water infrastructure since the extent required to support drinking water, latrines and hand-washing at the ranges would be minimal. Determining whether the establishment of a new CUP and PWS would cause adverse impacts on potable water for TA C-53 cannot be specifically determined at this time. The impact criteria described in Chapter 3 is based on the comparison of current capacities as specified in an existing CUP. The area proposed in this alternative for some of the Group 2 Ranges does not currently have an existing CUP with permitted levels. Since a new CUP and PWS permit would be required, the determination of impact on potable water would be made during the permitting process when the specifics of the water system and permit requirements are known (e.g. number, size, and depth of wells; size of the lines; pump capacity) (Sculthorpe, 2007). At this time, it is anticipated that adverse impacts to potable water would not result from the Group 2 Ranges at TA C-53.

Wastewater

Since there currently is no wastewater treatment system in the area proposed for the Group 1 Ranges, the establishment of an on-site wastewater treatment system and infrastructure would be required. Establishing wastewater treatment at the proposed Group 1 Ranges would have the same requirements and potential impacts as described in 7SFG(A) Cantonment Alternative 4 (Section 4.6.4.2, Environmental Consequences).

In support of the proposed Group 2 Ranges, the existing septic tanks located at TAs C-52 and C-72 would be adequate for handling the limited wastewater produced by troops training at the ranges. However, additional infrastructure is anticipated to be necessary depending on the specific locations selected for latrines. Since there currently are no septic tanks or wastewater infrastructure at TA C-53, this site would require installation of a septic system along with new infrastructure to be able to support the proposed 7SFG(A) ranges.

According to Florida Department of Environmental Protection (FDEP) regulations, domestic wastewater systems that treat less than 10,000 gallons of wastewater a day are not required to be permitted by the state of Florida. Most of the septic tanks on the Eglin Range would fall into this category including any new ones established at C-53 for the Group 2 Ranges (FDEP, 2006b). Since the existing septic tanks would be adequate at TAs C-52 and C-72 and since any new septic tanks to be established at TA C-53 would be under the permitting threshold based on amount of water to be treated, the proposed Group 2 Ranges would not cause adverse impacts to wastewater or infrastructure in this area of the Eglin Range.

As the amount of wastewater being treated increases at TAs C-52 and C-53, the use of multiple septic tanks stops being an efficient or effective method of treating wastewater. Instead, a more viable option may be to establish a small wastewater treatment facility that would be more cost effective to maintain, more efficient at treating wastewater, and would be a better solution than continually adding new septic tanks. The relative proximity of TAs C-52, C-53, and the Navy EOD School makes them good candidates for this kind of approach to wastewater treatment (Brown, 2006b).

Electricity and Natural Gas

The 7SFG(A)'s overall electrical energy (kilowatt hours) requirement for their cantonment area is 18 percent of the total electricity consumed in FY 2006 on Eglin AFB (see Chapter 4, Section 4.6.1.2, Environmental Consequences, for more details). The proposed Group 1 and 2 Ranges would use a fraction of what the 7SFG cantonment would require. Since Gulf Power anticipates being able to serve the increase in power requirements for the 7SFG cantonment area, they would also be able to accommodate the minor electrical requirements of the Group 1 and 2 Ranges. For this reason, this alternative would not cause an adverse impact to the electrical supply in Northwest Florida.

The same applies to natural gas since the 7SFG(A)'s requirement is less than 0.5 percent of the total natural gas consumed in FY 2006 on Eglin AFB (see Section 4.6.1.2 in Chapter 4 for more details). Since Okaloosa Gas anticipates being able to meet the additional natural gas demand, the Group 1 and 2 Ranges would not cause an adverse impact to the natural gas supply in Northwest Florida.

The proposed location for the Group 1 Ranges would require electrical infrastructure to support the needs of the ranges. The multiple electrical distribution lines and natural gas lines in the area of the proposed Group 1 Ranges provide ample points at which to tap into the electrical and natural gas supply. Since Eglin Main Base is already piped and supplied with natural gas and electricity and this location is in close proximity to Eglin Main Base, this proposed location would be easily accommodated. The exact

location of the ranges will influence specifics for supplying natural gas and electricity, but overall logistically it would be feasible (Shue, 2007; Erickson, 2007). For these reasons, no adverse impacts would occur to the electrical and natural gas infrastructure as a result of the proposed Group 1 Ranges.

The existing electrical distribution lines on the test areas proposed for 7SFG(A) Group 2 Ranges are predominantly positioned to support the ranges. However, a few of the proposed ranges may interfere with the existing power lines. The proposed Light Demolition Range (SOF 12) located between C-52 and C-53 along Range Road 200 may be positioned along an existing distribution line and may have to be adjusted. The power line located along Range Road 217 in TA C-52 may cross through the northeastern corner of the proposed Qualifications Training Range (SOF 11) located within TA C-52W. The southern portions of the Mortar Weapons Range (SOF 6) and the Battle Area Complex (SOF 9) may also impact a power line located along Range Road 222 at the TA C-52C southern boundary. With any adjustments required for the electrical distribution lines, no adverse impacts would occur to the electrical supply and infrastructure as a result of the proposed Group 2 Ranges.

Since none of these test areas have natural gas pipelines, the proposed Group 2 Ranges would not interfere with existing natural gas. However, the requirement for natural gas to support the proposed ranges would require new infrastructure. Tapping into the existing natural gas infrastructure would be feasible at the Navy EOD School at TA D-51, a little over a mile southwest of the Group 2 Ranges. Establishing new natural gas infrastructure would not have an adverse impact on natural gas as a result of the proposed Group 2 Ranges.

5.5.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.5.2.1 Existing Conditions (Utilities – 7SFG(A) Range Alternative 2)

Currently, no utilities exist on TA C-2 or in the undeveloped area to the southeast and north of TA C-2 where the 7SFG(A) ranges are proposed (U.S. Air Force, 2006d) (Figure 5-14). The Group 2 Ranges would be located in the same place as that described for 7SFG(A) Range Alternative 1 (Section 5.5.1.1).

5.5.2.2 Environmental Consequences (Utilities – 7SFG(A) Range Alternative 2)

The environmental consequences related to potable water, wastewater, electricity, and natural gas for the Group 2 Ranges are described in Section 5.5.1.2. The following subsections discuss environmental consequences related to utilities on or around TA C-2 and the areas proposed for the 7SFG(A) Group 1 Ranges.

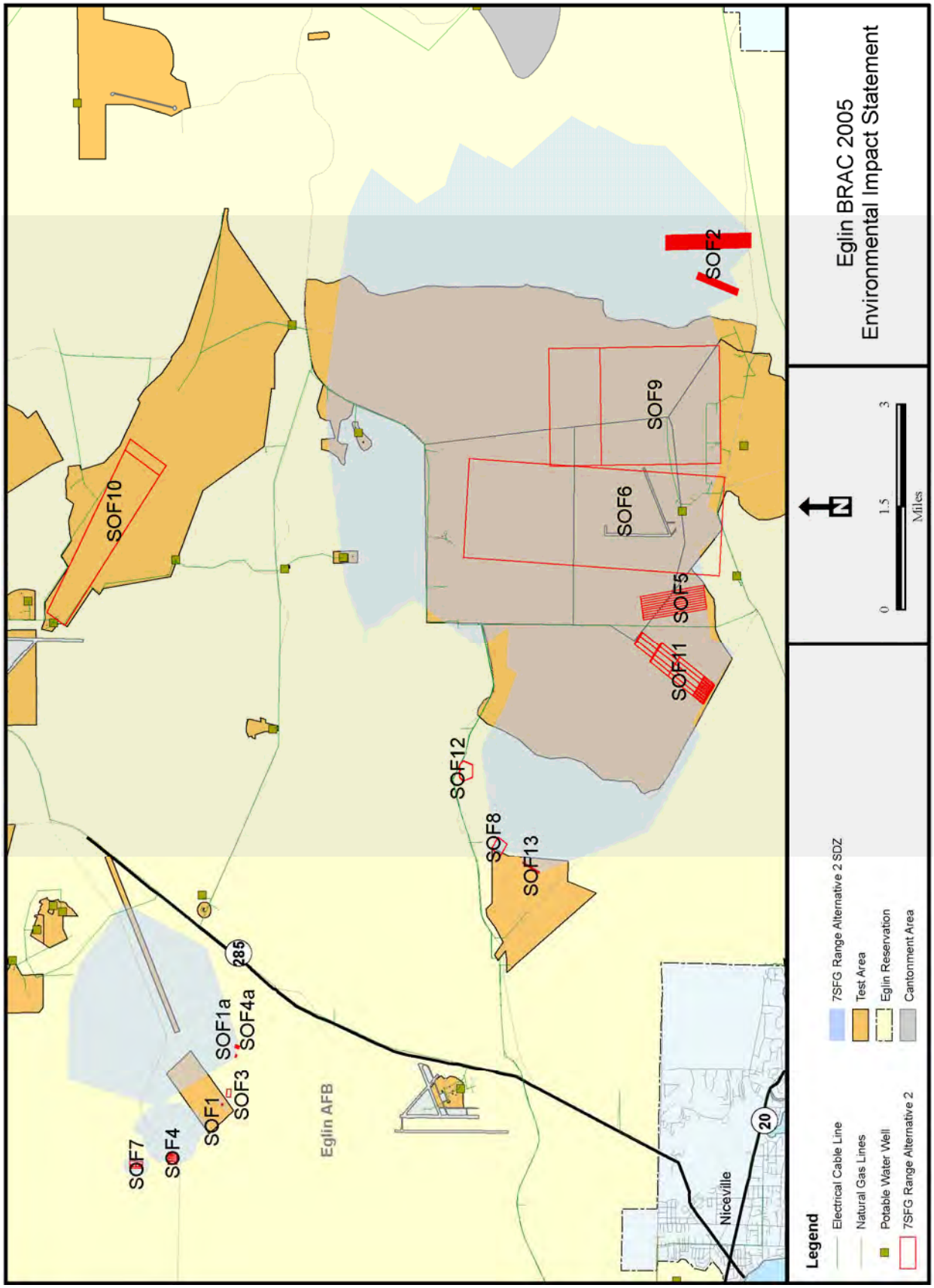

Figure 5-14. 7SFG(A) Range Alternative 2 – Utilities

Potable Water

No potable water wells are located at or near TA C-2. Since this area contains no potable water wells, a potable water system would need to be established. Establishing potable water at the site would require a new CUP and a PWS permit (Sculthorpe, 2007). Since no existing infrastructure is in place at or in the vicinity of TA C-2, this area would require new infrastructure to be established in support of the proposed ranges.

Determining whether the establishment of a new CUP and PWS would cause adverse impacts on potable water in this area cannot be specifically determined at this time. The impact criteria described in Chapter 3 is based on the comparison of current capacities as specified in an existing CUP. The area proposed in this alternative for the Group 1 Ranges does not currently have an existing CUP with permitted levels. Since a new CUP and PWS permit would be required, the determination of impact on potable water would be made during the permitting process when the specifics of the water system and permit requirements are known (e.g., number, size, and depth of wells; size of the lines; pump capacity). At this time, adverse impacts to potable water are not anticipated based on the limited amount of potable water to be used in association with the ranges and since the area is isolated from any adjacent population densities or industrial activities (Sculthorpe, 2007).

Wastewater

Since there currently are no septic tanks or wastewater infrastructure at TA C-2 or in the area to the southeast, this site would require installation of a septic system along with new infrastructure to be able to support the proposed Group 1 Ranges. According to FDEP regulations, domestic wastewater systems that treat less than 10,000 gallons of wastewater a day are not required to be permitted by the state of Florida. Most of the septic tanks on the Eglin Range would fall into this category including any new ones established at C-2 for the Group 1 Ranges (FDEP, 2006b). Since any new septic tanks to be established at TA C-2 would be under the permitting threshold based on amount of water to be treated, the proposed Group 1 Ranges would not cause adverse impacts to wastewater or infrastructure in this area of the Eglin Range.

As the amount of wastewater being treated increases in the vicinity of TA C-2, which would include the TA C-64 Complex and the proposed 7SFG(A) cantonment areas on the eastern side of Duke Field, the use of multiple septic tanks stops being an efficient or effective method of treating wastewater. Instead, a more viable option may be to establish a wastewater treatment facility that would be more cost-effective to maintain, more efficient at treating wastewater, and a better solution than continually adding new septic tanks. The relative proximity of these TAs and the proposed 7SFG(A) cantonment areas at Duke Field makes them a potentially good candidate for this kind of approach to wastewater treatment (Brown, 2006b).

Electricity and Natural Gas

The 7SFG(A)'s overall electrical energy (kilowatt hours) requirement for the cantonment area is 18 percent of the total electricity consumed in FY 2006 on Eglin AFB (see Chapter 4, Section 4.6.1.2, Environmental Consequences, for more details). The proposed Group 1 Ranges would use a fraction of what the 7SFG(A) cantonment would require. Since Gulf Power anticipates being able to serve the increase in power requirements for the 7SFG cantonment area, they would also be able to accommodate the minor electrical requirements of the Group 1 Ranges. For this reason, this alternative would not cause an adverse impact to the electrical supply in Northwest Florida.

The same applies to natural gas since the 7SFG(A)'s requirement is less than 0.5 percent of the total natural gas consumed in FY 2006 on Eglin AFB (see Section 4.6.1.2 in Chapter 4 for more details). Since Okaloosa Gas anticipates being able to meet the additional natural gas demand, the Group 1 Ranges would not cause an adverse impact to the natural gas supply in Northwest Florida.

Since TA C-2 and the surrounding area do not have existing electrical or natural gas utilities, new infrastructure would be required to support the needs of the proposed 7SFG(A) Group 1 Ranges. The closest electrical distribution line is located along Hwy 285, which is within a mile of the proposed site for the 100-meter Flat Range (SOF 4a). No adverse impacts would occur to the electrical supply and infrastructure as a result of the proposed Group 1 Ranges. The closest natural gas pipeline is located west of TA C-2 along Hwy 85. Duke Field is also plumbed for natural gas and could function as a starting point to reach TA C-2 and the area proposed for the ranges. Establishing new natural gas infrastructure would not have an adverse impact on natural gas as a result of the proposed Group 1 Ranges.

5.5.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.5.3.1 Existing Conditions (Utilities – 7SFG(A) Range Alternative 3)

The area proposed for the Group 1 Ranges is essentially undeveloped (except for range roads) and has no existing utilities (Figure 5-15). The nearest utility is an electrical distribution line along Range Road 211 north of the proposed ranges. A natural gas distribution line is located approximately 4 miles to the east in the right-of-way of Hwy 85. The Group 2 Ranges would be located in the same place as that described for 7SFG(A) Range Alternative 1 (Section 5.5.1.1).

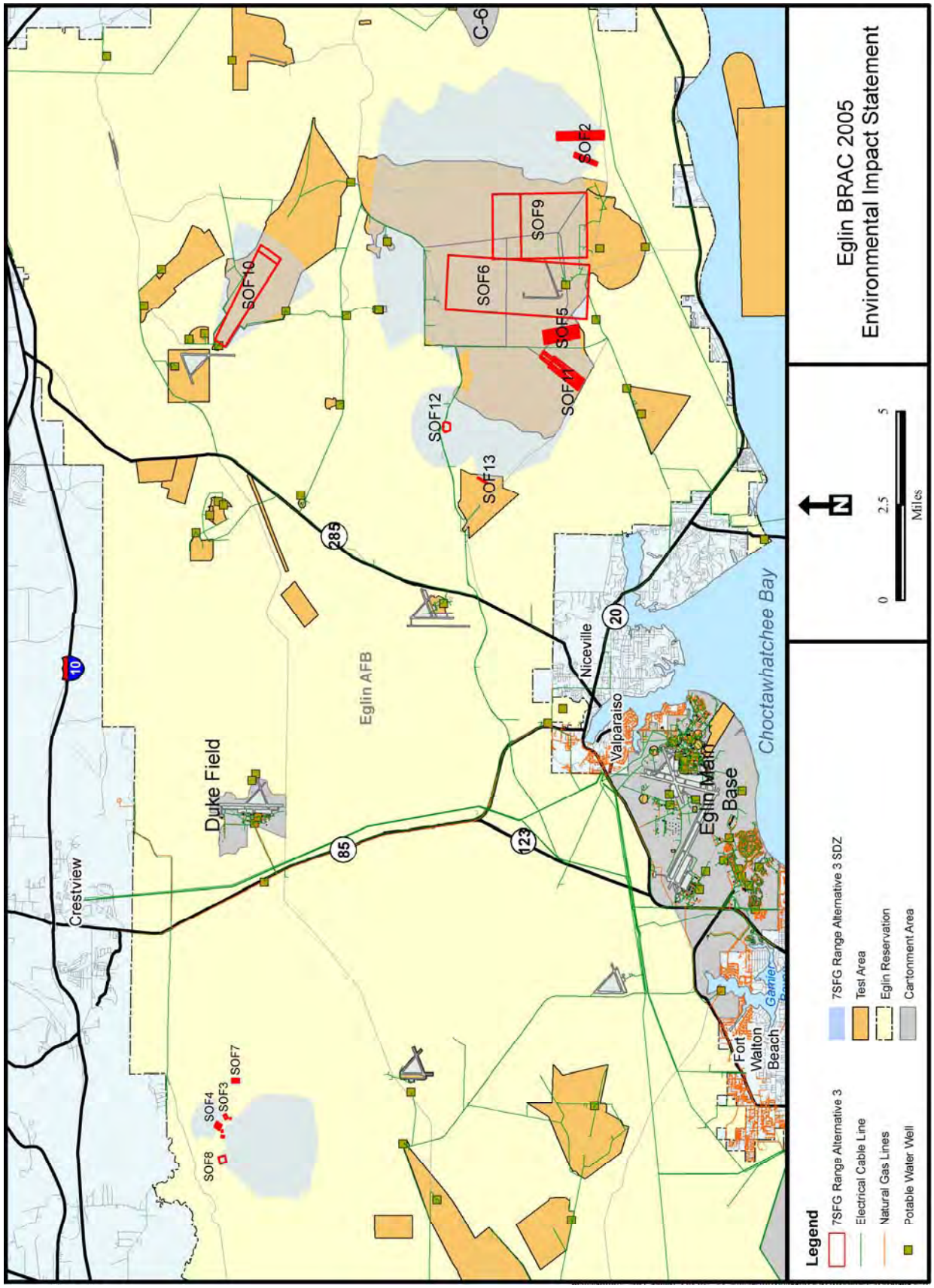

Figure 5-15. 7SFG(A) Range Alternative 3 – Utilities

5.5.3.2 Environmental Consequences (Utilities – 7SFG(A) Range Alternative 3)

The environmental consequences related to potable water, wastewater, electricity, and natural gas for the proposed 7SFG(A) Group 2 Ranges are described Section 5.5.1.2. The following subsections discuss environmental consequences related to the lack of existing utilities along the northwestern boundary of the Eglin Range where the 7SFG(A) Group 1 Ranges are proposed.

Potable Water

Since the area along the northwestern boundary of the Eglin Range proposed for the 7SFG(A) Group 1 Ranges contains no potable water wells, a potable water system will need to be established. Establishing potable water at the site will require a new CUP and a PWS permit and would have the same potential impacts as described in for 7SFG(A) Cantonment Alternative 3 (Chapter 4, Section 4.6.3.2, Environmental Consequences).

Wastewater

Since there are currently no septic tanks or wastewater infrastructure in the area along the northwestern boundary, this conglomerate of ranges would require the establishment of wastewater treatment facilities (septic tanks) and infrastructure to be able to support the proposed 7SFG(A) Group 1 Ranges. Establishing wastewater treatment at the proposed ranges would have the same requirements and potential impacts as described for 7SFG(A) Cantonment Alternative 3 (Chapter 4, Section 4.6.3.2).

Electricity and Natural Gas

Supplying natural gas and electricity to the proposed Group 1 Ranges would have the same requirements and potential impacts as those described for the 7SFG(A) Cantonment Alternative 3 (Chapter 4, Section 4.6.3.2)

5.5.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.5.4.1 Existing Conditions (Utilities – 7SFG(A) Range Alternative 4)

The area proposed for the Group 1 Ranges is essentially undeveloped (except for range roads) and has no existing utilities (Figure 5-16). No potable water wells, septic tanks, or wastewater treatment facilities are located in this area of the Eglin Range. The nearest utilities are electrical distribution lines and natural gas lines. Two electrical distribution lines, supplied by CHELCO, are located within approximately 2 to 3 miles of the proposed ranges. One is located south of Interstate 10 and the other east of the proposed ranges. Two natural gas distribution lines are located north of the proposed ranges within the I-10/Hwy 90 corridor. One is owned and operated by Okaloosa Natural Gas (Shue, 2007), and one is owned and operated by DeFuniak Springs Utility Company (Holloway, 2007). The Group 2 Ranges would be located in the same place as described for 7SFG(A) Range Alternative 1 (Section 5.5.1.1).

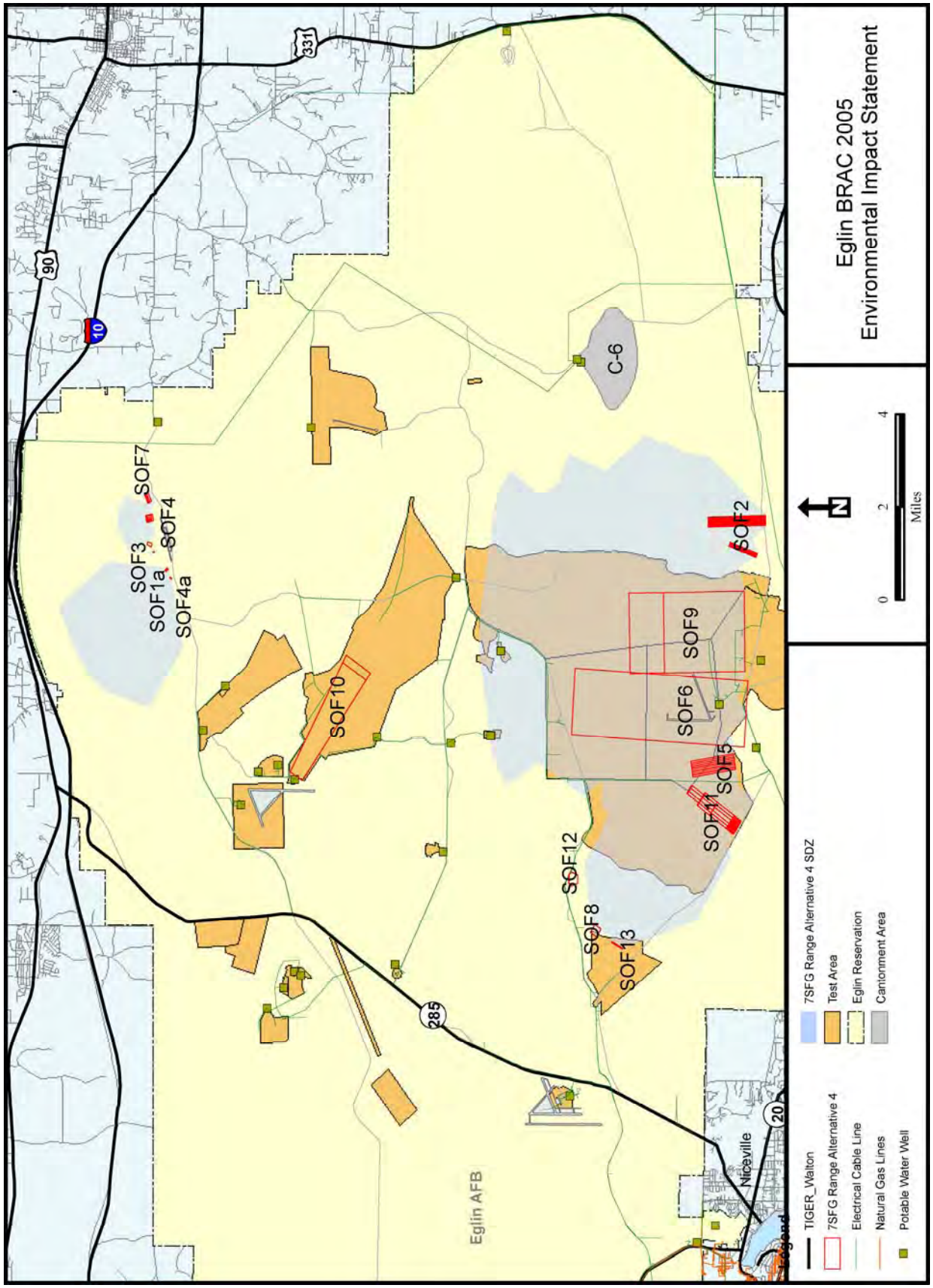

Figure 5-16. 7SFG(A) Range Alternative 4 – Utilities

5.5.4.2 Environmental Consequences (Utilities – 7SFG(A) Range Alternative 4)

The environmental consequences related to potable water, wastewater, electricity and natural gas for the proposed 7SFG(A) Group 2 Ranges are described in Section 5.5.1.2. The following subsections discuss environmental consequences related to the lack of existing utilities along the northeastern boundary of the Eglin Range where the 7SFG(A) Group 1 Ranges are proposed.

Potable Water

Since the area proposed for the 7SFG(A) Group 1 Ranges contains no potable water wells, a potable water system will need to be established. Establishing potable water at the site will require a new CUP and a PWS permit and would have the same potential impacts as described for 7SFG(A) Cantonment Alternative 5 (Chapter 4, Section 4.6.5.2, Environmental Consequences).

Wastewater

Since there are currently no septic tanks or wastewater infrastructure along the northeastern boundary, the Group 1 Ranges would require the establishment of wastewater treatment facilities and infrastructure. Establishing wastewater treatment at the proposed ranges would have the same requirements and potential impacts as described for 7SFG(A) Cantonment Alternative 5 (Chapter 4, Section 4.6.5.2).

Electricity and Natural Gas

Supplying natural gas and electricity to the proposed Group 1 Ranges would have the same requirements and potential impacts as those described for 7SFG(A) Cantonment Alternative 5 (Chapter 4, Section 4.6.5.2).

5.5.5 7SFG(A) Range Alternative 5: East Side Training

5.5.5.1 Existing Conditions (Utilities – 7SFG(A) Range Alternative 5)

The area proposed for the Group 1 Ranges under this alternative (TA C-53) has limited development (e.g., range roads) and limited existing utilities (Figure 5-17). No potable water wells, septic tanks, or wastewater treatment facilities are located on TA C-53. The closest potable water well is located approximately 2 miles to the northwest at TA C-3. TA C-53 has an electrical distribution line along its northern boundary, which extends into the test area.

Power is available in the fenced compound located adjacent to the clay arenas and assault landing strip (U.S. Air Force, 1996c). Natural gas is not available at TA C-53.

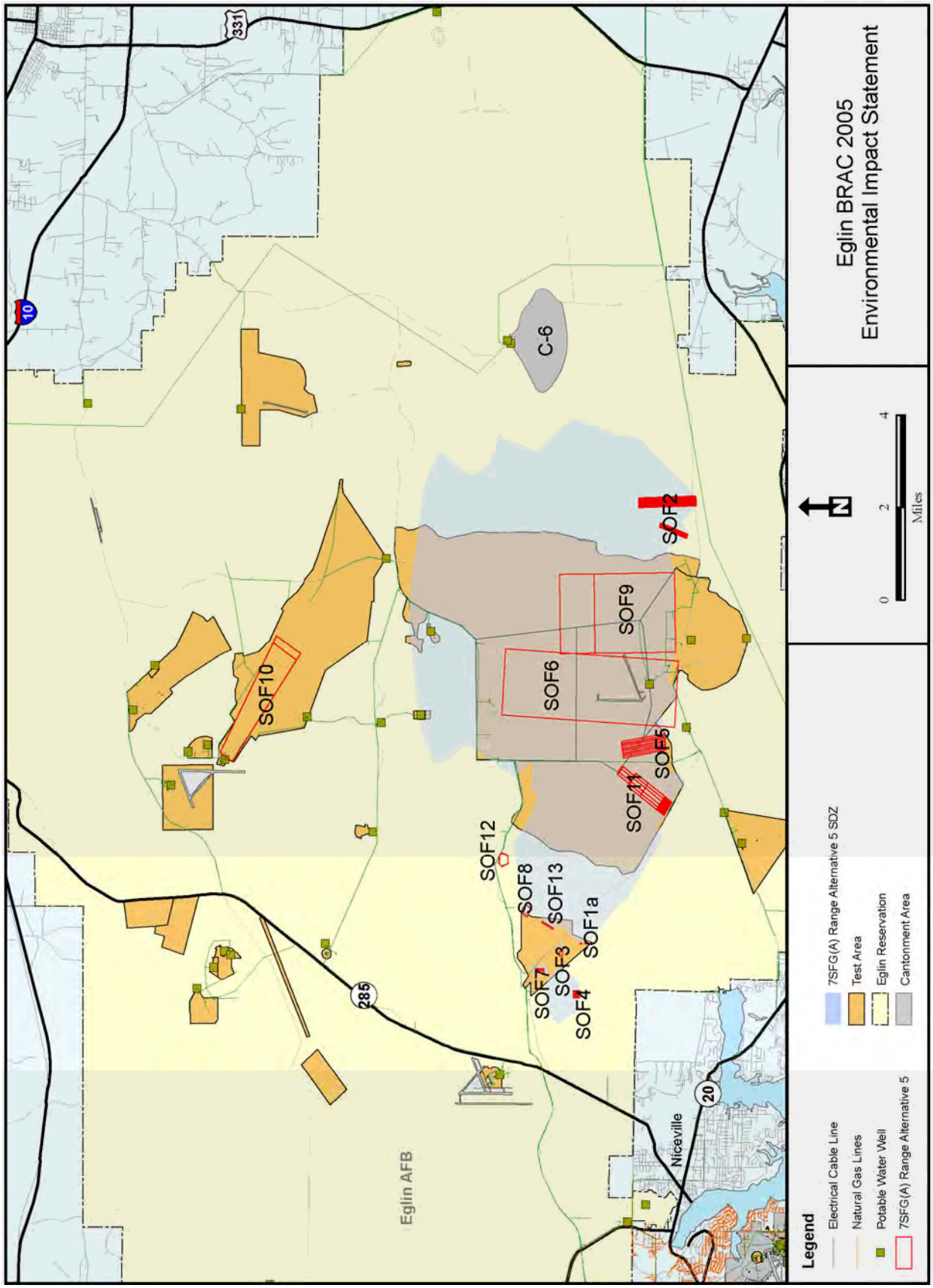

Figure 5-17. 7SFG(A) Range Alternative 5 – Utilities

The Group 2 Ranges for this alternative would be located in the same place as for 7SFG(A) Range Alternative 1 (Section 5.5.1.1).

5.5.5.2 Environmental Consequences (Utilities – 7SFG(A) Range Alternative 5)

The environmental consequences related to potable water, wastewater, electricity, and natural gas for the proposed 7SFG(A) Group 2 Ranges are described in Section 5.5.1.2. The following subsections discuss environmental consequences related to the lack of existing utilities in and around TA C-53 where the 7SFG(A) Group 1 Ranges are proposed.

Potable Water

No potable water well is located at TA C-53. To address the lack of potable water at TA C-53, either a new potable water well would have to be established or the existing well at C-3 would need to be accessed to support the proposed ranges at, and in the vicinity of, TA C-53. Establishing potable water at the site will require a new CUP and a PWS permit. Additionally, since no existing potable water infrastructure is in place at TA C-53, this site would require infrastructure to be established in support of the proposed ranges.

Determining whether the establishment of a new CUP and PWS would cause adverse impacts on potable water for this alternative cannot be specifically determined at this time. The impact criteria described in Chapter 3 is based on the comparison of current capacities as specified in an existing CUP. The area proposed in this alternative for the Group 1 Ranges does not currently have an existing CUP with permitted levels. Since a new CUP and PWS permit would be required, the determination of impact on potable water would be made during the permitting process, when the specifics of the water system and permit requirements are known (e.g., number, size, and depth of wells; size of the lines; pump capacity). At this time, adverse impacts to potable water are not anticipated based on the limited amount of potable water to be used in association with the ranges and since the area is isolated from any adjacent population densities or industrial activities (Sculthorpe, 2007).

Wastewater

Since there currently are no septic tanks or wastewater infrastructure at TA C-53, the Group 1 Ranges would require the establishment of wastewater treatment facilities (septic tanks) and infrastructure. According to FDEP regulations, domestic wastewater systems that treat less than 10,000 gallons of wastewater a day are not required to be permitted by the state of Florida. Most of the septic tanks on the Eglin Range would fall into this category, including any new ones established at C-53 for the Group 1 Ranges

(FDEP, 2006b). Since any new septic tanks to be established at TA C-53 would be under the permitting threshold based on amount of water to be treated, the proposed Group 1 Ranges would not cause adverse impacts to wastewater or infrastructure in this area of the Eglin Range.

As the amount of wastewater being treated increases in this portion of the Eglin Range, the use of multiple septic tanks stops being an efficient or effective method of treating wastewater. Instead, a more viable option may be to establish a small wastewater treatment facility that would be more cost-effective to maintain, more efficient at treating wastewater, and is a better solution than continually adding new septic tanks. The relative proximity of TAs C-52, C-53 and the Navy EOD School makes them good candidates for this kind of approach to wastewater treatment (Brown, 2006b).

Electricity and Natural Gas

The 7SFG(A)'s overall electrical energy (kWh) requirement for their cantonment area is 18 percent of the total electricity consumed in FY 2006 on Eglin AFB (see Chapter 4, Section 4.6.1.2, Environmental Consequences, for more details). The proposed Group 1 Ranges would use a fraction of what the 7SFG(A) cantonment would require. Since Gulf Power anticipates being able to serve the increase in power requirements for the 7SFG(A) cantonment area, they would also be able to accommodate the minor electrical requirements of the Group 1 Ranges. For this reason, this alternative would not cause an adverse impact to the electrical supply in Northwest Florida.

The same applies to natural gas since the 7SFG(A)'s requirement is less than 0.5 of the total natural gas consumed in FY 2006 on Eglin AFB (see Section 4.6.1.2 in Chapter 4 for more details). Since Okaloosa Gas anticipates being able to meet the additional natural gas demand, the Group 1 Ranges would not cause an adverse impact to the natural gas supply in Northwest Florida.

The electrical distribution lines on and in the vicinity of TA C-53 are predominantly positioned to support the proposed ranges. However, the proposed Urban Assault Course (SOF 8) located at the northeastern tip of TA C-53 may be positioned along an existing distribution line and may have to be adjusted. With any adjustments required for the electrical distribution lines, no adverse impacts would occur to the electrical supply and infrastructure as a result of the proposed Group 1 Ranges.

Since none of these test areas have natural gas pipelines, the proposed ranges would not interfere with natural gas. However, the requirement for natural gas to support the proposed ranges would require new infrastructure. Tapping into the existing natural gas infrastructure would be feasible at the Navy EOD School at TA D-51, approximately

4 miles south of the Group 1 Ranges. Establishing new natural gas infrastructure would not have an adverse impact on natural gas as a result of the proposed Group 1 Ranges.

5.5.6 No Action Alternative

Under the No Action Alternative, the 7SFG(A) would not be relocated to Eglin AFB and would therefore not require the use of the Eglin Range or any of the utilities located on the Range. The existing conditions for utilities on the Eglin Range is discussed in Sections 5.5.1 through 5.5.5. If the 7SFG(A) does not relocate to Eglin AFB, the utilities on the range would remain as described in the previous sections.

Several actions unrelated to BRAC are predicted to occur that would impact the current existing condition of utilities on Eglin AFB. However, only the Florida Army National Guard's (FLARNG's) Company C, 3rd Battalion, 124th Infantry's request to relocate to Eglin would potentially affect utilities on the Eglin Range. This unit currently trains on Eglin but is requesting to be permanently relocated from Panama City. Since no other information is currently available on the number of personnel to be relocated or the amount of vehicles and equipment associated with the unit, the potential impacts to utilities on the Eglin Range cannot be determined. It is expected, however, that since utilities on the Eglin Range vary widely from location to location, new utilities would be required to support the FLARNG.

5.6 AIR QUALITY

Identifying the affected area for an air quality assessment requires knowledge of sources of air emissions, pollutant types, emission rates, and release parameters, proximity to other emissions sources, and local conditions. Refer to Appendix D, *Air Quality*, for a review of air quality and associated methodologies used for emissions calculations.

5.6.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.6.1.1 Existing Conditions (Air Quality – 7SFG(A) Range Alternative 1)

Regional Air Quality

This alternative is located in Okaloosa County, which is included in the region of influence (ROI) used for analysis of air quality. The baseline emission levels for Okaloosa County are discussed in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

5.6.1.2 Environmental Consequences (Air Quality – 7SFG(A) Range Alternative 1)

Munitions

The 7SFG(A) intends to use a variety of munitions and vehicles on Eglin ranges. Munitions include a range of small arms, guns, grenades, simulators, mines, flares, rockets, and explosives. All munitions were assumed to be live, and since the specific type of munition was not specified, the munitions exhibiting the highest net explosive weight were used for this analysis. Table 5-9 summarizes the emissions generated from the various munitions. The methodology used to calculate emissions is detailed in Appendix D, *Air Quality*.

Table 5-9. Estimated Munitions Emissions Associated With 7SFG(A) Training

Expenditure	Proposed Qty	NEW[1] (pounds/item)	Calculated Emissions (tons)				
			CO	NO_X	$PM_{2.5}$	PM_{10}	SO_X
5.45 mm	29,000	--[2]	0.00	0.00	0.00	0.00	0.00
5.56 mm	4,966,000	3.98E-03	3.46	0.16	0.08	0.12	0.00
7.62 mm	1,248,000	6.30E-03	1.42	0.06	0.02	0.03	0.00
9 mm	2,100,000	7.89E-04	0.32	0.02	0.02	0.02	0.00
12 gauge	34,000	--	0.00	0.00	0.00	0.00	0.00
40 mm	57,000	1.17E-01	0.20	0.04	0.19	0.37	0.00
60 mm	8,200	4.57E-01	0.12	0.02	0.07	0.13	0.00
81 mm	6,300	1.04E-01	0.06	0.00	0.00	0.00	0.00
84 mm	400	1.37	0.01	0.04	0.01	0.03	0.00
0.50 caliber	300,000	3.38E-02	1.67	0.18	0.03	0.05	0.00
Mines	2,500	1.5	0.02	0.02	0.03	0.06	0.00
Grenades	8,100	0.41	0.07	0.00	0.07	0.12	0.00
Explosives	976,000	--	12.81	3.84	9.15	12.81	0.07
Flares	2,400	1.08	0.00	0.00	0.00	0.17	0.00
Simulators	11,400	0.188	0.04	0.01	0.00	0.26	0.00
Rockets - propellant	1,250	0.134	0.00	0.00	0.00	0.01	0.00
Rockets – warhead	1,250	0.684	0.03	0.00	0.02	0.03	0.00
Other (OPFOR)	290,000	--	0.00	0.00	0.00	0.00	0.00
		Total Emissions (tons)	*20.24*	*4.40*	*9.71*	*14.21*	*0.07*

CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_x = sulfur oxides; VOC = volatile organic compounds

1. NEW = Net explosive weight
2. "—" is listed for expenditures where data were unavailable

Section 5.9, Hazardous Materials, discusses chemical releases to the environment; this section discusses emissions released to the environment other than the criteria pollutants (carbon monoxide, nitrogen oxides, particulate matter with an aerodynamic diameter less than 10 microns, sulfur oxides, and volatile organic compounds). The chemicals of concern with air releases are antimony compounds (66 pounds), barium compounds (692 pounds), and lead compounds (210.6 pounds). Antimony and lead compounds are on the U.S. Environmental Protection Agency (USEPA) hazardous air pollutants (HAP) list (USEPA, 2006b). HAPs are regulated by point sources (e.g., reciprocating internal combustion engines). There are no regulations for the release of HAPs from sources such as munitions fire. It was assumed that the HAP levels of emissions from munitions would be insignificant and would have little affect on overall air quality for the ROI since the emissions levels are not concentrated enough to harm people and communities.

Mobile Sources

The 7SFG(A) would require the use of wheeled vehicles, aircraft, and watercraft for training operations. Table 5-10 lists the type of vehicle and emissions expected from each type of vehicle. Methods used to calculate vehicle emissions are detailed in Appendix D, *Air Quality*.

Table 5-10. Estimated Vehicle Emissions Associated With 7SFG(A) Training

Vehicle Type	Emissions (tons/yr)					
	CO	NO_X	$PM_{2.5}$	PM_{10}	SO_X	VOC
HMMWV (1-1/4 Ton)	0.106	0.078	0.027	0.083	0.009	0.050
HMMWV (Heavy)	0.063	0.035	0.011	0.042	0.003	0.011
HMMWV (Expanded)	14.737	8.187	2.532	9.736	0.645	2.519
1/2 ton Cargo Truck LMTV	0.273	0.201	0.069	0.216	0.023	0.129
5 Ton Cargo LMTV	0.025	0.018	0.006	0.020	0.002	0.012
ATV/Motorcycle	0.619	0.006	0.000	0.001	0.000	0.063
Total Wheeled Vehicle Emissions	*15.822*	*8.525*	*2.644*	*10.097*	*0.681*	*2.785*
CRRC (Zodiac Boats)	9.356	0.267	0.000	0.000	0.016	3.713
Total Watercraft Emissions	*9.356*	*0.267*	*0.000*	*0.000*	*0.016*	*3.713*
Fixed Wing[1]	80.68	200.88	0.00	83.35	0.00	34.01
Rotary Wing[2]	297.60	203.85	0.00	55.36	0.00	228.62
Total Aircraft Emissions	*378.28*	*404.73*	*0.00*	*138.72*	*0.00*	*262.63*

CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_x = sulfur oxides; VOC = volatile organic compounds

1. Assumed C-130 as the fixed wing aircraft type as it suited the needs of the operations
2. Assumed UH-60 for the rotary wing

Construction

A minimum area of 157.55 acres would need to be graded and cleared for the proposed facilities and shooting ranges. Emissions associated with these activities are summarized in Table 5-11.

Table 5-11. Estimated Construction and Grading Emissions Associated With 7SFG(A) Training

Source	Emissions (tons/yr)					
	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_x	VOC
Grading Equipment	2.5025	9.4185	0	0.7735	0.9555	1.001
Grading Operations	0	0	0	276.185	0	0
Total	**2.5025**	**9.4185**	**0**	**276.959**	**0.9555**	**1.001**

CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_x = sulfur oxides; VOC = volatile organic compounds

Summary

Using an ROI of Okaloosa, Santa Rosa, and Walton Counties, the emissions generated from vehicle and munitions use were compared to the county emissions to evaluate impacts on the regional air quality (Table 5-12). A temporary and short-term increase in emissions is expected from construction activities. No changes would be necessary to the Eglin AFB Title V Permit in conjunction with the range activities. The criterion of 250 tons per year would be exceeded for carbon monoxide and PM_{10} due to aircraft and construction emissions, respectively.

The other aspect of impact analysis is the general conformity analysis, where the ROI emissions are 0.3 percent for CO and 1.4 percent for PM_{10}. This is well below the 10 percent criteria established for conformity analysis, as described in Chapter 3. Based on the low emissions, there would be no adverse impacts from the proposed range activities for the 7SFG(A).

Table 5-12. Expected Air Quality Emissions Associated With 7SFG(A) Training

Source	Calculated Emissions (tons)					
	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_x	VOC
7SFG(A) Munitions	20.24	4.40	9.71	14.21	0.07	
7SFG(A) Vehicles	15.82	8.53	2.64	10.10	0.68	2.78
7SFG(A) Aircraft	378.28	404.73	0.00	138.72	0.00	262.63
7SFG(A) Construction	2.50	9.42	0.00	276.96	0.96	1.00
Total Emissions	**416.85**	**427.07**	**12.35**	**439.98**	**1.71**	**266.41**
ROI Total Emissions	150,219	22,909	--	30,829	4,097	23,742
% ROI Emissions	*0.3%*	*1.9%*	--	*1.4%*	*0.0%*	*1.1%*

CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter less than or equal to 2.5 microns; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_x = sulfur oxides; VOC = volatile organic compounds

5.6.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.6.2.1 Existing Conditions (Air Quality – 7SFG(A) Range Alternative 2)

The air quality existing conditions would be the same as for 7SFG(A) Range Alternative 1, since the ROI encompasses all of Eglin AFB.

5.6.2.2 Environmental Consequences (Air Quality – 7SFG(A) Range Alternative 2)

The air quality impacts would be the same as for 7SFG(A) Range Alternative 1, since the ROI encompasses all of Eglin AFB. Therefore, regardless of the location, the air quality analysis would not change. No impacts are expected from the 7SFG(A) range activities.

5.6.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.6.3.1 Existing Conditions (Air Quality – 7SFG(A) Range Alternative 3)

The existing conditions for air quality would be the same as for 7SFG(A) Range Alternative 1, since the ROI encompasses all of Eglin AFB.

5.6.3.2 Environmental Consequences (Air Quality – 7SFG(A) Range Alternative 3)

The air quality impacts would be the same as those for 7SFG(A) Range Alternative 1, since the ROI encompasses all of Eglin AFB. Location does not change the results of the analysis. No impacts are expected from 7SFG(A) range activities.

5.6.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.6.4.1 Existing Conditions (Air Quality – 7SFG(A) Range Alternative 4)

The existing conditions for air quality would be the same as for 7SFG(A) Range Alternative 1, since the ROI chosen encompasses all of Eglin AFB.

5.6.4.2 Environmental Consequences (Air Quality – 7SFG(A) Range Alternative 4)

The air quality impacts would be the same as those for 7SFG(A) Range Alternative 1, since the ROI encompasses all of Eglin AFB. Location does not change the results of the analysis. No impacts are expected from 7SFG(A) Range activities.

5.6.5 7SFG(A) Range Alternative 5: East Side Training

5.6.5.1 Existing Conditions (Air Quality – 7SFG(A) Range Alternative 5)

The existing conditions for air quality would be the same as those discussed for 7SFG(A) Range Alternative 1, since the ROI encompasses all of Eglin AFB.

5.6.5.2 Environmental Consequences (Air Quality – 7SFG(A) Range Alternative 5)

The activities and associated impacts for 7SFG(A) Range Alternative 5 are the same as those for 7SFG(A) Range Alternative 1, since the activities are the same and the ROI encompasses all of Eglin AFB. No impacts are expected from 7SFG(A) Range activities.

5.6.6 No Action Alternative

The No Action Alternative analysis included an evaluation of the emissions expected from known projects expected to occur on Eglin AFB, such as the VA CBOC and JRF. Short-term and minor increases in emissions would occur from the construction projects but are not considered adverse. The No Action Alternative analysis for air quality is detailed in Chapter 4, Section 4.7.6.

5.7 SAFETY

There are no specific aspects of the 7SFG(A) Range Alternatives that would affect safety differently among the alternatives.

5.7.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.7.1.1 Existing Conditions (Safety – 7SFG(A) Range Alternative 1)

Explosives Safety

A number of standard safety procedures exist to ensure limited public access to affected test areas during testing or training activities. These procedures require every practical effort to keep the designated areas clear of all nonparticipating vehicles and personnel. A key part of these procedures includes development of weapon safety footprints, also referred to as surface danger zones, or SDZs, by the U.S. Army. SDZs are employed for land-based training where live ordnance is used. These SDZs act as overlays that restrict activities that could normally occur within and adjacent to test or training areas. If any unauthorized personnel or vehicles are detected within the area during training, all activity is temporarily halted until the area is again cleared and secured (U.S. Air Force, 2002b).

Fire Safety

Specific procedures are implemented at Eglin AFB for minimizing the risk of fire from range operations, such as limiting or eliminating the use of pyrotechnic devices or ordnance during periods of high fire potential. When a high fire potential has been declared, the Range Control Officer (RCO) notifies scheduled range users of the hazard and resultant operational limitations. During dry periods, specific targets and ranges with a high fire risk are continuously evaluated for the safety of planned operations. In the event of a large fire on the range, the RCO closes the range and notifies all appropriate organizations (U.S. Air Force, 2002b).

Unexploded Ordnance

For the 60 years the Eglin Range has been in use, the location of impact areas and the SDZs have changed many times. Impact areas and SDZs are where ordnance might have been accidentally dropped long or short of their target or might have landed after ricocheting. In 2000, Congress dictated an inventory of land contaminated by unexploded ordnance (UXO) to gain an understanding of the UXO liability nationwide. The Eglin inventory classified 724 mi^2 as active range using two subcategories: current impact areas (50,000 acres) and historic impact areas (335,000 acres). Test areas, some cantonment areas on historic ranges (not UXO-contaminated but restricted due to the mission), and some interstitial areas are closed to the public due to high UXO risk (U.S. Air Force, 2001c).

Eglin has strict safety policies and procedures in place to minimize the risk posed by UXO to personnel. For example, areas that may contain UXO have signs posted to warn of potential danger. Also, Eglin's Outdoor Recreation Map shows areas of probable and possible UXO contamination. Public is required to observe a UXO awareness video prior to being issued a recreation permit to access the range. No injuries to the public are known to have occurred at Eglin AFB as a result of UXO (U.S. Air Force, 1998a). However, UXO could potentially pose a danger to the people involved in training as personnel must sometimes enter potentially hazardous test areas to set up targets or instrumentation in support of test or training activities. However, other controls are in place for personnel involved in range management and/or engaged in missions on the range.

96 CES/CED manages the risks posed by UXOs on the Range. Equipment such as metal detectors, robots, and protective "bomb suits" are routinely employed to find and deal with UXOs. Once a potentially dangerous item is found, 96 CES/CED determines the best way to disarm it. The item may be removed to another location for disposal or it may be destroyed in place (a small amount of plastic explosive is placed next to the item and detonated from a safe distance). 96 CES/CED will then verify that no dangerous components remain on the range.

5.7.1.2 Environmental Consequences (Safety – 7SFG(A) Range Alternative 1)

Explosives Safety

All ordnance would be handled by trained and qualified personnel in accordance with Air Force and Army explosive safety standards and detailed published technical data.

Safety footprints or SDZs would be employed for land-based training where live ordnance would be used. In the case of the proposed live-fire ranges, personnel exclusion zones and appropriate safety buffers would be developed and implemented. Standard safety procedures, such as closing range gates and blocking all passable trails, would be implemented in all cases to ensure limited public access to affected areas during training activities. As a result, no adverse impacts with regard to safety would occur.

Ground Safety

Eglin AFB would apply existing procedures for minimizing the risk of fire from range operations to the activities of the 7SFG(A); therefore, development and use of the proposed ranges would not result in heightened ground safety concerns.

Unexploded Ordnance

As the result of 60 years of use, most areas on the Eglin Range, including areas associated with the proposed ranges at Test Complex C-52 have the potential for UXO contamination. While a detailed records search of range use and potential UXO contamination on the Eglin Range has been accomplished by the U.S. Army Corps of Engineers (USACE) and a number of other studies have been completed, records of UXO contamination remain incomplete. Eglin has published a UXO Management Plan, which addresses historic use and contamination, current management practices, and future needs. A number of procedures are in place to minimize risks to Eglin personnel and members of the public who access the Eglin Range. To mitigate any potential adverse impacts from UXO, consultation and coordination with 96 CES/CED personnel would be required before beginning any activity associated with development on or use of the Eglin Range.

5.7.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.7.2.1 Existing Conditions (Safety – 7SFG(A) Range Alternative 2)

The existing conditions of environmental factors associated with safety for all 7SFG(A) Range Alternatives are the same as those described for the 7SFG(A) Range Alternative 1 (Section 5.7.1.1).

5.7.2.2 Environmental Consequences (Safety – 7SFG(A) Range Alternative 2)

The environmental consequences associated with safety for all 7SFG(A) Range Alternatives are the same as those described for the 7SFG(A) Range Alternative 1 (Section 5.7.1.2).

5.7.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.7.3.1 Existing Conditions (Safety – 7SFG(A) Range Alternative 3)

The existing conditions of environmental factors associated with safety for all 7SFG(A) Range Alternatives are the same as those described for the 7SFG(A) Range Alternative 1 (Section 5.7.1.1).

5.7.3.2 Environmental Consequences (Safety – 7SFG(A) Range Alternative 3)

The environmental consequences associated with safety for all 7SFG(A) Range Alternatives are the same as those described for the 7SFG(A) Range Alternative 1 (Section 5.7.1.2).

5.7.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.7.4.1 Existing Conditions (Safety – 7SFG(A) Range Alternative 4)

The existing conditions of environmental factors associated with safety for all 7SFG(A) Range Alternatives are the same as those described for the 7SFG(A) Range Alternative 1 (Section 5.7.1.1).

5.7.4.2 Environmental Consequences (Safety – 7SFG(A) Range Alternative 4)

The environmental consequences associated with safety for all 7SFG(A) Range Alternatives are the same as those described for the 7SFG(A) Range Alternative 1 (Section 5.7.1.2).

5.7.5 7SFG(A) Range Alternative 5: East Side Training

5.7.5.1 Existing Conditions (Safety – 7SFG(A) Range Alternative 5)

The existing conditions of environmental factors associated with safety for all 7SFG(A) Range Alternatives are the same as those described for the 7SFG(A) Range Alternative 1 (Section 5.7.1.1).

5.7.5.2 Environmental Consequences (Safety – 7SFG(A) Range Alternative 5)

The environmental consequences associated with safety for all 7SFG(A) Range Alternatives are the same as those described for the 7SFG(A) Range Alternative 1 (Section 5.7.1.2).

5.7.6 No Action Alternative

Under the No Action Alternative, Eglin AFB would continue current operations using established safety procedures. No adverse impacts with regards to safety would occur as a result of implementing the actions listed in Chapter 2 (Section 2.7, No Action Alternative).

5.8 SOLID WASTE

Solid waste would be generated from the construction and operation of Group 1 and Group 2 Range facilities. For the purpose of evaluating solid wastes generated from range construction and operations, all construction footprints remain the same for all five 7SFG(A) Range Alternatives; therefore, the same quantities of waste (debris) from construction will be generated regardless of which alternative is selected. In addition, training operations would be common to all alternatives and result in the expenditure of ordnance at 7SFG(A) facilities.

As discussed in Table 2-5 (*Estimated 7SFG(A) Ammunition Expenditure Per Range*) in Chapter 2, over 9 million rounds of ammunition and other ordnance would be expended during training operations on an annual basis. This would result in the generation of debris, primarily in the form of shell casings and expended bullets. Based upon the projected annual utilization, approximately 136 tons of metallic debris would be generated according to data obtained from the TRI-DDS database from training operations (see Table 5-16 in Section 5.9). It is anticipated that while casings from range training would be mostly recovered, bullets associated with these activities will remain on the range due to range design. This translates to approximately 39 tons of metallic lead per year remaining within the berms at range facilities. Removal of projectiles from berms at range facilities will not be conducted during the active life of the range facilities. This could result in migration of contaminants from the leaching of contaminants from the projectiles to surface and/or groundwater and surrounding soils as discussed in Section 5.10. Potential actions could be utilized to mitigate potential impacts associated with the disposal in place of projectiles include. These actions include: design of berms to limit surface water transport from range locations, an agreement between the U.S. Army and U.S. Air Force governing range management and cleanup, and monitoring of potentially affected resources (e.g., surface water,

groundwater, etc.) to determine whether the remaining projectiles were resulting in an impact to such resources.

5.8.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.8.1.1 Existing Conditions (Solid Waste – 7SFG(A) Range Alternative 1)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

5.8.1.2 Environmental Consequences (Solid Waste – 7SFG(A) Range Alternative 1)

Solid waste would be generated from range operations and from construction and land clearing associated with the development of the various ranges and support facilities necessary to fulfill the training requirements of the 7SFG(A).

7SFG(A) Range Support Activities

Support operations conducted at the various range facilities result in the generation of solid waste similar to that generated from household activities (e.g., trash, paper, plastic, cardboard). Although specific estimates for this type of waste could not be established for each range operation, it is anticipated that the volume of waste (e.g., trash) generated from support activities would not adversely increase the estimated generation rate on a per-person, per-day basis discussed for the 7SFG(A) Cantonment Alternatives in Chapter 4 (Section 4.9.1.2, Environmental Consequences).

7SFG(A) Range Operations

Range operations will result in the generation of approximately 136 tons of metallic debris annually. As previously discussed, it is anticipated that the bulk of spent casings will be collected during range training operations; however, spent projectiles will remain in place at range facilities. It is anticipated that approximately 39 tons of lead per year will remain in place at the various range facilities where small arms are utilized.

7SFG(A) Range Construction

It is anticipated that construction and demolition (C&D) wastes would be generated during the construction of the ranges and associated support facilities. These wastes would include debris not only from the construction of buildings and support facilities but from land clearing as well. Table 5-13 summarizes the training facilities and assets needed for 7SFG(A) training certifications, as well as the total SDZ and/or buffer

area, estimated construction footprint, and the total affected area for each range. The mass of debris generated was derived using generation rates provided in USEPA guidance.

In addition to construction debris, land clearing would be required in order to construct the range and required support facilities. Based upon training needs and range configuration, a total of 157.55 acres would require clearing in order to fulfill the training requirements of the 7SFG(A).

Table 5-13. 7SFG(A) Range – 7SFG(A) Training Facility/Asset Requirements

Facility Description	Identifier	Minimum Size (acres)	Estimated Construction Footprint (acres)	Total SDZ (acres)	Total affected area per range (acres)
SOF Shoot House	SOF 1	0.72	0.72[a]	2,682.48	2,682.48
SOF Sniper Range Suite	SOF 2	182.88	18.3[b]	6,413.88	6,413.95
SOF Breach Facility	SOF 3	4.00	4[a]	193.09	197.10
SOF Shotgun Range	SOF 4	13.96	1.4[b]	3,049.55	3,052.31
MK19/M203 Grenade Launcher Range	SOF 5	180.88	18.1[b]	1,034.17	1,034.18
Mortar Weapons System Range	SOF 6	2,965.25	29.7[c]	3,164.37	3,502.20
Hand Grenade Qualification Course	SOF 7	10.01	10.01[a]	45.99	45.99
Urban Assault Course	SOF 8	17.60	17.6[a]	2,737.64	2,738.59
SOF Battle Area Complex (BAX)	SOF 9	2,372.20	23.7[c]	18,886.83	18,886.83
Anti-Armor Tracking and Live Fire	SOF 10	741.31	7.4[c]	2,759.52	2,759.52
Qualification Training Range*	SOF 11	218.18	21.2[b]	4,945.49	4,945.73
SOF Light Demolition Range	SOF 12	26.93	2.7[b]	2,583.20	2,583.20
SOF 25 Meter Zero Range	SOF 13	2.72	2.72[a]	4,669.42	4,669.42
Total		**6,736.64**	**157.55**		

BAX = Battle Area Complex; SDZ = Surface Danger Zone; SOF = Special Operations Forces

* Qualification Training Range provides capability to conduct same training as Multi-Purpose Machine Gun, Modified Record Fire, and Combat Pistol Qualification at a reduced scale.

a. For close combat ranges, the construction footprint was assumed to equal the minimum range size.

b. For ranges requiring long distance targeting, the construction footprint was assumed to equal 10 percent of the minimum range size for support facilities.

c. For ranges utilizing heavy weapons or large maneuver areas, the construction footprint was assumed to be 1 percent of the minimum range size for support facilities.

Note: The Indoor Baffle Range is considered part of the cantonment and would be analyzed as such.

Land clearing activities will result in the generation of soils and vegetation mass. Based upon construction and land clearing practices, it is assumed that none of the soils and debris generated from tree removal and land clearing would require disposal in a C&D landfill. This is based upon the assumptions that soils generated from grubbing activities would be used as fill during the construction projects and woody wastes would be reused or burned in place as discussed in Chapter 3 (Section 3.9.3, Analysis Methodology, Debris from Land Clearing). The reuse or disposal in place results in

only the debris generated from construction activities (13,348 tons) requiring disposal in a C&D landfill.

The analysis estimated the amount of debris generated during construction activities for the 7SFG(A) Range Alternative 1, and compared that quantity to the average amount of C&D debris generated in Santa Rosa and Okaloosa Counties to evaluate the increase of waste expected during the construction phase. The Walton County Landfill was not included within the evaluation since wastes are only accepted from county residents. For estimating purposes, it was assumed that all C&D waste generated would be disposed in a single landfill. Percent estimates are based upon the annual quantity of project generated waste compared to the five-year county average. Construction is anticipated to commence in CY 2008 and be completed by CY 2011, which would result in the annual generation of an estimated 3,337 tons per year of debris from construction activities requiring disposal in a C&D landfill. For the landfills evaluated, the debris generated during 7SFG(A) Range construction would increase use in Okaloosa County by approximately 4 percent or by approximately 3 percent in Santa Rosa County. This estimated increase would likely be higher due to the large amount of debris taken to C&D landfills during 2004 and 2005 because of several hurricanes that artificially raised the five-year average for Okaloosa County. Based upon information from local landfill owners/operators, C&D landfills are not reaching full capacity and are not expected to be adversely impacted from slightly higher increases (Floyd, 2005; Ensor, 2005; Lingenfelter, 2005; Anderson, 2005).

5.8.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.8.2.1 Existing Conditions (Solid Waste – 7SFG(A) Range Alternative 2)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

5.8.2.2 Environmental Consequences (Solid Waste – 7SFG(A) Range Alternative 2)

Range support activities, operations, and construction activities would be the same as those discussed for 7SFG(A) Range Alternative 1 (Section 5.8.1.2); therefore, the environmental consequences associated with the implementation of 7SFG(A) Range Alternative 2 would be the same. As in Alternative 1, range operations under Alternative 2 would result in leaving spent projectiles in place where small arms are utilized.

5.8.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.8.3.1 Existing Conditions (Solid Waste – 7SFG(A) Range Alternative 3)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

5.8.3.2 Environmental Consequences (Solid Waste – 7SFG(A) Range Alternative 3)

Range support activities, operations, and construction activities under 7SFG(A) Range Alternative 3 would be the same as those discussed for 7SFG(A) Range Alternative 1 (Section 5.8.1.2); therefore, the environmental consequences associated with the implementation of 7SFG(A) Range Alternative 3 would be the same. As in Alternative 1, range operations under Alternative 2 would result in leaving spent projectiles in place where small arms are utilized.

5.8.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.8.4.1 Existing Conditions (Solid Waste – 7SFG(A) Range Alternative 4)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

5.8.4.2 Environmental Consequences (Solid Waste – 7SFG(A) Range Alternative 4)

Range support activities, operations, and construction activities under 7SFG(A) Range Alternative 4 would be the same as those discussed for 7SFG(A) Range Alternative 1 (Section 5.8.1.2); therefore, the environmental consequences associated with the implementation of 7SFG(A) Range Alternative 4 would be the same. As in Alternative 1, range operations under Alternative 4 would result in leaving spent projectiles in place where small arms are utilized.

5.8.5 7SFG(A) Range Alternative 5: East Side Training

5.8.5.1 Existing Conditions (Solid Waste – 7SFG(A) Range Alternative 5)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

5.8.5.2 Environmental Consequences (Solid Waste – 7SFG(A) Range Alternative 5)

Range support activities, operations, and construction activities under 7SFG(A) Range Alternative 5 would be the same as those discussed for 7SFG(A) Range Alternative 1 (Section 5.8.1.2); therefore, the environmental consequences associated with the implementation of 7SFG(A) Range Alternative 2 would be the same. As in Alternative 1, range operations under Alternative 5 would result in leaving spent projectiles in place where small arms are utilized.

5.8.6 No Action Alternative

The existing conditions of solid waste resources for the No Action Alternative are described in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions). The environmental consequences for the No Action Alternative are the same as those discussed in Chapter 4 (Section 4.9.6, No Action Alternative).

5.9 HAZARDOUS MATERIALS

The quantities of munitions-related waste and Environmental Restoration Program (ERP) sites in the vicinity of Group 2 Ranges and maneuvering areas are common to all 7SFG(A) Range Alternatives. Therefore, the associated existing conditions and environmental consequences are the same across all alternatives and are only discussed in detail under 7SFG(A) Range Alternative 1.

5.9.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.9.1.1 Existing Conditions (Hazardous Materials – 7SFG(A) Range Alternative 1)

ERP Sites

The existing conditions of environmental factors associated with hazardous materials for the 7SFG(A) Range Alternative 1 include ERP sites located on the Eglin Reservation (see Chapter 3, Section 3.10.2, Region of Influence and Existing Conditions), since development of live-fire ranges or other 7SFG(A) training-related activities have the potential to impact existing ERP sites.

Group 1 Ranges

There are no ERP sites located within the vicinity of the Group 1 range locations under 7SFG(A) Range Alternative 1. The nearest ERP sites are located well outside of the SDZ footprint and over a half-mile away from any of the construction areas.

Group 2 Ranges

Group 2 Ranges will be located on TAs C-52 and C-53 with the exception of SOF-10, which will be located at TA C-72. Table 5-14 and Figure 5-18) lists ERP sites associated with 7SFG(A) Group 2 Ranges.

Table 5-14. ERP Sites Within the Footprint of the 7SFG(A) Group 2 Ranges

Site	Name	Status	Potential Impacts-Mitigations
ERP Sites			
DP-09	Mullet Creek Drum Disposal Area	LUCs are in place. LUCs require no residential development without adequate engineering control and no use of groundwater for potable purposes. Long-term monitoring is scheduled through 2024.	None expected from training activities; Site would be avoided during any construction activities.
SS-25	C-52A Herbicide Test Area	LUCs are in place. LUCs require no residential development without adequate engineering control and no use of groundwater for potable purposes. Long-term monitoring is scheduled through 2024.	None expected from training activities; Site would be avoided during any construction activities.
OT-46	C-52 Open Detonation Site	No Further Action has been approved for site.	None expected; Any construction activities on/near this site would be coordinated with the Environmental Restoration Branch.
Areas of Concern (AOCs)/Point of Interest (POI)			
AOC-71	C-52 Test Area	AOC File Closed	None expected; Coordination would be required with the Environmental Restoration Branch regarding planned activities on or near these sites.
AOC-24	C-52A Aerial Overspray Site	AOC File Closed	
AOC-93	Munitions Disposal Area	AOC File Closed	
AOC-99	C-80A Celotex Burial Site	AOC File Closed	
POI-316	C-52A N. East Rocky Creek Tributary	POI File Closed	
POI-397	Shaw Property Cattle Dip Vat	POI File Closed	
POI-402	Test Area C-80B	POI File Closed	
POI-403	Test Area C-80A	POI File Closed	

Source: U.S. Air Force, 2003b

AOC = Area of Concern; ERP = Environmental Restoration Program; LUC = Land Use Control; POI = Point of Interest

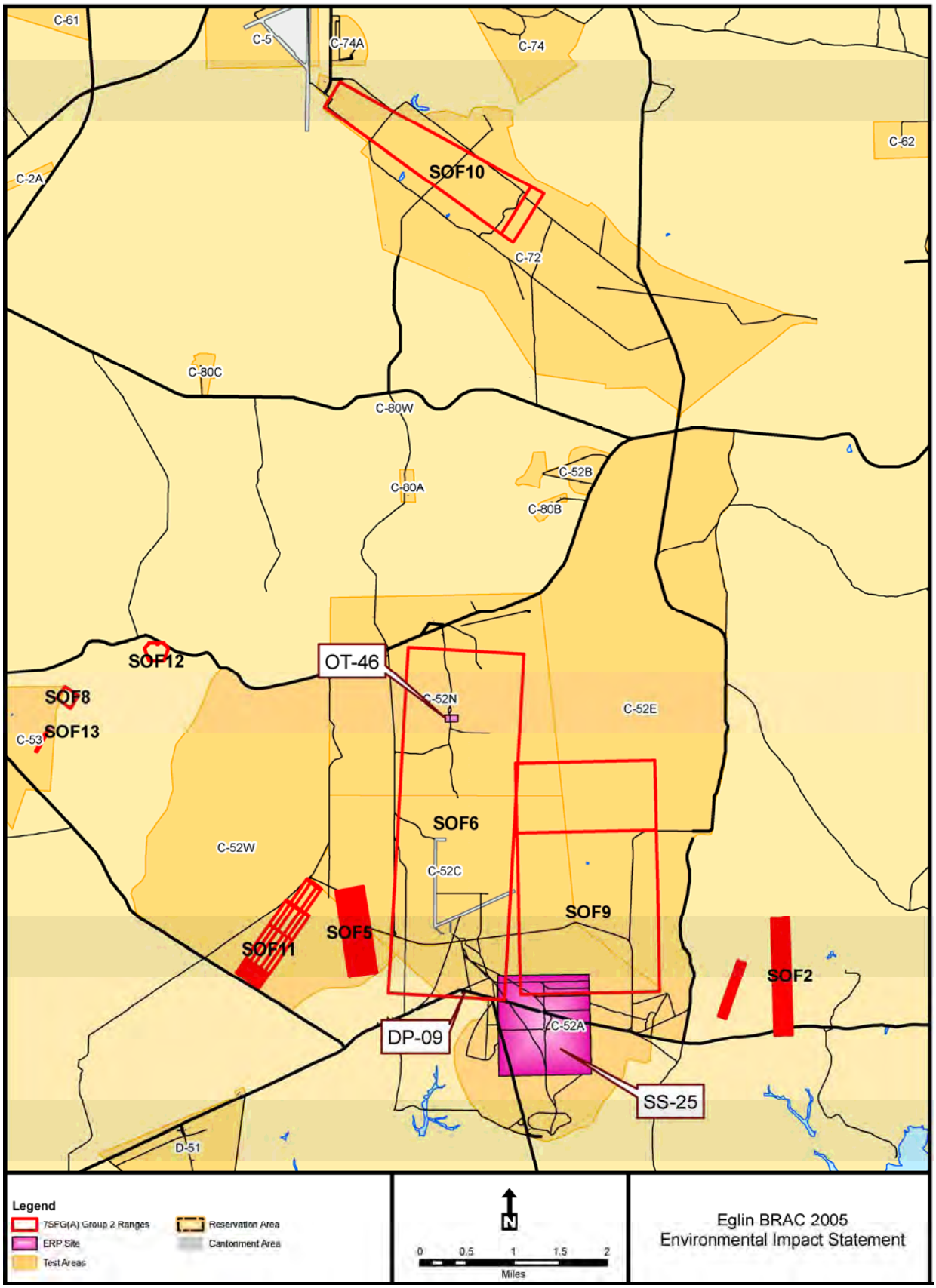

Figure 5-18. ERP Sites in the Vicinity of 7SFG(A) Group 2 Ranges

Ground Maneuvering

Ground maneuvering activities would take place throughout the Eglin Reservation. There are multiple ERP sites located within the interstitial area and on various test areas. However, only one site is located within the potential designated ground maneuvering area for the 7SFG(A), Auxiliary Field No. 2 East Disposal Area (DP-88/AOC-97). NFA has been approved for this site and the AOC file is closed (U.S. Air Force, 2007g).

Munitions-Related Residue

Eglin AFB conducts a number of training missions currently that generate munitions-related residue, or range residue. Munitions-related residue includes practice bombs; expended artillery; small arms and mortar projectiles; bombs and missiles; rockets and rocket motors; hard targets; grenades; incendiary devices; experimental items; demolition devices; berms; and any other material fired on or upon a military range (U.S. Air Force, 2001a).

The 7SFG(A) training ranges will include multiple live fire ranges. The expenditure of live ammunition or detonations has the potential to release hazardous chemicals or other elements, such as heavy metals, into the environment. The existing condition is considered to be the baseline levels released into the environment from current training and testing missions on Eglin AFB (Table 5-15).

Table 5-15. Eglin AFB Baseline Munitions-Related Residue

Chemical	2005 Quantity at Eglin AFB (Baseline) (pounds)*
Antimony	251
Arsenic	1
Chromium	199
Copper	**103,154**
Lead	**14,418**
Manganese	1,195
Nickel	94

* Source: DoD, 2006.
Quantities highlighted and **bold** exceeded, or would exceed, the applicable Toxic Release Inventory reporting threshold.

5.9.1.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Range Alternative 1)

ERP Sites

Group 1

Because there are no ERP sites located near the proposed construction areas for the Group 1 Ranges under 7SFG(A) Range Alternative 1, there are no environmental impacts expected. However, an initial consultation with the Environmental Restoration Branch regarding planned training and construction activities would still be conducted.

Group 2

No impacts to ERP sites are anticipated, although any construction activities would avoid sites DP-09 and SS-25, since Land Use Controls (LUCs) are established for these two sites. As the table indicates, the other sites located within the footprint for 7SFG(A) Range Alternative 1 are classified as requiring No Further Action (NFA). Most of these sites are Areas of Concern (AOCs) or Points of Interest (POIs). These sites are typically associated with former landfills, spill sites, disposal areas, industrial operations, and munitions testing and disposal areas. Once a site is identified as an AOC or POI, it is then investigated for actual contamination. AOCs and POIs are terms applied to sites that have been previously identified as having potential contamination based on limited historical information. Files have been closed for all AOCs and POIs in the vicinity of Group 2 Ranges.

Since NFA has been issued for these sites, there would be no impacts associated with activities on or around these sites, although initial coordination would be required with the Environmental Restoration Branch regarding planned training activities.

Ground Maneuvering

Ground movement generally occurs in small groups and the tactical standard is to ensure that sites used for bivouac are left with no sign of their use, so environmental impacts are minimized. Only temporary tent complex operations would include ground disturbance, and this would be minimal. Therefore, there is unlikely that any ERP sites would be impacted. Additionally, the Environmental Restoration Branch would be consulted regarding potential ground maneuvering activities taking place in or near ERP sites; therefore, no adverse impacts to ERP sites would occur.

Munitions-Related Residue

Munitions fragments and residues would be generated as a result of 7SFG(A) training missions. Ordnance, such as gun-fired ammunition, grenades, and simulators, are proposed to be used as part of the 7SFG(A) range training. Table 5-16 compares the

quantity of metallic residue generated from proposed 7SFG(A) munitions training activities to quantities generated at Eglin AFB during 2005.

Table 5-16. Munitions-Related Residue from 7SFG(A) Proposed Training

Chemical	Estimated Quantity from Training (pounds)*	2005 Quantity at Eglin AFB (Baseline) (pounds)*	Total Estimated Quantity (pounds)	Estimated Increase from Baseline (%)	New EPCRA TRI Reporting Required
Antimony	1,431	251	1,682	570	No
Arsenic	2	1	3	200	No
Chromium	248	199	447	125	No
Copper	190,459	**103,154**	293,613	185	No
Lead	78,536	**14,418**	92,954	545	No
Manganese	278	1,195	1,473	23	No
Nickel	148	94	242	157	No

* Source: DoD, 2006
EPCRA = Emergency Planning and Community Right-To-Know Act; TRI = Toxic Release Inventory
Quantities highlighted and **bold** exceeded, or would exceed, the applicable TRI reporting threshold.

As the table indicates, metallic releases would be expected to increase, especially in the case of antimony, copper and lead. The public may perceive the increase in the quantity of chemicals released, compared to baseline quantities, as an adverse impact from hazardous materials.

Standard procedures require that ejected casings from gun-fired ammunition be recovered for recycling during training. Large metallic residue resulting from the use of practice grenades or other ordnance could also be removed from test areas on a scheduled basis. Potential impacts associated with smaller debris (including lead bullets) could be minimized by implementation of proactive range sustainability practices and procedures. These could include the use of bullet traps to recover and properly dispose of expended lead. Section 5.10.1.2 presents additional range sustainability methods. Potential impacts of metallic releases on specific media (i.e., soil, water) are discussed in each of those respective sections in Section 5.10, Physical Resources.

5.9.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.9.2.1 Existing Conditions (Hazardous Materials – 7SFG(A) Range Alternative 2)

Group 1 Ranges would be located near TAs C-2 and C-2A. There are no ERP sites in proximity to this area that could potentially be affected by training or construction activities.

5.9.2.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Range Alternative 2)

No adverse impacts are anticipated, since there are no ERP sites in the vicinity of the proposed construction sites for Group 1 Ranges under 7SFG(A) Range Alternative 2. However, the Environmental Restoration Branch would be contacted prior to beginning construction or training activities.

5.9.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.9.3.1 Existing Conditions (Hazardous Materials – 7SFG(A) Range Alternative 3)

Under 7SFG(A) Range Alternative 3, the Group 1 Ranges would be placed on the west side of the range, east of Camp Rudder. No ERP sites are located in the surrounding area.

5.9.3.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Range Alternative 3)

There would be no anticipated impacts to ERP sites due to construction of the Group 1 Ranges on the west side of the range in accordance with 7SFG(A) Range Alternative 3, because there are no ERP sites in the vicinity. Nevertheless, the Environmental Restoration Branch would be consulted concerning planned construction and training.

5.9.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.9.4.1 Existing Conditions (Hazardous Materials – 7SFG(A) Range Alternative 4)

7SFG(A) Range Alternative 4 would locate Group 1 Ranges in the northeast corner of the Eglin Reservation, northeast of TA C-74. Currently no ERP sites are located in the proposed range sites or neighboring area.

5.9.4.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Range Alternative 4)

The location of the Group 1 Ranges in the northeast portion of the range as planned under 7SFG(A) Range Alternative 4 would not lead to undesirable impacts to ERP sites, since there are none located in the area. Regardless, the Environmental Restoration Branch would be consulted concerning planned construction and training.

5.9.5 7SFG(A) Range Alternative 5: East Side Training

5.9.5.1 Existing Conditions (Hazardous Materials – 7SFG(A) Range Alternative 5)

No ERP sites are located within the vicinity of the Group 1 Ranges under 7SFG(A) Range Alternative 5. All of the associated buildings would be located near C-53 and C-52W. No current or former ERP sites are located in this area.

5.9.5.2 Environmental Consequences (Hazardous Materials – 7SFG(A) Range Alternative 5)

The 7SFG(A) Range Alternative 5 would locate the training ranges in an area devoid of ERP sites. Therefore, no harmful impacts to ERP sites are expected as a result of 7SFG(A) Range Alternative 5. Still, the Environmental Restoration Branch would be consulted about possible construction or training near ERP sites.

5.9.6 No Action Alternative

Under the No Action Alternative, current operations, including munitions training activities, would continue at Eglin AFB. All construction and training activities would be coordinated with the Environmental Restoration Branch to avoid any potential impacts to ERP sites. Therefore, no adverse impacts with regard to hazardous materials would occur as a result of implementing the actions listed in Chapter 2 (Section 2.7, No Action Alternative).

5.10 PHYSICAL RESOURCES

5.10.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.10.1.1 Existing Conditions (Physical Resources – 7SFG(A) Range Alternative 1)

Group 1 Ranges

Soils

Group 1 Range areas within 7SFG(A) Range Alternative 1 consist of approximately 28 acres within the site area. Much of the locations consist of Lakeland sand (Table 5-17) (Figure 5-19).

Table 5-17. 7SFG(A) Range Alternative 1 – Group 1 Ranges Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Acreage
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	28

Surface Water

Surface waters within the 7SFG(A) Range Alternative 1, Group 1 ranges water resource study area include Turkey Creek and Rogue Creek (Figure 5-20). Rogue Creek joins Turkey Creek and flows south into Choctawhatchee Bay via Boggy Bayou.

Surface Water Quality

The 303(d) List does not list as impaired any of the surface waters within the 7SFG(A) Range Alternative 1, Group 1 ranges water resource study area (FDEP, 2006c).

Wetlands and Floodplains

Wetlands and floodplains within the 7SFG(A) Range Alternative 1, Group 1 ranges water resource study area cover approximately 491 (6.9 percent) and 599 (8.4 percent) acres, respectively, of the 7,125 acre study area (Figure 5-20 and Table 5-18). These wetland and floodplain areas are associated with Turkey Creek and Rogue Creek.

Table 5-18. 7SFG(A) Range Alternative 1 – Total Acreages for Wetlands and Floodplains Group 1 Ranges Water Resource Study Area

Resource	Acreage	Percent of Total Study Area (%)
Wetlands Area		
Palustrine	483	6.8
Riverine	8	0.1
Total Wetlands	*491*	*6.9*
FEMA Flood Zone	599	8.4

FEMA = Federal Emergency Management Agency

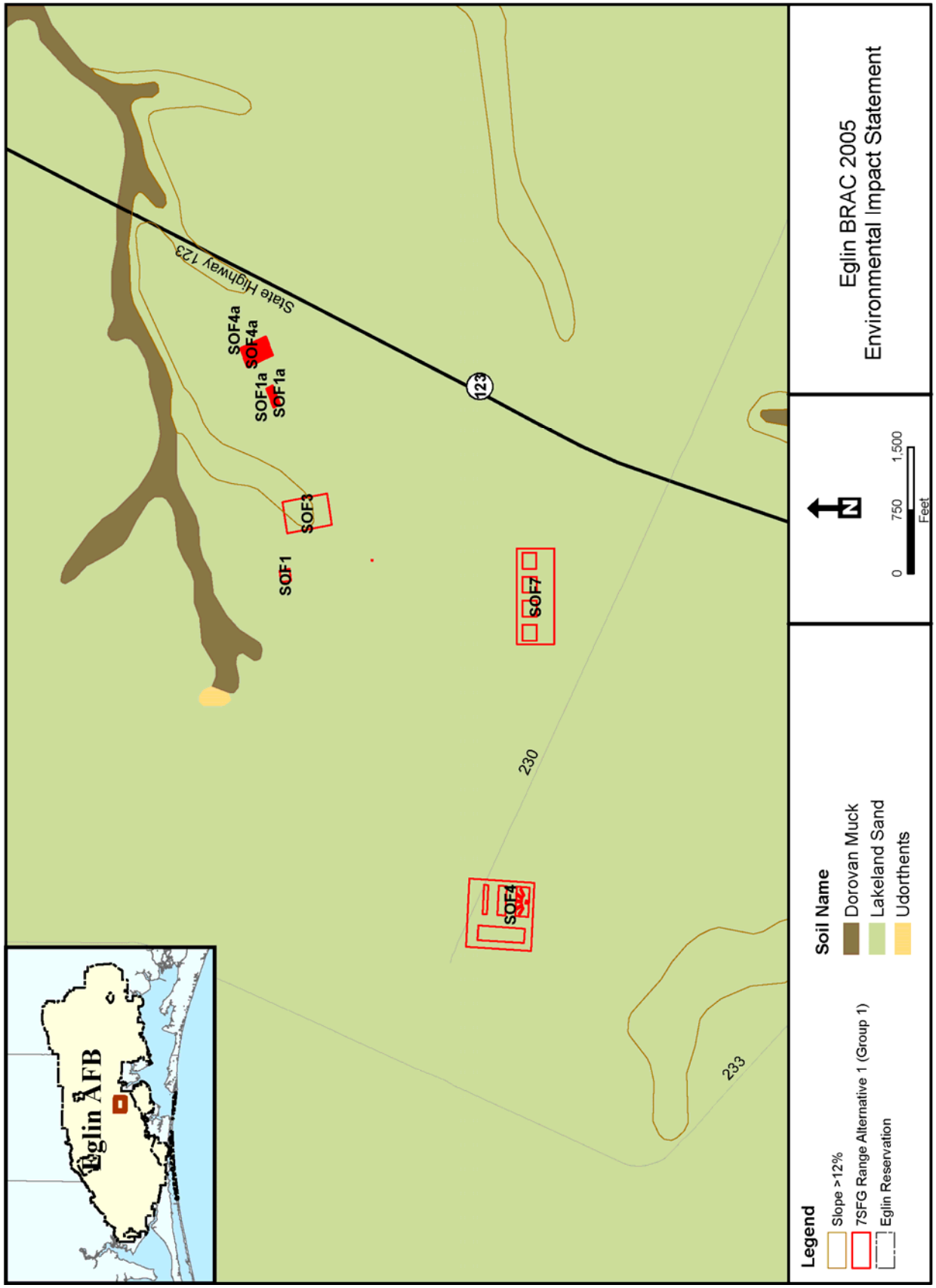

Figure 5-19. 7SFG(A) Range Alternative 1 – Group 1 Range Soils

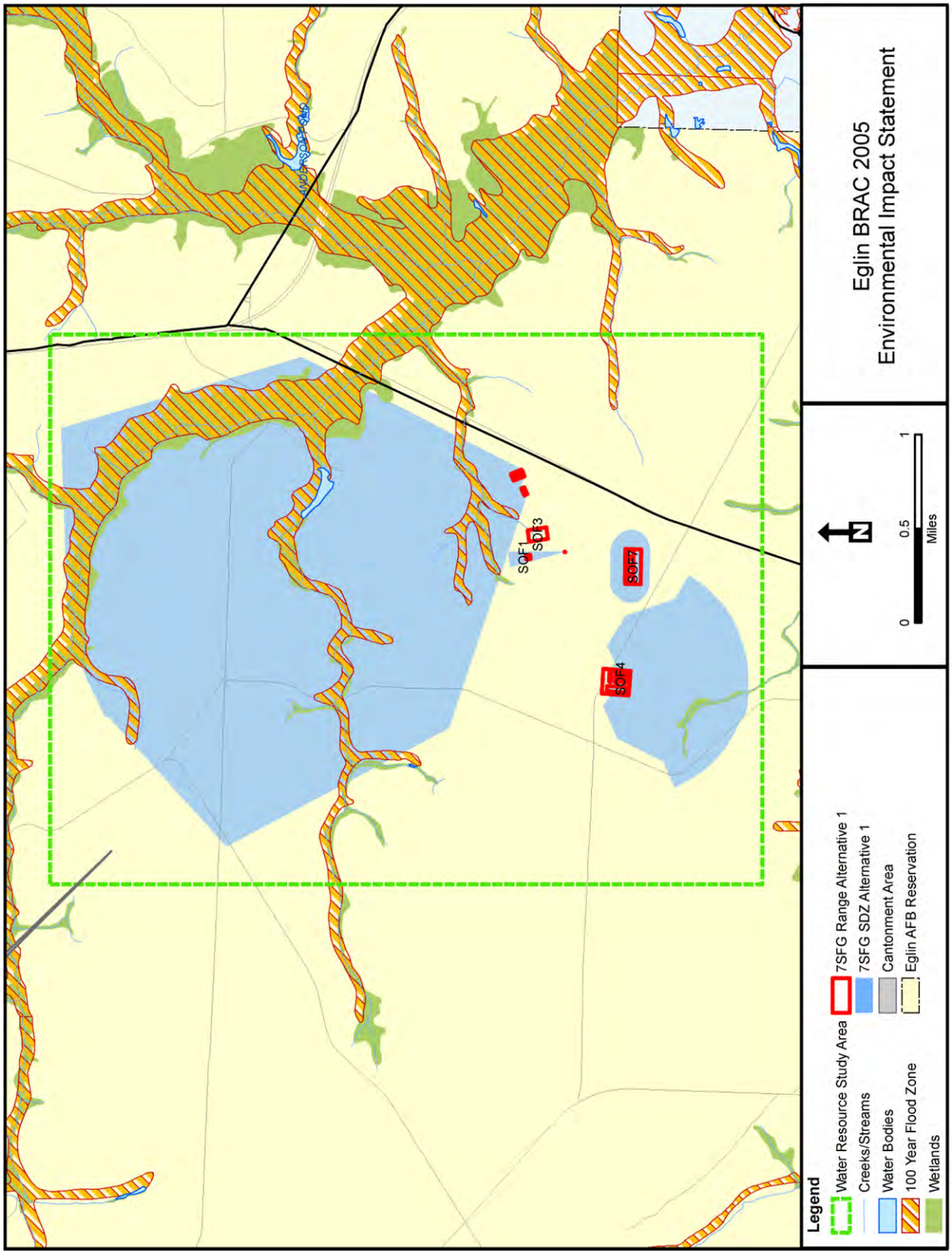

Figure 5-20. 7SFG(A) Range Alternative 1 – Water Resources

Group 2 Ranges

Soils

The soils on TA C-52A have developed from the Citronelle Formation and alluvial material (gravel, sand, silt, and clay deposited by water) in the floodplains of Rocky Creek and lowland areas. The combined soils are called soil associations since they are groups of soil series (soils with similar profiles) with common characteristics. These soils are also associated geographically and delineated as a single map unit.

The majority of soils within the Group 2 Range areas (Table 5-19 and Figure 5-21) belong to the Lakeland Association. Primarily, these are excessively drained, brownish-yellow sands that have developed along the tops of broad ridges and slopes. Lakeland sand has sandy surface layers with sandy subsoils that are more than 80 inches deep. These soils can have slopes of 0 to 8 percent. Depth to seasonal water table is usually more than 80 inches. All Lakeland sands soil horizons or layers are fine sand with 50 to 10 percent silt, with clay in the 10 to 40 inch top sections. The combination of almost pure sand texture and very high soil infiltration, permeability, and hydrologic conductivity has created a distinctive landscape of excessively drained soils that have a high capacity to move water through the soil but limited capacity to hold water and nutrients in the soil.

Table 5-19. 7SFG(A) Range Alternative 1 – Group 2 Ranges Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Acreage
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	5,720
Troup Sand	Moderate	Dark brown, fine sand	Sandy	1
Dorovan-Pamlico Association	Slight to Moderate	Dark grey to black	Muck	298
Hurricane Sand	Slight	Dark grayish brown to pale brown	Sand	209
Chipley Sand	Slight	Yellow to yellowish brown	Sand	68
Foxworth Sand	Slight	Brown to brownish yellow	Sand	89
Rutledge Sand	Slight	Very dark grey to light brownish grey	Sandy	19
Eglin Sand	Moderate	Yellowish brown to grayish brown	Sand	291
Troup-Orangeburg Complex	Moderate	Yellowish to Dark brown, fine sand	Sandy	13

Other soils in TA C-52 are well-drained loamy sands to clay loams belonging to the Bonifay-Troup-Dothan association. These are found within the upper reaches of the streams and along the northern portion of TA C-52E. These soils have slopes of 0 to 8 percent.

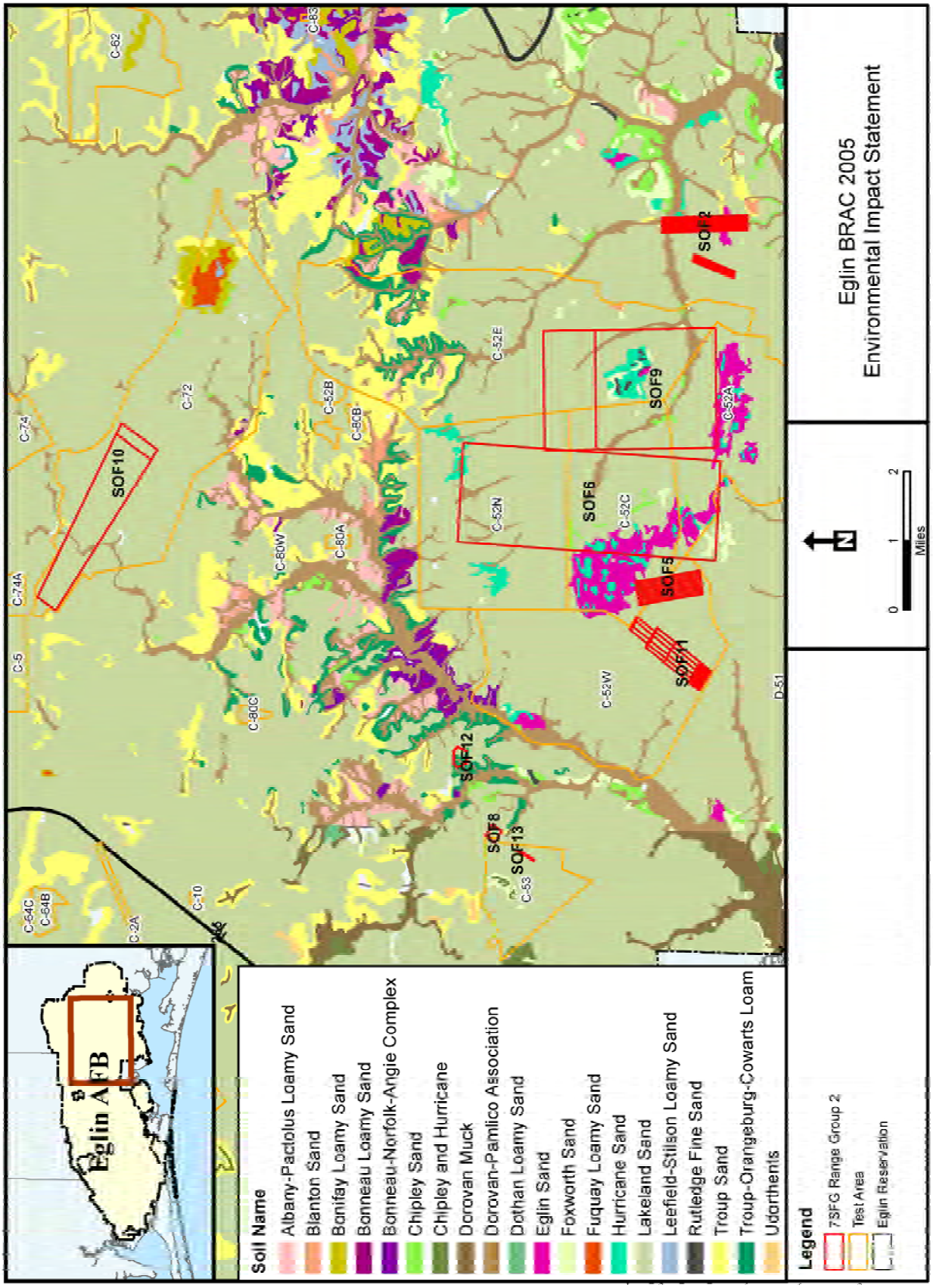

Figure 5-21. 7SFG(A) Range Alternative 1 – Group 2 Range Soils

Dorovan-Pamlico mucks are located along Rocky Creek, which flows down the western edge of TA C-52W, and the southeast corner of TA C-52E. Mucks are soils composed of more than 20 percent organic matter that is highly decomposed. They are very poorly drained and strongly acidic. Water is usually at or near the surface for nine months or more each year. About 60 percent of this association is made up of Dorovan soils, which have organic material that is more than 40 inches deep, overlying sands. The Pamlico soils make up about 25 percent and have soils that are 20 to 40 inches deep (U.S. Air Force, 2003c). Commonly referred to as Dorovan muck, this soil type and association occurs in hardwood swamps and floodplains. Since it is frequently flooded, it forms a mucky, dark grayish peat for the first 4 inches. Below that, the muck becomes almost black, to a depth of 80 inches. Natural fertility is high since the organic content is high. Typical vegetation of for this soil association is bald cypress, black gum, red maple, and water tupelo (Overing et al., 1995).

Other soils at TA C-53 and C-72 include Troup sand, which is a moderately well-drained soil that formed in sandy and loamy marine sediments. The water table for Troup sand is very low, present usually below 80 inches. However, the water table can be easily modified by season rainfall. These soils exist on nearly level to steep upland slopes and are loamy and siliceous. These sands tend to be dark brown, very granular in texture, and highly acidic (Weeks et al., 1980).

Surface Water

The TA C-52 Complex contains numerous streams that feed two different watersheds: Rocky Creek and Basin Creek (Table 5-20 and Figure 5-22). The streams are classified as seepage streams with the flow remaining fairly constant year-round. The streams in the central and eastern portions of TA C-52 flow into Basin Creek, which empties into Basin Bayou. The streams along the northern boundary and in the western portion of TA C-52 are part of the Rocky Creek watershed, which drains into Rocky Bayou. Basin Bayou and Rocky Bayou flow into Choctawhatchee Bay. Mullet Creek and Trout Creek flow south from TA C-52A and drain directly into Choctawhatchee Bay (U.S. Air Force, 2005f).

Table 5-20. Surface Streams Found Within the Group 2 Range Study Area

Test Area	Stream(s)	Watershed
C-52A	Mullet Creek and Trout Creek	Choctawhatchee Bay
C-52B	None	Basin Creek
C-52C	Basin Creek	Basin Creek
C-52N	Bay Branch, Coonfield Branch, and Middle Creek	Basin Creek
C-52E	Hogpen Branch, Pochanee Branch, Bear Creek, Watering Creek	Basin Creek
C-52W	Rocky Creek, Hickory Branch Creek, Schoolhouse Branch Creek, Cedar Head Branch, and Long Creek	Rocky Creek
C-53	Little Rocky Creek, Long Creek, and Smith Branch	Choctawhatchee Bay
C-72	Rocky Creek, Open Branch, East Rocky Creek, and Long Branch	Choctawhatchee Bay

Source: U.S. Air Force, 2005c

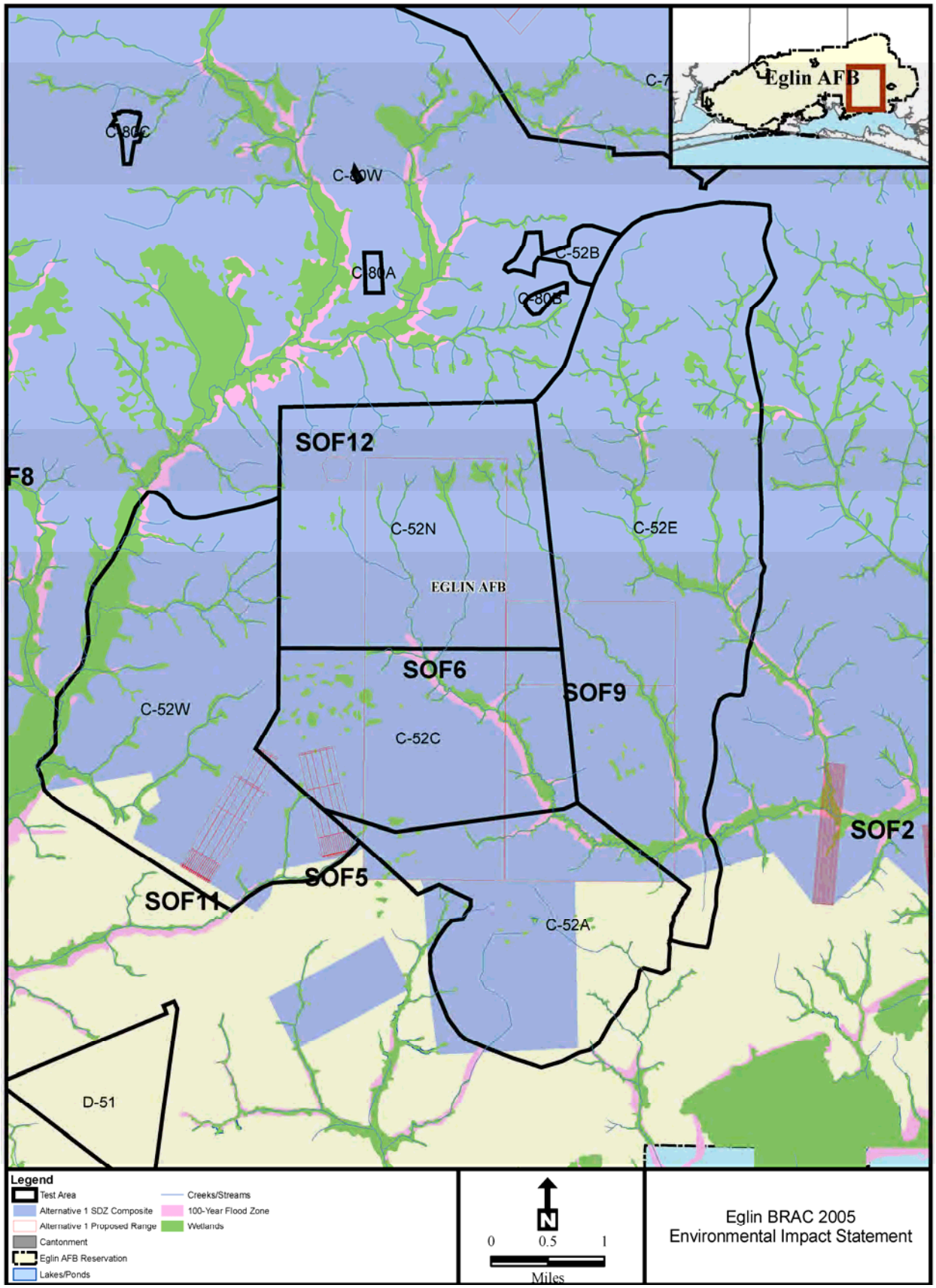

Figure 5-22. 7SFG(A) Range – Water Resources in the Vicinity of Test Area C-52

Numerous small, seasonally wet ponds are scattered throughout the TA C-52 Complex. Generally, these ponds exist only during spring and winter, which are the wet seasons. Additionally, several seepage slopes are located in the northern portion of TA C-52E, and along tributaries to Rocky Creek north of TA C-52N. Seepage slopes are wetlands located at the base of a slope where moisture is maintained by the down slope seepage of water. Soils remain saturated, but rarely have standing water (U.S. Air Force, 2005e).

All surface waters within TA C-53 (Figure 5-23) and TA C-72 (Figure 5-24) are located in the Choctawhatchee Bay Basin and flow south into Choctawhatchee Bay (U.S. Air Force, 2003c).

Surface Water Quality

According to the FDEP 2006 Florida Water Quality Assessment 305(b) Report and 303(d) List Update (FDEP, 2006f), the streams on TA C-52 were either rated as "Fully Meets Use" or there was "insufficient data" to determine the status.

The FDEP has divided the river basins across the state into groups and is currently addressing them according to an established rotation schedule. Choctawhatchee Bay Basin is included in Group 3. The 303(d) List does not list any of the surface waters at TA C-52, C-53, or C-72 as impaired (FDEP, 2006b).

Wetlands and Floodplains

In total, TA C-52 supports an average (influenced by seasonal fluctuations) of 1,441.06 acres of wetlands (Figure 5-22). These systems help to promote regional biodiversity, improve water quality, and provide floodwater storage. Table 5-21 lists quantitative data (in acres) for the land areas within the TA C-52 Complex.

Table 5-21. Land Area and Associated Wetlands and Floodplains of the Group 2 Ranges

Test Area	Total Land Area	Associated Wetlands (acres)	Wetlands to Total Land Area (%)	FEMA Flood Zone (Acres)
C-52A	2,585.6	91.18	3.55 %	65.3
C-52B	160.0	0	N/A	0
C-52C	2,470.4	171.64	6.95 %	133.0
C-52E	6,028.8	532.10	8.83 %	175.2
C-52N	3,276.8	119.97	3.66 %	6.8
C-52W	3,840.0	526.17	13.70 %	294.3
C-52 Total	**18,361.6**	**1,441.06**	**7.85 %**	**674.6**
C-53	858.0	6.74	0.8%	6.61
C-72	4,592.0	185.79	4%	19.52

Sources: U.S. Air Force, 2005d and 2005e
FEMA = Federal Emergency Management Agency; N/A = not applicable

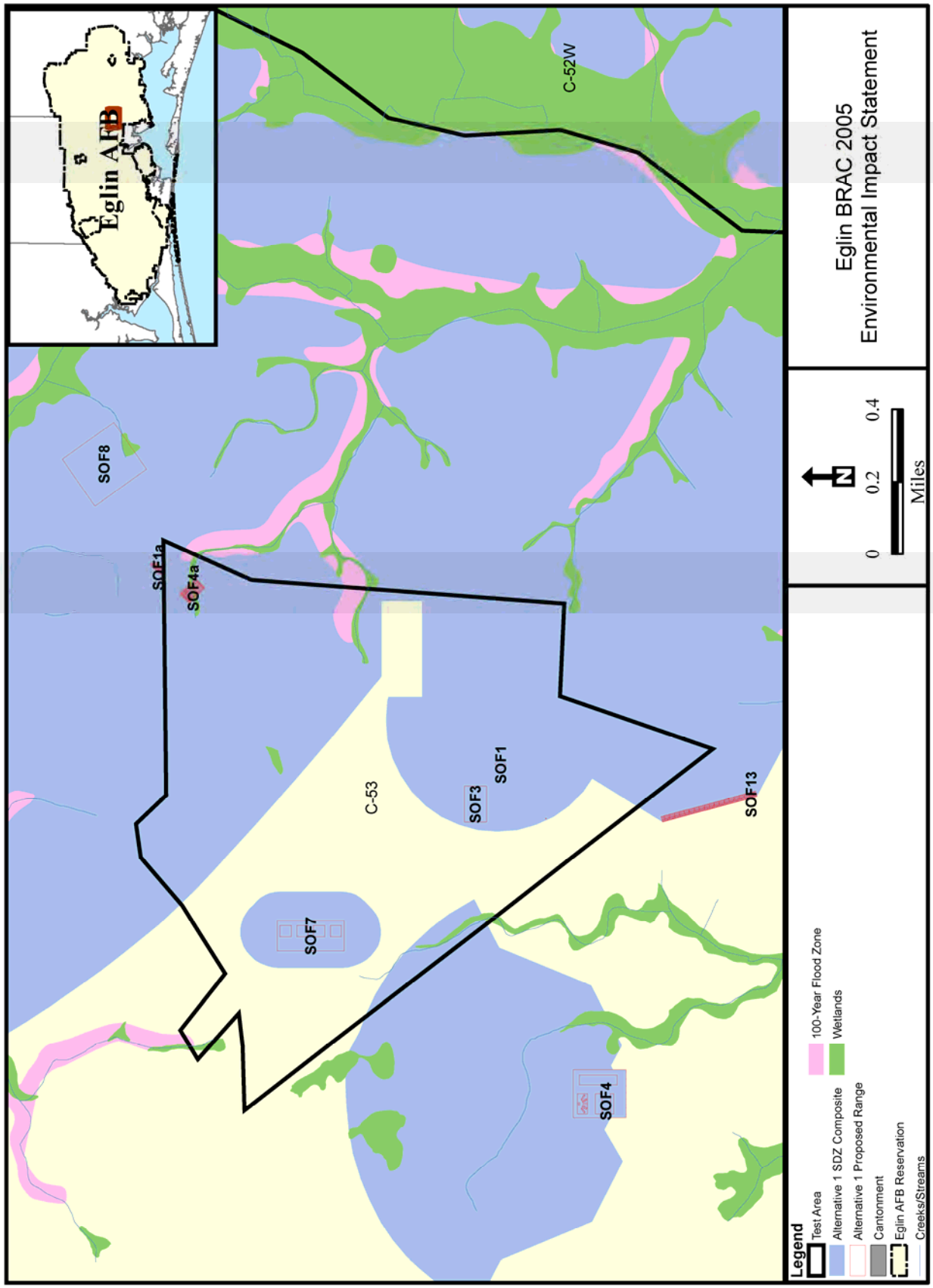

Figure 5-23. 7SFG(A) Range – Surface Waters in the Vicinity of Test Area C-53

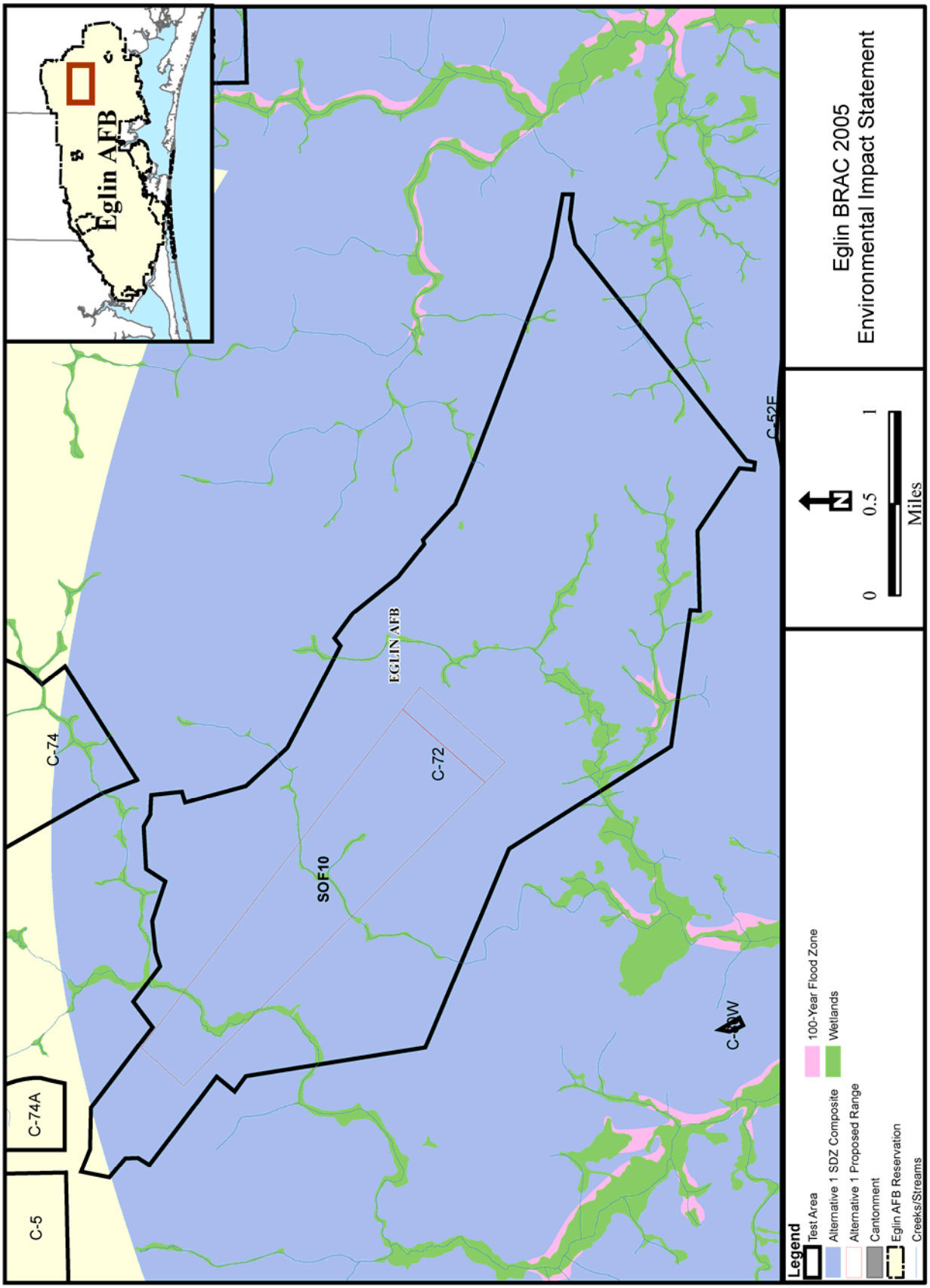

Figure 5-24. 7SFG(A) Range – Surface Waters in the Vicinity of Test Area C-72

Wetland areas occurring on TA C-52 include depression wetlands, seepage streams, and associated floodplain areas (U.S. Air Force, 1995). These depression marshes are shallow, rounded depressions that are generally small and seasonally wet. Seepage slopes (or perched) are complex hydrological systems dominated by groundwater discharge (Tiner, 1999). Typically, seepage slopes are geographically isolated and found in areas where the water table is at or near to the ground surface (U.S. Air Force, 2005d).

The floodplains on TA C-52 are associated with the many streams identified above in Table 5-20 and shown in Figure 5-22. The majority (96.3 percent or 17,687 acres) of TA C-52 is not within the 100-year flood inundation area.

TA C-53 supports wetland areas associated with Little Rocky Creek, Long Creek, and Smith Branch (Figure 5-23). The floodplains on TA C-53 are associated with Little Rocky Creek. The majority (approximately 99.2 percent) of TA C-53 is not within the 100-year flood inundation area (Figure 5-23).

TA C-72 supports wetland areas associated with Rocky Creek, East Rocky Creek, Long Branch, and Open Branch and its tributaries (Figure 5-24). The floodplains on TA C-72 are associated with Rocky Creek, Open Branch, East Rocky Creek, and Long Branch (Figure 5-24). The majority (99.6 percent) of TA C-72 is not within the 100-year flood inundation area.

Estuarine Areas

Soils

Choctawhatchee Bay was formed during the Pleistocene Era, 7,000 to 20,000 years ago, when rising sea levels inundated local river valleys (which exist today as bayous). At the time, the region was about 300 feet above sea level. As the level of the Gulf of Mexico rose, a westward littoral drift of sand created Moreno Point (now Destin), which eventually separated the Bay from the Gulf of Mexico except for a narrow passage now known as Old Pass Lagoon. Periodically, shoaling would close the pass and Choctawhatchee Bay would become a freshwater lake (Wolfe et al., 1988). The isolation from the Gulf of Mexico affected the Bay's sedimentary environment, altering biological and physical conditions. Once prolific shell-producing organisms decreased in abundance, possibly as a result of the increased entrapment of fine sediments introduced by the Choctawhatchee River, surface sediments became more acidic with a high reducing capacity (Wolfe et al., 1988).

Sediment grain size, percent silt, clay, sand, and organic content were analyzed quarterly at 47 stations in 1986 and at 26 of those same stations in April 1987

(Livingston, R. J., 1987). Bayous are characterized by relatively fine sediments with high organic content originating from urban runoff and natural freshwater sources (i.e., streams and creeks). Bay shelf-slope margins, the river mouth, and extreme western sections are characterized by coarser particles (Livingston, R. J., 1987).

An estimated 600,000 tons of sediment is deposited annually in Choctawhatchee Bay (Livingston, R. J., 1987). Depth and freshwater runoff are two factors affecting sediment distribution. Distribution in the deeper sections, which is primarily influenced by the River, follows an east-to-west gradient of coarse to fine particles. Coarser particles characterize sediments at the river mouth and around the shallow shelf areas of the Bay. Fine, silty particles are a major component of deeper water sediments and bayous, although the origins for each differ: deep-water fine sediments are primarily of river origin, while those in bayous are deposited by urban runoff (Eglin AFB, 2003b).

Water Resources

Choctawhatchee Bay and Santa Rosa Sound are adjacently located in the northwest Florida panhandle. The Bay is located within Okaloosa and Walton counties and is bordered by the Choctawhatchee River and forestland on the east and northeast and by urbanized areas on the west and northwest. The Sound is located in Okaloosa and Santa Rosa counties. The Bay is supplied with freshwater by the Choctawhatchee River, the fourth largest river (in terms of flow) in the state. The surrounding basin drains an area of more than 4,000 mi^2) and extends up into portions of Alabama. Destin, Fort Walton Beach, Eglin AFB, and Niceville-Valparaiso are all situated along the westernmost shore of the Bay. Choctawhatchee Bay is characterized by five primary hydrographical features that support distinct habitat types: bayous; western saline areas and the East Pass, which connects directly with the Gulf of Mexico, providing the primary source of saltwater; the eastern river delta, which provides the primary source of freshwater; deep central sections; and shallow shelf areas (Livingston, 1986). Resource descriptions for Choctawhatchee Bay are provided in greater detail in the Choctawhatchee Bay Resource Summary Report, a synopsis of selected research projects and data on the Bay (U.S. Air Force, 1996d).

Choctawhatchee Bay has a surface area of 129 mi^2 and is 30 miles long and 1 to 6 miles wide. The Bay basin covers 699 mi^2 (Livingston, 1986). The accompanying river drainage basin covers an area of 4,384 to 4,670 mi^2 (McNulty et al., 1972; Barnett and Teehan, 1989; Livingston, 1986). The estuarine drainage area encompasses 2,259 mi^2. Water depth averages between 10 feet in the eastern third of the Bay and 30 feet in the western portion. The deepest area, in the westernmost section of the Bay, is 43 feet (U.S. Department of Agriculture Soil Conservation Service, 1993).

Santa Rosa Sound is a narrow, brackish water lagoon that separates Santa Rosa Island (SRI) from the mainland. There are no large direct freshwater (i.e., riverine) inputs into Santa Rosa Sound, although there are some small drainages. Saltwater exchange occurs via the Choctawhatchee Bay and Pensacola Bay systems, located at either end of the 50-mile-long body of water.

Water Quality

Overall water quality in Choctawhatchee Bay is reported to be good, as defined by a FDEP water quality index (Hand et al., 1994). FDEP's Environmental Regulation Commission has classified Rocky Bayou, located in northwest Choctawhatchee Bay, as an Outstanding Florida Water (OFW) and as an Aquatic Preserve, for having exceptional recreational or ecological significance.

State waters are classified as Class I, II, III, IV, or V where Class I is potable water, Class II is for shellfish harvesting or propagation, Class III is for recreation and maintenance of a healthy fish and wildlife population, Class IV is for agricultural water, and Class V for navigation and industrial use. FDEP further regulates the harvest of shellfish from state waters by an additional classification based on the quality of water, and primarily the degree of pollution in Class II waters.

The FDEP rates water quality in the Sound as "good" with little change over the last 10 years (FDEP, 2001). Water quality around the Navarre Waste Water Treatment Plant, which discharges into the Sound west of the ROI, was deemed acceptable according to USEPA Water Quality Criteria for Class III waters, which are suitable for recreation and fishing (Butts and Ray, 1995). Most of the waters in the Sound are Class II waters, approved for shellfish harvesting (Florida Department of Agriculture, 2001).

The Sound, like other Gulf coastal waters, is susceptible to toxic dinoflagellate (a type of algae) blooms commonly known as red tide. Rapid increases in numbers of certain dinoflagellates, such as *Gymnodinium breve*, sometimes cause reddish, brownish, or yellow-green discoloration of the water. *Gymnodinium* species (sp.) produces a neurotoxin that can create respiratory discomfort for some people as the toxins in the water become airborne through wind and surf, and can cause shellfish (clams and oysters) to become inedible and result in massive fish mortalities. The blooms are naturally occurring and typically originate 40 to 80 miles offshore before moving into coastal areas. In the northern Gulf, red tides are not associated with man-made pollution (Mote Marine Laboratory, 1996).

East Bay and Blackwater Bay are part of the Pensacola Bay system, which due to decreasing water and sediment quality and loss of habitat was designated a priority Surface Water Improvement and Management water body in the 1980s (Florida Department of Natural Resources [FDNR], 1991). East Bay rated good during the 1980s and 1990s and showed a trend toward improving water quality. East Bay is a Class II water. Oysters are the only shellfish species commercially harvested from East Bay. Depending on the season, areas of East Bay are classified as Conditionally Approved or Conditionally Restricted, classifications that allow oyster harvesting with closures of oyster beds potentially occurring following pollution events such as rainfall or increased river flow.

Riverine Areas

Soils

The riverine ROI lies in the physiographic province of the Western Highlands, a subdivision of the Northern Highlands and the Gulf Coastal Lowlands. In general, the northern half of the Eglin Reservation lies in the Western Highlands and the southern half lies within the Gulf Coastal Lowlands (Eglin AFB, 2003). Soil of the Western Highlands are derived from undifferentiated sands and clays of the Citronelle Formation and are dry on the upland slopes and ridge crests and frequently wet on the downslope areas as water seeps through to form seepage slope bogs. Within the ROI, the Gulf Coastal Lowlands form an elevated sandy plateau, generally flat with many low coastal terraces.

Sediments of the East Bay and Blackwater Bay originated as a mixture of Pleistocene and Citronelle deposits and marine terrace sediments deposited during the Pleistocene epoch as a result of erosion occurring throughout the watershed (Wolfe et al., 1988). Presently, these sediments are eroding. Today, sediments primarily consist of unconsolidated sand, silts, and clays of the Coast Plain Province deposited before the last rise in sea level. Streams and wave action are the primary mechanism for sediment transport into the Pensacola Bay system to which East Bay and Blackwater Bay belong. Sediments are mainly composed of quartz, kaolinite, montmorillonite, and calcite, with finer grain sizes found in the center of the bay and coarse grain sizes along the edges of the system (Eglin AFB, 2003).

Water Resources

The Yellow River forms 38 miles of the northwest boundary of the Eglin Reservation beginning at a point 5 miles northwest of Camp Rudder and winding in a southwesterly direction until flowing into Blackwater Bay near Choctaw Field. East Bay borders approximately 1.6 miles of the Eglin Reservation's westernmost edge, and the

East Bay River forms approximately 4 miles of the southern boundary of the reservation. East Bay and Blackwater Bay are part of the larger estuarine system of Pensacola Bay.

Water Quality

Information on water quality was obtained from the Yellow River Marsh Aquatic Preserve Management Plan and from the FDEP 2006 305(b) report. In the 305(b) database, FDEP maintains water chemistry, metals analysis, and biological data on water bodies throughout the state. The Yellow River is regarded as a pristine riverine system with good water quality on an FDEP scale of good, fair, and poor, having been designated in 1979 as an OFW by the Florida state legislature (FDNR, 1991). Data from the 1990s support that water quality is generally good at stations in Blackwater Bay and Yellow River, with one historical rating of fair for mercury violations occurring at one station along the Yellow River in the 1980s (FDEP, 2001). The Yellow River is designated as a Class III water. The East Bay River rated fair in 1995 for conventional water analysis violations (dissolved oxygen and coliform bacteria) but good overall as other chemical parameters (e.g., suspended solids, nutrients, and chlorophyll) were acceptable (FDEP, 2001). East Bay River and Blackwater Bay are classified as Prohibited; oyster harvesting is not permitted in these areas due to actual or potential pollution (Florida Department of Agriculture, 2001). The reason for such restrictions is that oysters filter the surrounding waters to feed and in doing so may concentrate water pollutants in their tissues (Barnett and Teehan, 1989).

5.10.1.2 Environmental Consequences (Physical Resources – 7SFG(A) Range Alternative 1)

Soils

Under certain conditions, the interaction between stormwater runoff and the soil surface, in association with land disturbances, can create conditions prone to erosion that may result in adverse impacts to land and water resources. Soil erosion can significantly affect ecosystem health and function. Erosion can reduce land productivity, pollute waters, and degrade habitats. Human-induced soil disturbances, whether minor, transitory, or drastic, generally determine the nature of environmental effects.

Group 1 Range areas within Alternative 1 are composed of the soils listed in the above test area locations. Impacts to soils are expected since troop movements can disrupt soils stability and chemical residue from munitions can leach into local soils and sediments. Mines, rockets and grenades all have the ability to leach contaminants into soils if the expended ammunition is not retrieved.

Slopes along Turkey and Rogue Creeks do exist within the Group 1 Range area; therefore, BMPs such as hay bales, vegetation and silt fences are recommend if construction were to occur along creek bank, to reduce sediment flow into the creeks.

Any construction of firing ranges at TAs C-52, C-53, and C-72 would likely impact soils. In addition, the relocation of the Sensor Fused Weapon grid from TA C-52, and the relocation of TAs C-52W and C-52N Navy EOD activities and associated C&D have the potential to impact soils.

The dominant soil types within TAs C-52, C-53, and C-72 fall within the Lakeland Association. In terms of soil coverage under this alternative, Lakeland is followed in area by the Bonifay-Troup-Dothan association. This soil association is frequently found along streams and the northern portion of TA C-52E. These soils are rapid draining with typically 8 percent or less steep slopes. Under normal conditions typically these soils are relatively stable and not prone to erosion if covered with vegetation. Land clearing and construction would modify the terrain such that BMPs would be required to minimize potential adverse impacts from loss of soil.

Past development in various locations of Eglin AFB have likely contributed to erosion and soil loss. However, the extent to which this has occurred is difficult to determine. Implementation of Alternative 1 would involve the utilization of erosion control measures to minimize the potential for soil erosion, as well as to avoid adversely impacting water quality. No adverse impacts are anticipated to the underlying geology of the area.

Dismounted ground training operations have the potential to accelerate soil erosion, mainly through ground disturbance and damage to vegetation. Any digging or cutting of vegetation would not occur within 100 feet of water bodies or wetlands. When use of fighting holes is complete, these would be filled and covered with nearby pine straw or leaves to minimize the potential for runoff. With implementation of the above recommendations, erosion impacts from this aspect of ground operation would be minimal.

Vehicle movements and large troop movements limited to established roads would not impact soils. Off-road troop or vehicle movements do have the potential to impact soils under this alternative. To minimize the potential for impacts, off-road vehicles and large troop movements would use established roads to cross areas of sparse vegetative cover and high erosion potential areas near water bodies. When it is necessary for vehicles and troops to traverse an area within 100 feet of a water feature, efforts would be made to minimize disturbance to streamside vegetation.

The 7SFG(A) would implement the Integrated Training Area Management (ITAM) Program and rotate use of areas to allow time for plants and soils to recover from impacts. In general, areas would be scheduled for use and closure on a two-to-one use-to-recovery ratio. For example, if a training area is scheduled for two days of use, it will be closed for the following four days. By allowing time for vegetation and soils to recover, impacts from erosion would be minimized.

Over time Alternative 1 7SFG(A) range soils would contain high levels of copper and lead from small arms projectiles. The lead and copper levels expected in range soils would pose a potential ecological risk. To screen for potential environmental risks associated with copper and lead alloys from small arms ranges, the 7SFG(A) small arms range activities were compared to small arms training analyzed in the *Estuarine-Riverine Areas Programmatic Environmental Assessment, Eglin AFB* (U.S. Air Force, 2004a). Analysis in the *Estuarine-Riverine Programmatic Environmental Assessment* used Seasonal Soil Compartment (SESOIL) modeling to estimate the concentration of metals in the soil from lead-alloy projectiles at proposed small arms ranges at Eglin AFB. The SESOIL model is a one-dimensional, vertical transport, integrated screening-level soil compartment tool. The model utilizes site-specific soil, chemical, and meteorological values as input to obtain chemical concentrations. SESOIL can estimate the rate of migration of chemicals through soils and the concentration of chemicals in soil layers following instantaneous or continuous chemical loading. SESOIL modeling assumed that the constituents in the lead-alloy projectiles were immediately available (i.e., free to move through the environment) once expended. In reality, some time would pass before all lead would be available, though the weathering process would begin immediately (Hardison et al., 2004).

The criteria used to determine potential impacts indicated by modeling results were contaminant thresholds or benchmarks identified by the federal government for screening or identifying areas where the potential for contamination exists. More specifically, USEPA uses these ecological screening benchmarks to identify chemical concentrations in environmental media that are associated with a low probability of unacceptable risk to ecological receptors.

The Estuarine-Riverine small arms ranges exceeded ecological benchmarks for lead and copper in soil, based on a scenario of 855 lb of projectile expenditures within a 1-to 5-year period. Since 7SFG(A) small arms range activity exceeds that analyzed in the Estuarine-Riverine PEA by several tons and at several range locations, it is safely assumed that 7SFG(A) ranges would also exceed soil benchmarks within a 1- to 5-year period.

Water Resources

Troop movements and chemical materials from munitions would potentially affect water resources. Small arms, guns, rockets, mines, grenades, and explosives would be expended on the Group 1 and Group 2 Range areas. Ammunition expenditures are shown in Table 5-22.

Table 5-22. Ammunition Expenditures for 7SFG(A) Range Group 1 and Group 2 Range Areas

Ammunition	Group 1 Ranges	Group 2 Ranges		Maneuver Areas
		C-52/C-53	C-72	
0.45 cal	9,000	20,000	---	---
5.56 mm	1,000,000	3,966,000	---	---
7.26 mm	100,000	1,148,000	---	---
9 mm	200,000	1,900,000	---	---
12 gauge	15,000	19,000	---	---
40 mm	---	57,000	---	---
60 mm	---	8,200	---	---
81 mm	---	6,300	---	---
84 mm	---	---	400	---
0.50 cal	2,000	290,000	---	---
Mines	---	2,500	---	---
Grenades	---	8,100	---	---
Rockets	---		1,250	---
Demolition and explosive devices	976,000			
Flares	---	---	---	2,400
Simulators	---	---	---	11,400
Total*	**1,326,000**	**7,425,100**	**1,650**	**13,800**

cal = caliber; mm = millimeter
* Total excludes demolition and explosive devices.

Mission type for parts of these test areas would shift in emphasis from air to ground testing to ground troops training (shooting ranges, troop movements, ground exercises). With this change in mission type, different types of weapons and munitions would be used from what is currently employed. Unlike current missions, bombs would not be dropped as part of the proposed action.

It is assumed that this alternative does not include construction that would significantly increase the amount of impermeable surfaces or change drainage patterns. According to predevelopment plans, SOF 9 (Battle Area Complex) would have the greatest amount in impervious surfaces (1.13 acres, in the form of buildings and concrete pads) of all the proposed SOF ranges. Therefore, stormwater runoff due to the increase of impervious surfaces for the SOF ranges was analyzed using SOF 9 in order to obtain a "most conservative" scenario. Stormwater runoff was modeled using the WinTR-55 program as discussed in Chapter 4 (Section 4.11.1.2, Environmental Consequences). The same

assumptions that were used to analyze the cantonment alternatives were used to analyze SOF 9 conditions. The model determined that an increase in impervious surfaces by 1.13 acres would not increase stormwater runoff volume or velocity. Therefore, with the addition of a maximum of about 1.13 acres of impervious surfaces for any SOF range, no significant stormwater runoff is expected. Furthermore, range layouts are conceptual, and in those locations where construction appears to directly impact streams, the final surveys and design layouts will be implemented so that riparian areas will not be impacted per the Army's guidelines:

> "Terrain configuration will influence the extent of construction and the cost required to transform land into a usable range. Contour profile, soil content, and trafficability requirements affect the extent of moving and other clearing work needed. Sites requiring minimal earthwork to create level trails, visible targets, and good drainage are preferred" (U.S. Army, 2004b).

Given the attainment of permits and the implementation of site-specific management actions (detailed in Chapter 4, Section 4.11.1.2, Environmental Consequences), no adverse impacts to water quality due to range construction from Alternative 1 would be expected. Possible impacts would come from actual training operations and/or equipment movement off of paved roads and chemical materials from munitions.

Potential impacts from troop movements in wetlands and around surface waters are of concern though special forces units currently conduct training in and around wetland areas. Erosion at shoreline areas heavily used for boat landings is also of concern. Certain activities, such as digging, vehicle operation or the creation or ruts are prohibited in wetland areas on Eglin. Additionally, troops should avoid crossing through wetland or areas. Wetland areas will be identified through coordination with Eglin's Environmental Compliance Branch prior to activity implementation. If there were any doubt as to whether an area is considered a wetland, troops would move to higher ground before digging (U.S. Marine Corps, 2003). These minimization procedures will ensure that troop movement will not cause any adverse impacts to wetlands or surface waters.

Projectiles and casings are typically composed of lead, copper and zinc with lead the primary component of traditional small-arms projectiles. Over 7 million rounds would be expended on TAs C-52 and C-53. However, most lead is retained strongly in soils and only very small amounts move into surface waters (USEPA, 1986). The potential exists for lead to migrate into surface waters from erosion of soil that contains this particulate metal (Agency for Toxic Substances and Disease Registry [ATSDR], 2005) though downward migration through permeable Lakeland soils is more likely. Lead leached into groundwater may eventually reach surface waters. The risk to surface waters is assumed to be minimal if the lead source is more than 0.25 mile away (USFWS, 2008). Alternative 1 small arms ranges are located within 0.25 mile from

creeks and streams. Thus, there is a risk that lead from Alternative 1 small arms ranges would leach into groundwater and eventually reach surface waters.

Cartridge brass by composition is 70 percent copper and 30 percent zinc, and corrosion of the elements, though slow, would occur over time. In water, the primary interactions between the brass alloy and the environment would occur at the sediment-water interface, potentially affecting those organisms that live in the sediments. Soil-stabilizing vegetation around proposed training areas may limit the transport of munition components via erosion into surrounding surface waters. Copper and zinc are not expected to reach levels of concern in surface waters. Transport of corroded cartridge brass is not anticipated to impact surface water quality (U.S. Air Force, 2004g). Estimated quantities of munitions-related wastes generated by proposed 7SFG(A) training can be found in Table 5-16.

The transport of metals and explosives through the soil column depends on many physical and chemical properties of the metals, the soil, and climate. However, potential impacts to water quality could be reduced by implementation of range sustainability practices and procedures. Use of the following practices and procedures would serve to reduce the potential for runoff from munitions to impact water quality:

- Use of bullet containment methods and lead-based projectiles management.
- Proactive monitoring for potential migration of metals.
- Runoff control through the use of vegetative ground cover, mulches and compost, surface covers, and engineered runoff controls.
- Recovery of brass casings expended during training.

With the attainment of all applicable permits, the development of a mandatory comprehensive stormwater, erosion, and sedimentation control plan, and the appropriate use of the above-listed range sustainability practices and procedures, no adverse impacts to water resources would be expected. Employing the BMPs listed below and in Chapter 4 (Section 4.11.1.2, Environmental Consequences) would further decrease the likelihood of adverse impacts to water resources.

Permits

All construction activities that have the potential to impact stormwater quality or disturb more than 1 acre of land must be permitted under NPDES regulation as administered by the FDEP.

Management Actions

To minimize the potential for impacts to groundwater, wetlands floodplains, and other surface water resources in interstitial areas, the following management requirements

would be employed (in addition to those found in Chapter 4 (Section 4.11.1.2, Environmental Consequences).

- Do not extract over 500 gallons of water per day from the streams for any reason.
- Do not alter natural flow patterns of streams by diverting water, causing siltation, or damming any portion of the stream or its tributaries.
- Wheeled vehicles must keep to existing trails/roads, except for missions that have been approved for off-road vehicle use.
- Vehicles and equipment must stay a minimum of 50 meters (164 feet) from the edge of slopes leading down to streams.
- For permitted off-road vehicle use: Do not drive vehicles in or across streams except at designated crossing points.
- All trenches must be filled immediately after use.
- Tree clearing of any species is not permitted.
- Do not affect water purity either directly by releasing chemicals or metals into the streams or indirectly by releasing toxic aerosols in the vicinity of streams.

In addition, management requirements for the use of bivouac sites by large groups of personnel are as follows.

- Assure that no facilities (kitchens, latrines, showers, etc.) are located within 60 meters (200 feet) of any stream.
- Police area afterward for trash/debris.
- Collect all residues from field kitchens and truck to Eglin for proper disposal.
- Dispose of wastewater from field showers in accordance with Air Force regulation.

To further minimize the potential for impacts to groundwater, wetlands, floodplains, and other surface water resources in Range areas, the following management requirements are proposed:

- No new cleared areas (bivouac, fighting position, etc.) would be established within 100 feet of any water body, wetland, or floodplain, or on steep slopes.
- When use of fighting holes or other cleared areas is complete, they would be filled back in and covered with nearby pine straw or leaves to minimize the potential for runoff.
- No water would be withdrawn from Okaloosa darter streams.

- Debris removal and disposal of solid debris from blanks, chaff, smokes, simulators, and flares would be conducted in accordance with Eglin operating procedures.
- Disposal/discharged of hazardous materials to the ground would be prohibited.
- For permitted off-road vehicle use: Vehicles would avoid driving in wetlands, floodplains, and on steep slopes.
- Large troop movements on steep slopes and in wetlands would be minimized.
- Smokes, simulators, and flares would not be used within 100 feet for water bodies and would never be thrown directly into a water body.
- User groups would be provided basic guidance in wetland identification and be given instructions to avoid wetlands whenever possible.

BMPs

- Restrict access to wetlands by troop and vehicular traffic.
- Conduct target and ordnance debris removal and disposal of solid debris form blanks, chaff, smokes, and flares in accordance with Air Force regulations.
- Bullet containment, lead projectiles management, and lead reclamation should be employed to reduce lead concentrations.
- Release flares at altitudes that will ensure complete burnout prior to reaching the surface.
- No new cleared target areas should be established within 200 feet of water bodies.
- If any ordnance lands in wetlands or streams, they should be removed immediately.
- Vehicles should remain on roads or established tracks.

5.10.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

The location of the Group 1 Ranges is the only component of 7SFG(A) Range Alternative 2 that would differ from 7SFG(A) Range Alternative 1. Therefore, only Group 1 Ranges are discussed. Existing conditions and environmental consequences associated with the Group 2 Ranges and ground maneuvering activities would be the same as those discussed for 7SFG(A) Range Alternative 1.

5.10.2.1 Existing Conditions (Physical Resources – 7SFG(A) Range Alternative 2)

Soils

Group 1 Ranges were analyzed as a whole unit in order to analyze the potential for soil erosion. Creeks within this region consist of Blue Spring Creek, Bull Creek, Still Branch and Little Rocky Creek. Therefore, slope impacts along these waterways were also examined for sediment erosion and control needs.

Soil analyses for the Group 1 Ranges were derived by using information from the *Interstitial Area Environmental Baseline Document (EBD), Eglin Air Force Base* (U.S. Air Force, 2005c) (Figure 5-25). The majority of soils for this area are Lakeland Sand. The second most common soil for this area is Troup Sand (Table 5-23). For a description of this soil type, see Appendix G, *Physical Resources*.

Table 5-23. 7SFG(A) Range Alternative 2 – Group 1 Ranges Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Acreage
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	29
Troup Sand	Moderate	Dark brown, fine sand	Sandy	2.0

Surface Water

In order to analyze water resources, a polygon was created around the proposed Group 1 Ranges. All surface water, wetlands, and floodplain data was obtained using the area labeled "North-South Corridor Study Area" in Figure 5-26. Surface waters in and adjacent to this proposed area for Group 1 Ranges include Blue Spring Creek, Bull Creek, and Honey Creek, which flow south into Pensacola Bay, and Still Branch and Little Rocky Creek that flow south into Choctawhatchee Bay (Figure 5-26) (U.S. Air Force, 2006h).

Surface Water Quality

FDEP has divided the river basins across the state into groups and is currently addressing them according to an established rotation schedule. Pensacola Bay Basin is included in Group 4 and Choctawhatchee Bay is in Group 3. The 303(d) List does not list any of the surface waters in and around this proposed area for Group 1 Ranges as impaired (FDEP, 2006b; FDEP, 2006d).

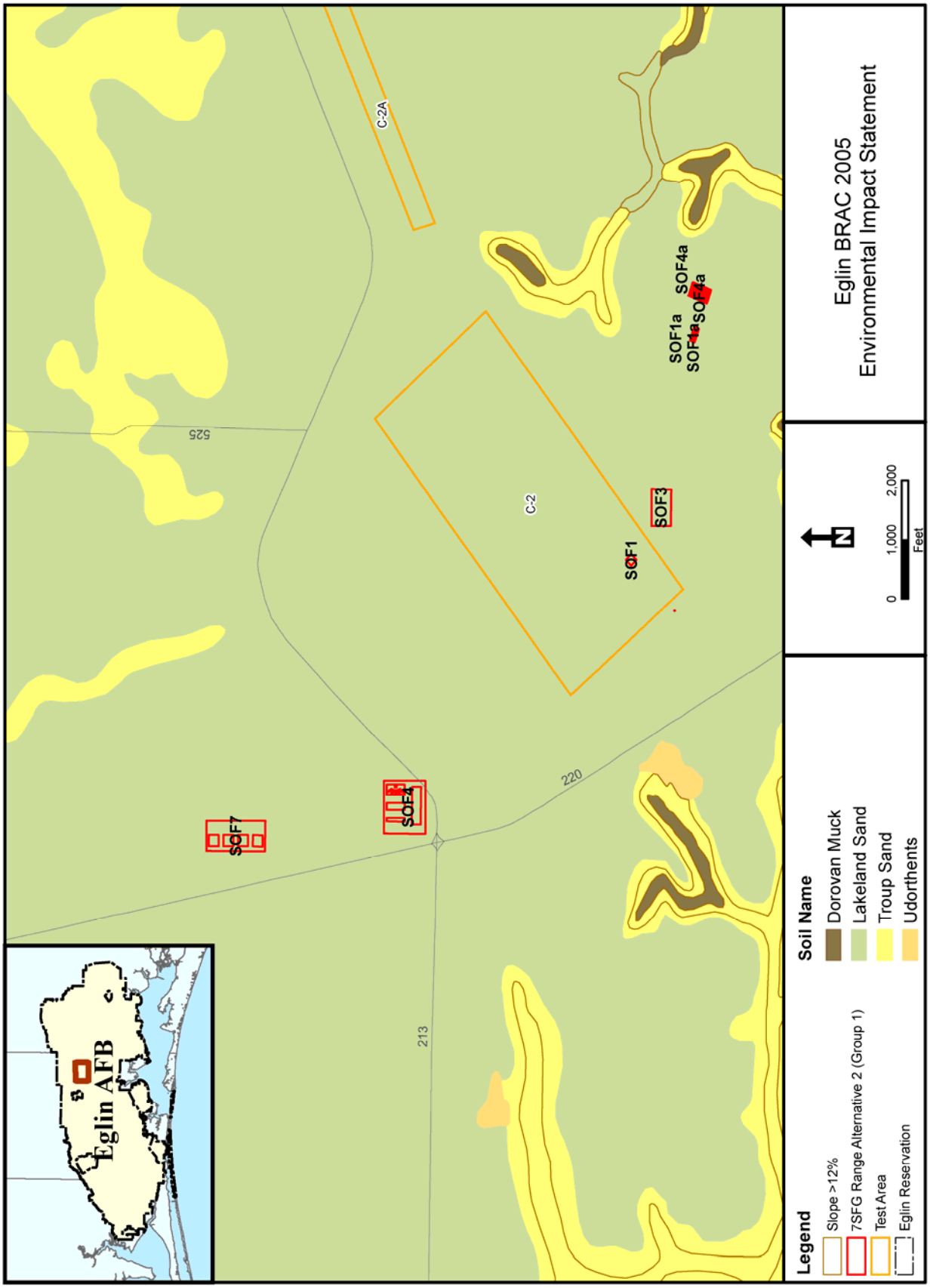

Figure 5-25. 7SFG(A) Range Alternative 2 – Group 1 Range Soils

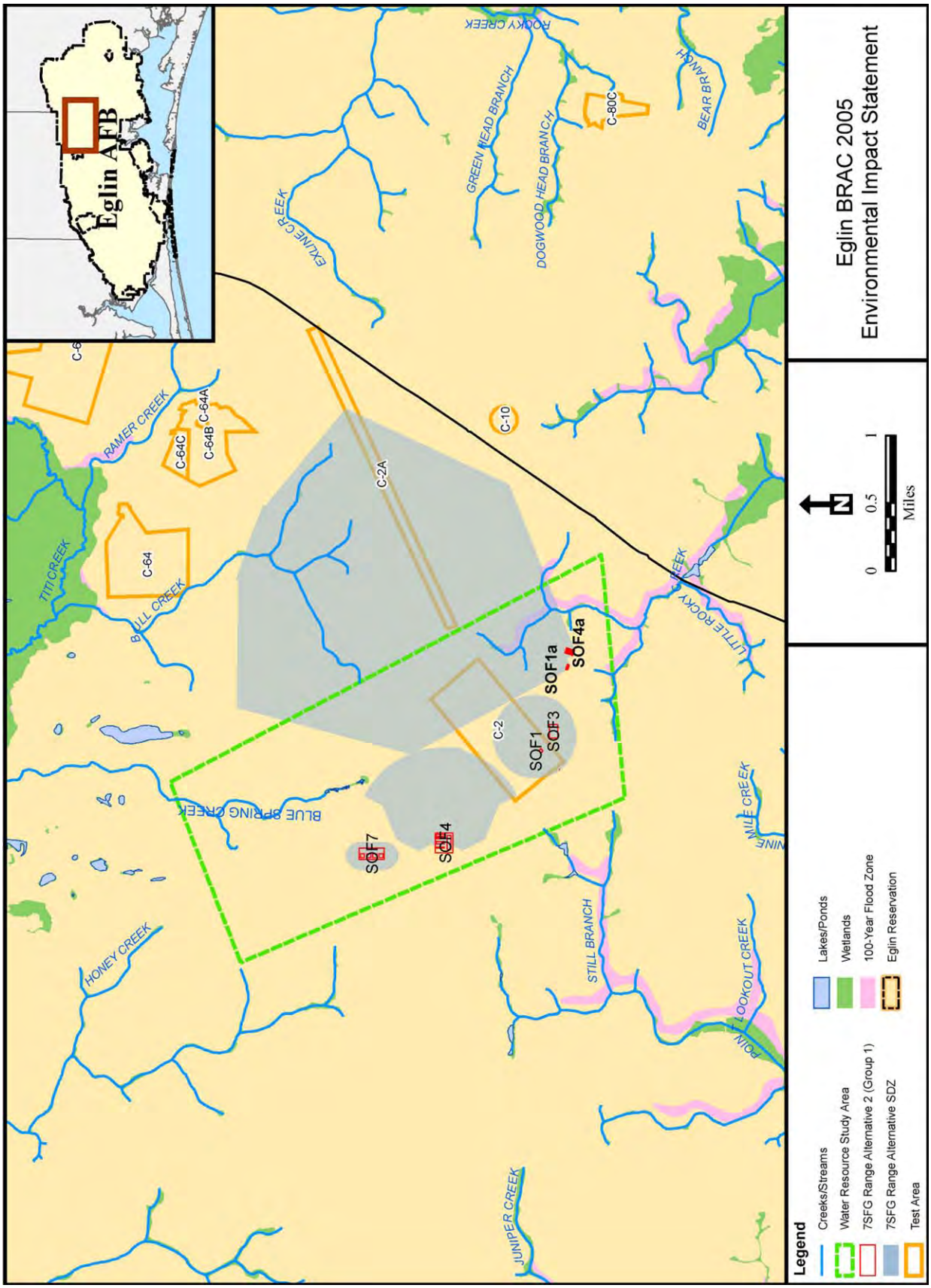

Figure 5-26. 7SFG(A) Range - Water Resources in the Vicinity of the North-South Corridor

Wetlands and Floodplains

The proposed area within the North-South Corridor Study Area supports wetland areas associated with Blue Spring Creek and Little Rocky Creek (Figure 5-26). The floodplains within the proposed area are associated with Little Rocky Creek. Table 5-24 provides the acreages for these areas. Wetlands cover about 0.7 percent of the 3,360 acres that make up the North-South Corridor Study Area surrounding the Group 1 Ranges. The majority (98.6 percent) of the study area is not within the 100-year flood inundation area.

Table 5-24. 7SFG(A) Range Alternative 2 – Total Acreages for Wetlands and Floodplains Within the Group 1 Range Study Area

Resource	Acreage	Percent of Total Study Area (%)
Wetlands Area		
Palustrine	24.5	0.7
Riverine	0	0
Total Wetlands	*24.5*	*0.7*
FEMA Flood Zone	46.1	1.4

FEMA = Federal Emergency Management Agency

5.10.2.2 Environmental Consequences (Physical Resources – 7SFG(A) Range Alternative 2)

Soils

Impacts to soils and mitigations would be the same under 7SFG(A) Range Alternative 2 as under 7SFG(A) Range Alternative 1, as the same soil types exist under both alternatives. Implementation of 7SFG(A) Range Alternative 2 would involve the utilization of erosion control measures to minimize the potential for soil erosion, as well as to avoid adversely impacting water quality. As in 7SFG(A) Range Alternative 1, potential impacts would be the result of chemical leaching into the underlying soils and sediments as well as sediment and soil runoff into existing local waterways (refer to Table 5-22 for approximate ammunition expenditures). Alternative 2 range expenditures would result in elevated levels of lead and copper in soils, likely exceeding USEPA benchmarks for identifying ecological risks.

Further soil and sediment impacts to be expected are construction of buildings for mission training exercises as well as troop movements that could include off-road maneuvers. The former and latter activities are likely to erode soil/sediment stability, especially if the site areas become cleared of vegetation. This can lead to infiltration of contaminated sediments into local waterways (see *Water Resources* subsection below). BMPs that should be heavily implemented involve the stringent use of hay bales, silt fencing, as well as vegetating barren areas around creek banks and slopes.

Water Resources

7SFG(A) Range Alternative 2 includes the use of TAs C-52, C-53, C-72 and the east side of the North-South Corridor. Activities within TAs C-52, C-53 and C-72 would stay about the same as those of 7SFG(A) Range Alternative 1. Ammunition expenditures are shown and discussed in Section 5.10.1.2, Environmental Consequences. As for 7SFG(A) Range Alternative 1, impacts to water resources would be due to troop movement and chemical materials from munitions.

As discussed for 7SFG(A) Range Alternative 1, the numbers and types of munitions used on these range areas are different than current mission utilization. It is assumed that this alternative does not include any significant construction that would increase the amount of impermeable surfaces or change drainage patterns. Construction is discussed in detail in Section 5.10.1.2. Possible impacts would come from actual training operations and/or equipment movement off of paved roads and chemical materials from munitions.

Troop movements could impact water resources in the areas where training is taking place. However, the minimization procedures given in 7SFG(A) Range Alternative 1 would ensure that troop movement would not cause any adverse impacts to wetlands or surface waters.

The potential exists for contaminants from munitions, such as lead, copper, zinc, etc., to be carried to ground and surface water. However, using the guideline of 0.25 mile separation distance between lead source and surface waters, the potential for surface water impacts from Alternative 2 is low, as there are no surface waters within this distance of the potential Group 1 range sites.

With the attainment of all applicable permits, the development of a mandatory comprehensive stormwater, erosion, and sedimentation control plan, and the use of the range sustainability practices and procedures (provided in Section 5.10.1.2), no adverse impacts to water resources are expected.

5.10.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.10.3.1 Existing Conditions (Physical Resources – 7SFG(A) Range Alternative 3)

Soils

Soil analyses for the Alternative 3 Group 1 Ranges were derived by using information from the *Interstitial Area EBD, Eglin Air Force Base* (U.S. Air Force, 2005c) (Figure 5-27).

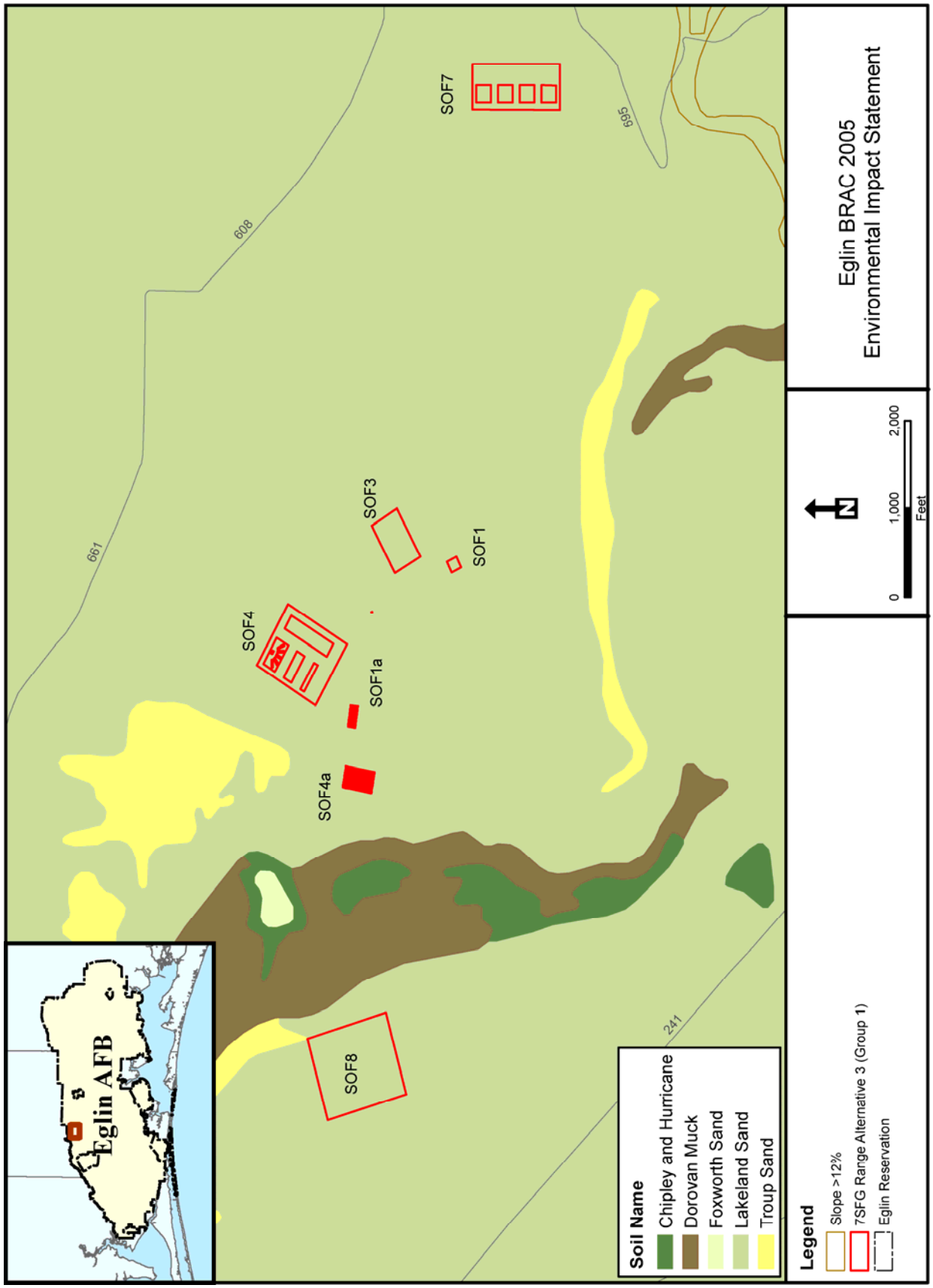

Figure 5-27. 7SFG(A) Range Alternative 3 – Group 1 Range Soils

The majority of soils for this area are Lakeland Sand. For a description of these, please see Appendix G, *Physical Resources*. The site area for 7SFG(A) Range Alternative 3 contains surfaces water such as Carr Branch, Turkey Gobbler Creek, and Middle Creek. See Table 5-25 for the total soils affected.

Table 5-25. 7SFG(A) Range Alternative 3 – Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Acreage
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	27
Bonneau-Norfolk-Angie	Low	Yellowish-brown	Clayey sediments	4.5
Troup Sand	Moderate	Dark brown, fine sand	Sandy	2.0
Dorovan-Pamlico	Low	Dark brown, organic	Clay	16

Surface Water

In order to analyze water resources, a polygon was created around the proposed Group 1 Ranges. All surface waters, wetlands, and floodplain data was obtained using the area labeled "Western Range Study Area" in Figure 5-28. Surface waters in and around this proposed area for Group 1 Ranges include Carr Spring Branch, Turkey Gobbler Creek, and Middle Creek (Figure 5-28). All of the streams in this area flow south into Pensacola Bay (U.S. Air Force, 2006h).

Surface Water Quality

The Group 4 303(d) List, which includes the Pensacola Bay Basin, does not list any of the surface waters in and around this proposed area for Group 1 Ranges as impaired (FDEP, 2006d).

Wetlands and Floodplains

The proposed area within the Group 1 Ranges supports wetland areas associated with Carr Spring Branch and Turkey Gobbler Creek and floodplain areas are associated with Turkey Gobbler Creek (Figure 5-28). Table 5-26 provides the types and acreages for theses areas. Wetlands cover about 7.1 percent of the approximately 2,739 acres that make up the Western Range Study Area. The majority (93.1 percent) of the study area is not within the 100-year flood inundation area.

Table 5-26. 7SFG(A) Range Alternative 3 – Total Acreages for Wetlands and Floodplains Within the Group 1 Ranges Study Area

Resource	Acreage	Percent of Total Study Area (%)
Wetlands Area		
Palustrine	185.6	6.8
Lacustrine	9.7	0.3
Total Wetlands	*195.3*	*7.1*
FEMA Flood Zone	188.9	6.9

FEMA = Federal Emergency Management Agency

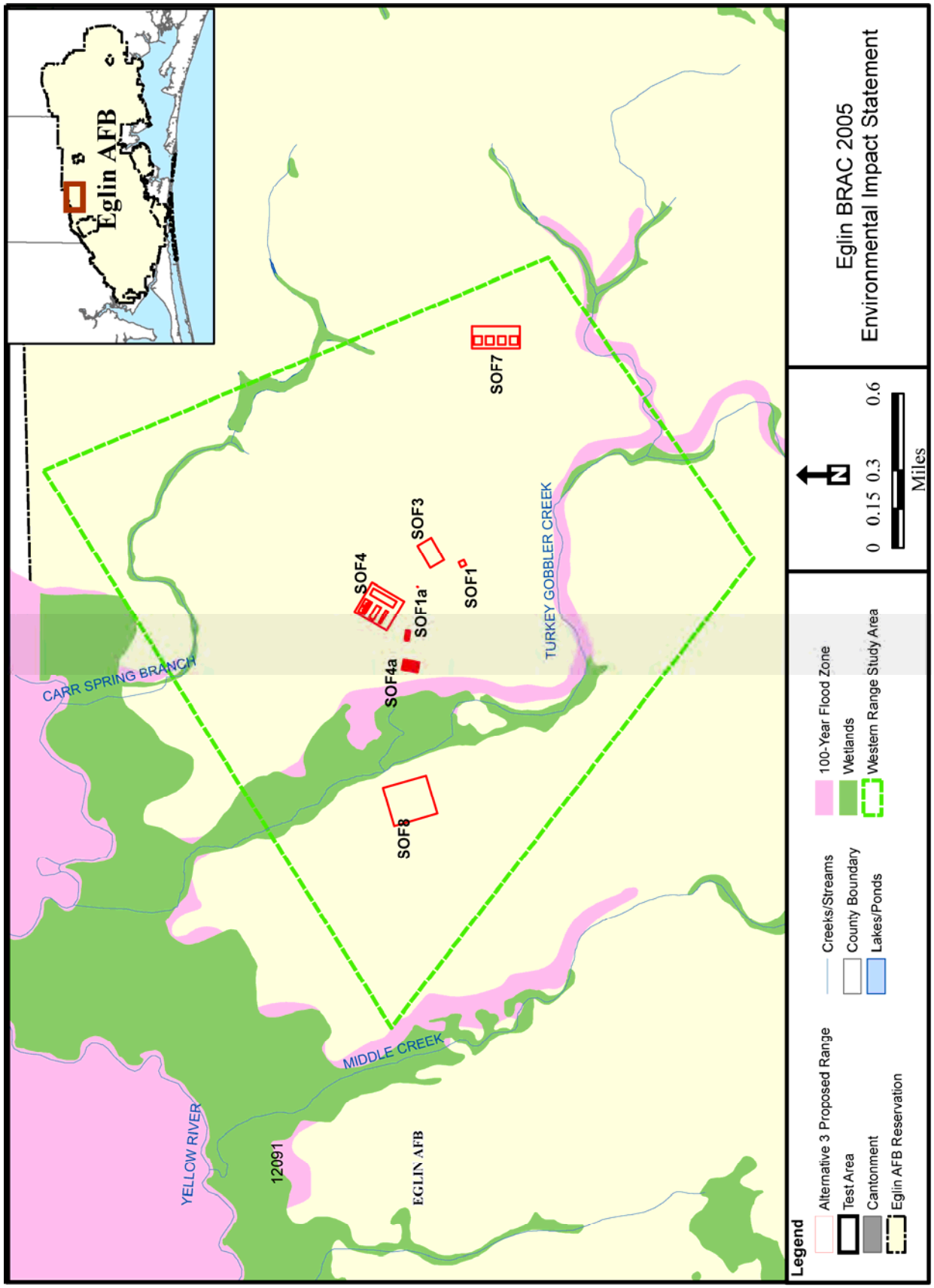

Figure 5-28. 7SFG(A) Range Alternative 3 – Surface Waters

5.10.3.2 Environmental Consequences (Physical Resources – 7SFG(A) Range Alternative 3)

Soils

Impacts to soils and mitigations could be adverse under 7SFG(A) Range Alternative 3. Soil types are limited to Lakeland Sand. The possibility of ponding exists due to slopes; thus, the implementation of BMP measures to minimize the potential for soil erosion (in this case slump and creep) is critical. However, even with proposed BMPs, soil slump and creep is likely; thus, another location for construction and the use of military maneuvers is preferred. As with Alternative 1, the amount of lead and copper expended at small arms ranges would likely exceed USEPA ecological soil benchmarks.

Water Resources

As in 7SFG(A) Range Alternatives 1 and 2, potential impacts to water resources would primarily be due to troop movement and chemical materials from munitions. Range sites SOF 1 and SOF 1a are located within 0.25 mile of a surface water. The risk of lead and copper transport is highest for these locations. Other Alternative 3 small arms ranges would be located farther than 0.25 mile from surface waters and pose minimal risk of lead or copper contamination. It is assumed that this alternative does not include any significant construction that would increase the amount of impermeable surfaces or change drainage patterns. Construction is discussed in detail in Section 5.10.1.2, Environmental Consequences.

As discussed in 7SFG(A) Range Alternatives 1 and 2, the numbers and types of munitions used on these range areas are much different than current mission utilization. The potential exists for contaminants from munitions, such as lead, copper, zinc, etc., to be carried to ground and surface water. However, potential impacts to water quality would be reduced by implementation of range sustainability practices and procedures. These procedures (found in 7SFG(A) Range Alternative 1 analysis Section 5.10.1.2) would serve to reduce the potential for runoff from munitions to impact water quality.

Troop movements could impact water resources in the areas where training is taking place. However, the minimization procedures given in 7SFG(A) Range Alternative 1 would ensure that troop movement would not cause any adverse impacts to wetlands or surface waters.

With the attainment of all applicable permits, the development of a mandatory comprehensive stormwater, erosion, and sedimentation control plan, and the use of the range sustainability practices and procedures (provided in Section 5.10.1.2), no adverse impacts to water resources are expected.

5.10.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

Surface water information for TA-52, TA-53, A-72, estuarine and riverine areas, wetland information for TA-52, TA-53, and TA-72, and floodplain information for TA-52, TA-53, and TA-72 are described in Section 5.10.1.1, Existing Conditions.

5.10.4.1 Existing Conditions (Physical Resources – 7SFG(A) Range Alternative 4)

Soils

Lakeland sand is predominant, with a small amount of Troup sand and Bonneau-Norfolk-Angie Complex (Figure 5-29). Bonneau Norfolk-Angie Complex soils occur as strongly sloping, upland soils that are moderately well drained. These soils range from loamy to sandy and contain loamy or clayey subsoil at a depth below 40 inches. The surface layer is generally 6 inches thick and yellowish-brown in color. A silty, clayey, brown loam follows the top layer to a depth of 80 inches. Natural vegetation for this soil association is loblolly pine, hickory, southern magnolia and water oak. Cultivated crops as well as pastureland are suitable uses for this soil type (Overing et al., 1995). Table 5-27 presents the total soils affected.

Table 5-27. 7SFG(A) Range Alternative 4 – Soils Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Acreage
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	19.6
Bonneau-Norfolk-Angie	Low	Yellowish-brown	Clayey sediments	4.5
Troup Sand	Moderate	Dark brown, fine sand	Sandy	4.25

Surface Water

Surface waters within the 7SFG(A) Range Alternative 4, Group 1 Ranges water resource study area include Horseshoe Branch, Cowpen Branch, Cawthan Branch, and Indigo Branch that flow into Pensacola Bay (via Titi Creek, Shoal River and Yellow River), and White Head Spring Branch, Live Oak Branch, Live Oak Head, Buck Branch, and Bullhide Creek which flow into Choctawhatchee Bay (via Alaqua Creek) (Figure 5-30).

Surface Water Quality

FDEP has divided the river basins across the state into groups and is currently addressing them according to an established rotation schedule. Pensacola Bay Basin is included in Group 4 and Choctawhatchee Bay is in Group 3. The 303(d) List does not list any of the surface waters in and around this proposed area for Group 1 Ranges as impaired (FDEP, 2006b; FDEP, 2006d).

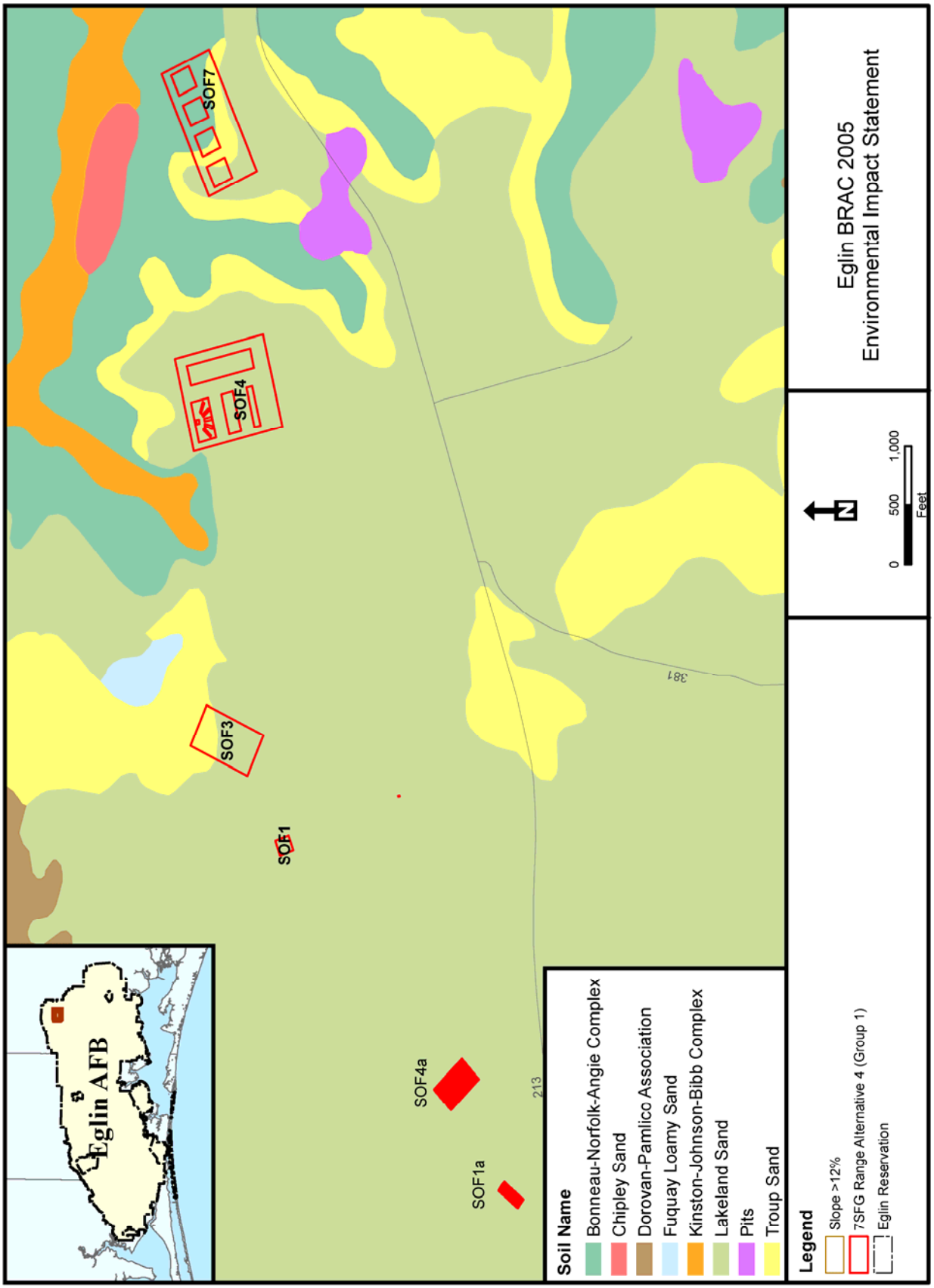

Figure 5-29. 7SFG(A) Range Alternative 4 – Group 1 Range Soils

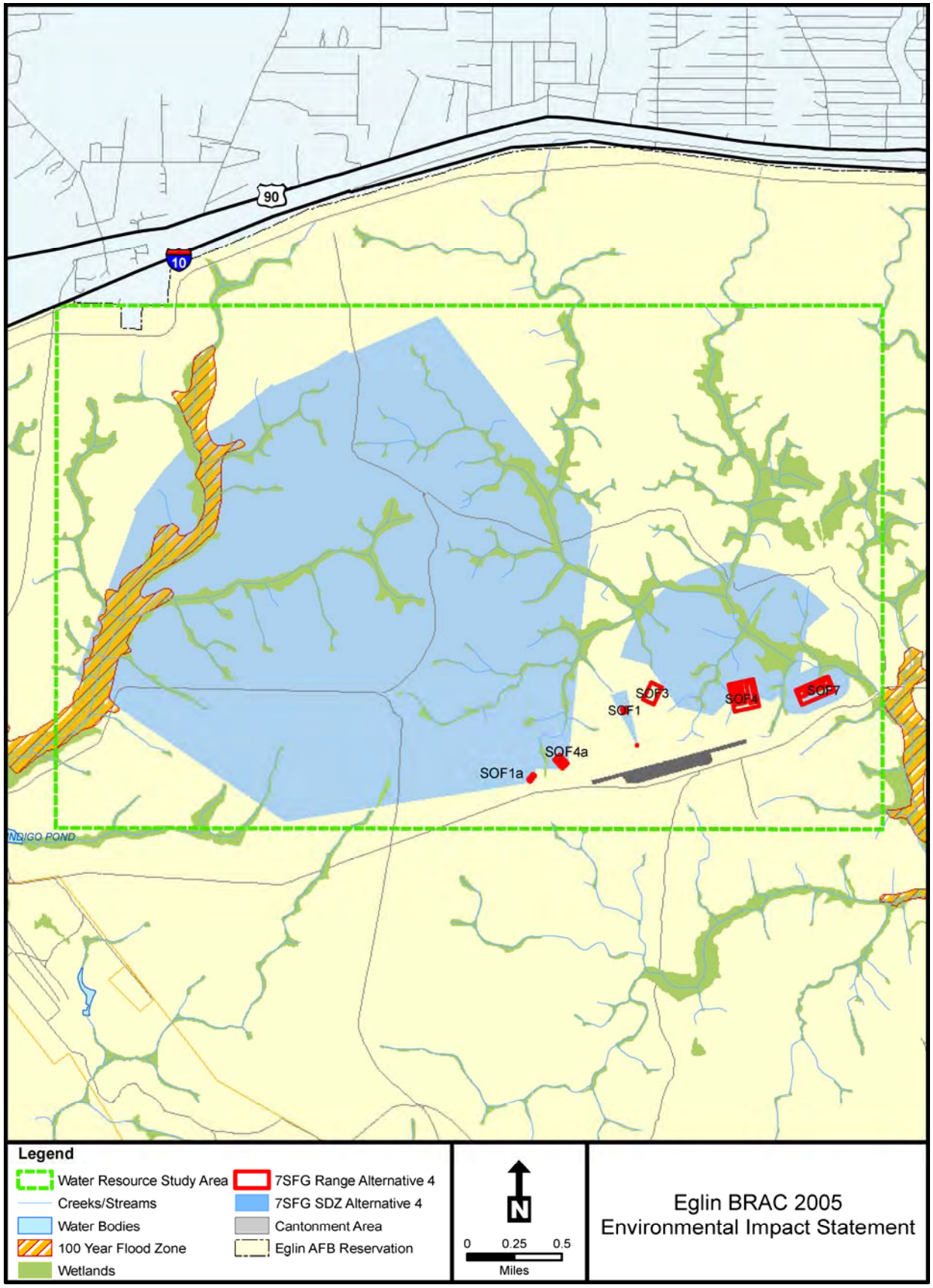

Figure 5-30. 7SFG(A) Range Alternative 4 – Water Resources

Wetlands and Floodplains

Wetlands within the 7SFG(A) Range Alternative 4, Group 1 Ranges water resource study area cover approximately 932 acres of the 7,743 acre study area (Table 5-28). Wetlands cover about 12 percent of the water resource study area and only about 599 acres (or just under 8 percent) is within the 100-year flood inundation area (Figure 5-30). These areas are associated with the surface waters discussed above.

Table 5-28. Total Acreages for Wetlands and Floodplains of the 7SFG(A) Range Alternative 4, Group 1 Ranges Water Resource Study Area

Resource	Acreage	Percent of Total Study Area (%)
Wetlands Area		
Palustrine	924	11.9
Riverine	8	0.1
Total Wetlands	*932*	*12.0*
FEMA Flood Zone	599	7.7

FEMA = Federal Emergency Management Agency

5.10.4.2 Environmental Consequences (Physical Resources – 7SFG(A) Range Alternative 4)

Soils

7SFG(A) Range Alternative 4 includes the use of TAs C-52, C-53, C-72 and the 7SFG(A) Range Alternative 4, Group 1 Range soils area. Impacts in the test areas are not adverse and are expected to be the same as those previously discussed under 7SFG(A) Range Alternative 1. As with Alternatives, 1, 2 and 3, Alternative 4 small arms range expenditures would result in elevated levels of lead and copper in range soils. These levels would likely exceed USEPA criteria for soil.

Water Resources

7SFG(A) Range Alternative 4 includes the use of TAs C-52, C-53, C-72 and the 7SFG(A) Range Alternative 4, Group 1 Range water resource study area. Activities within TAs C-52, C-53 and C-72 would stay about the same as those in 7SFG(A) Range Alternative 1. Ammunition expenditures are shown and discussed in Section 5.10.1.2, Environmental Consequences. As in 7SFG(A) Range Alternative 1, impacts to water resources would be due to troop movement and chemical materials from munitions.

As discussed in 7SFG(A) Range Alternative 1, the numbers and types of munitions used on these range areas are different than current mission utilization. It is assumed that this alternative does not include any significant construction that would increase the amount of impermeable surfaces or change drainage patterns. Construction is discussed in detail in Section 5.10.1.2. Possible impacts would come from actual

training operations and/or equipment movement off of paved roads and chemical materials from munitions.

Troop movements could impact water resources in the areas where training is taking place. However, the minimization procedures given in the 7SFG(A) Range Alternative 1 discussion would ensure that troop movement would not cause any adverse impacts to wetlands or surface waters.

As in the previous alternatives, the potential exists for contaminants from munitions, such as lead, copper, zinc, etc., to be carried to ground and surface water. Each of the Group 1 and Group 2 ranges would be located within 0.25 mile of surface water. Lead in soils would potentially leach into groundwater, eventually posing a risk to surface waters. Potential impacts to water quality from surface runoff would be reduced by implementation of range sustainability practices and procedures. These procedures (found in 7SFG(A) Range Alternative 1 analysis Section 5.10.1.2) would serve to reduce the potential for runoff from munitions to impact water quality.

With the attainment of all applicable permits, the development of a mandatory comprehensive stormwater, erosion, and sedimentation control plan, and the use of the range sustainability practices and procedures (provided in Section 5.10.1.2), no adverse impacts to water resources are expected.

5.10.5 7SFG(A) Range Alternative 5: East Side Training

5.10.5.1 Existing Conditions (Physical Resources – 7SFG(A) Range Alternative 5)

Soils

Lakeland sand is the only soil type present at the Group 1 Ranges under this alternative (Table 5-29 and Figure 5-31). The 7SFG(A) Range Alternative 5 Group 1 Ranges cover approximately 28.68 acres of Lakeland sands. Soils descriptions are discussed in detail in Appendix G, *Physical Resources*.

Table 5-29. 7SFG(A) Range Alternative 5 – Soils Type and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Acreage
Lakeland Sand Slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	28.68

Water Resources

The only named surface water within the 7SFG(A) Range Alternative 5 Group 1 Ranges study area is Long Creek (Figure 5-32). Long Creek is located in the Choctawhatchee Bay Basin and flows south into Choctawhatchee Bay (U.S. Air Force, 2003c). There are also two small, unnamed water bodies within the study area totaling less than 0.2 acre.

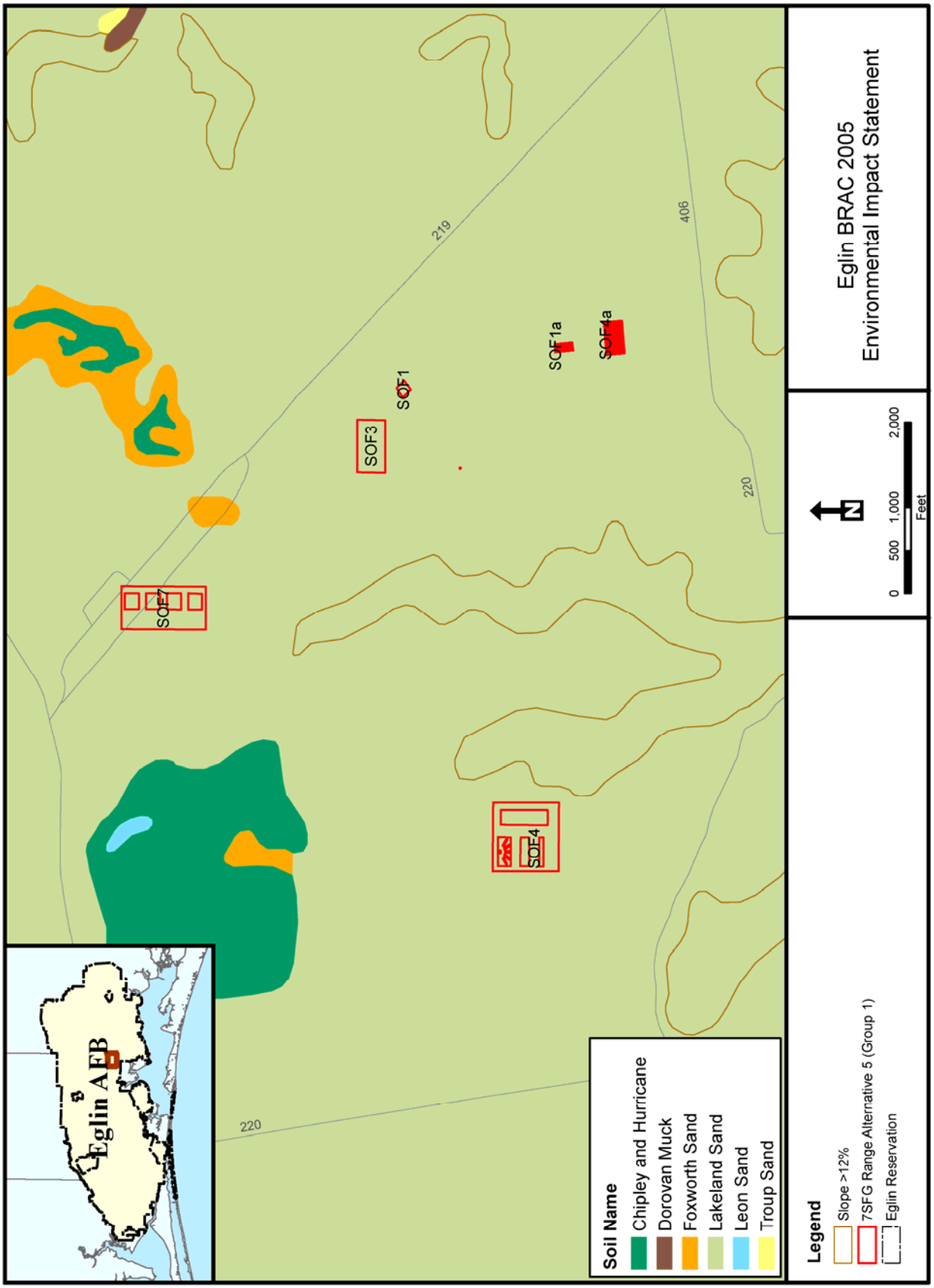

Figure 5-31. 7SFG(A) Range Alternative 5 – Range Soils

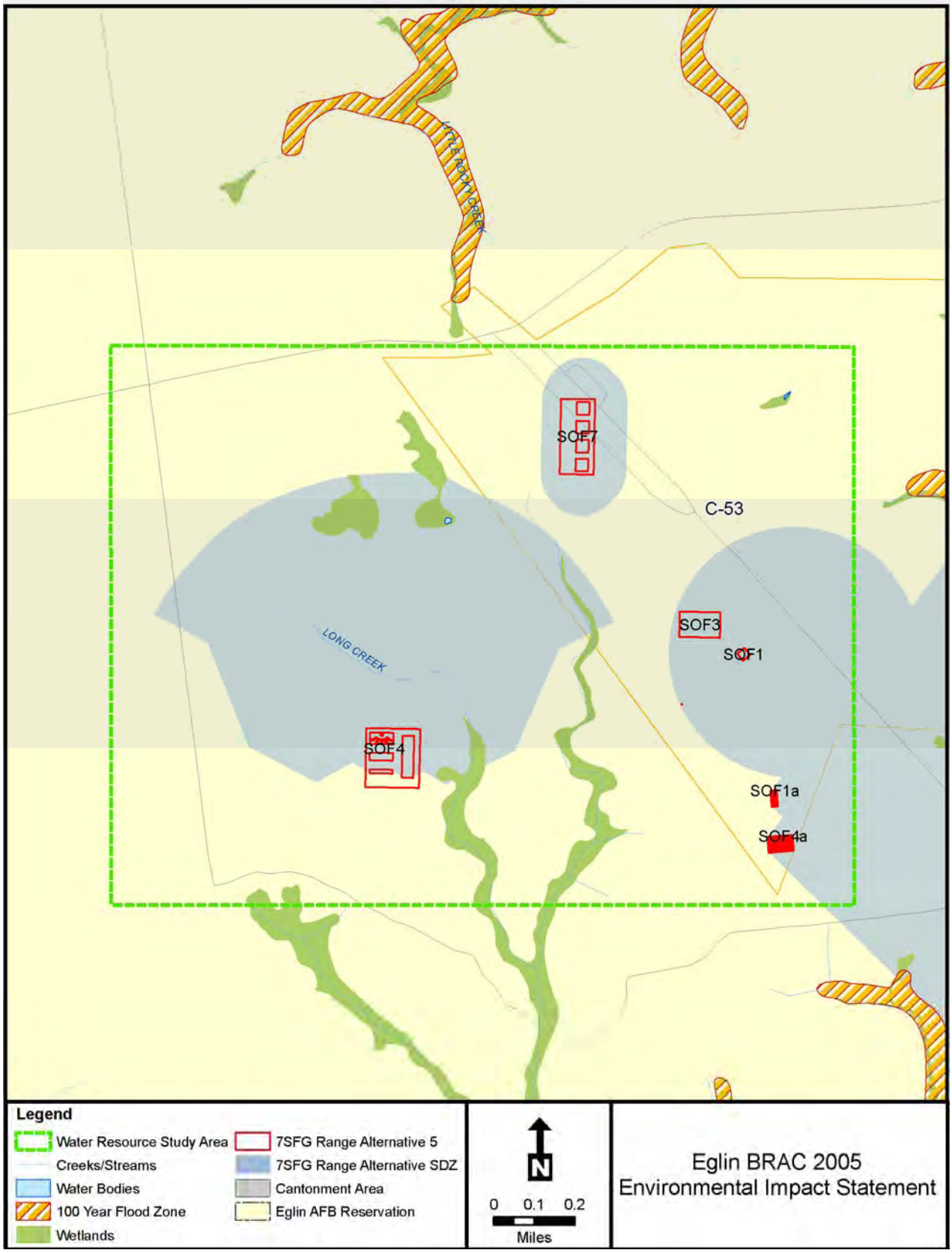

Figure 5-32. 7SFG(A) Range – Water Resources within the Alternative 5 Group 1 Range Study Area

Surface Water Quality

FDEP has divided the river basins across the state into groups and is currently addressing them according to an established rotation schedule. Choctawhatchee Bay Basin is included in Group 3. The 303(d) List does not list any of the surface waters in the vicinity of the 7SFG(A) Range Alternative 5 Group 1 Ranges as impaired (FDEP, 2006b).

Wetlands and Floodplains

Wetlands within the 7SFG(A) Range Alternative 5, Group 1 Ranges water resource study area cover approximately 246.8 acres, or about 15 percent, of the 1,649-acre study area (Figure 5-32). These palustrine wetland areas are associated with Long Creek. There are no floodplains located within the study area.

5.10.5.2 Environmental Consequences (Physical Resources – 7SFG(A) Range Alternative 5)

Soils

7SFG(A) Range Alternative 5 includes the use of the areas within and adjacent to TAs Alternative 4, Group 1 Range soils area. As with previously discussed alternatives, there is a potential for Alternative 5 to cause elevated levels of lead and copper in range soils. These metals would be available for downward vertical transport into groundwater.

Water Resources

Potential impacts to water resources under 7SFG(A) Range Alternative 5 would be similar to those discussed previously under 7SFG(A) Range Alternative 1. Training activities associated with the Group 1 Ranges would occur within or adjacent to TA C-53. All other training activities and location would be the same as those utilized under 7SFG(A) Range Alternative 1; therefore the potential impacts would be the same.

The potential exists for contaminants from munitions, such as lead, copper, zinc, etc., to be carried to ground and surface water. Small arms ranges SOF 1, SOF 1a and SOF 4 are located within 0.25 mile of surface water and therefore pose a risk of lead contamination. Beyond the distance of 0.25 mile, the risk of lead migration from groundwater into surface water is low (USFWS, 2008). Other small arms ranges would be located beyond 0.25 mile of any surface water.

Potential impacts to water quality would be reduced by implementation of range sustainability practices and procedures. These procedures (found in 7SFG(A) Range

Alternative 1 analysis Section 5.10.1.2) would serve to reduce the potential for runoff from munitions to impact water quality.

It is assumed that this alternative does not include any significant construction that would increase the amount of impermeable surfaces or change drainage patterns, as discussed in detail in Section 5.10.1.2. Potential impacts would come from actual training operations and/or equipment movement off of paved roads and chemical materials from munitions.

As in 7SFG(A) Range Alternative 1, impacts to water resources would be due to troop movement and chemical materials from munitions. Troop movements could impact water resources in the areas where training is taking place. However, the minimization procedures given in the 7SFG(A) Range Alternative 1 discussion would ensure that troop movement would not cause any adverse impacts to wetlands or surface waters.

With the attainment of all applicable permits, the development of a mandatory comprehensive stormwater, erosion, and sedimentation control plan, and the use of the range sustainability practices and procedures (provided in Section 5.10.1.2), no adverse impacts to water resources are expected to occur with the implementation of 7SFG(A) Range Alternative 5.

5.10.6 No Action Alternative

Under the No Action Alternative, no construction, land clearing, or training for the 7SFG(A) would occur on Eglin ranges. Therefore, water resources would remain as they are currently. Physical resources within the proposed 7SFG(A) project area boundaries would be unaffected under this alternative.

Soil and water resources have the potential to be impacted from other construction activities such as the VA CBOC and the JRF. These construction actions require coverage under the Generic Permit for Stormwater Discharge from Construction Activities that Disturb 1 or More Acres of Land (Rule 62-621, FAC). Both actions would be required to incorporate an SWPPP into the final design plan. Environmental analysis of these projects found no adverse impacts to soils, water resources, or water quality given the attainment of the required permits and the implementation of BMPs defined in the SWPPP (U.S. Air Force, 2005 and 2007a).

Given the assessments above, no adverse impacts to soil or water resources are anticipated under the No Action Alternative.

5.11 BIOLOGICAL RESOURCES

5.11.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.11.1.1 Existing Conditions (Biological Resources – 7SFG(A) Range Alternative 1)

This section describes the biological resources currently present within the ROI at locations that are common across all of the 7SFG(A) Range Alternatives, which involves Group 2 Ranges (SOF ranges 2, 5, 6, 8, 9, 10, 11, 12, and 13 in the TA C-52, TA C-72, and TA C-53 areas), SRI, Yellow River, East Bay River, Santa Rosa Sound, Choctawhatchee Bay, the near-shore waters of the Gulf of Mexico, and all interstitial areas on Eglin AFB. SOF 8 is considered a Group 2 Range because it is located in the same spot for Alternatives 1, 2, 4, and 5; the SOF 8 location for Alternative 3 is covered in Section 5.11.3. This section also includes the biological resources for Alternative 1 Group 1 Ranges (SOF ranges 1, 3, 4, and 7) in the area west of Hwy 123.

Flora and Fauna

All of Eglin's ecological associations are found within the ROI (Flatwoods, Wetland/Riparian, Sandhills, and Barrier Island). Open Grassland/Shrubland and Landscaped/Urban Areas also exist within the ROI (Figure 5-33 and Figure 5-34). Table 5-30 and Table 5-31 show approximate acreages of the habitats within each range. Appendix H, *Biological Resources*, provides descriptions of each ecological association along with its typical flora and fauna.

Table 5-30. 7SFG(A) Range Alternatives Drop Zones/Landing Zones (DZ/LZs) and Group 2 SOFs - Acres of Habitats

Identifier	Sandhills	Grasslands/ Shrublands	Flatwoods	Landscaped/ Urban	Wetland/ Riparian	ONA	SBS	HQNC
North DZ/LZ	366	-	-	-	15	-	-	2
South DZ/LZ	361	-	-	-	39	89	89	62
SOF 2	156	-	-	-	27	-	-	22
SOF 5	136	42	-	-	-	-	-	-
SOF 6	84	2845	9	299	28	-	-	3
SOF 8*	18	-	-	-	-	-	-	-
SOF 9	1,448	697	97	-	221	-	-	98
SOF 10	8	716	-	17	-	-	-	-

Continued on the next page…

Table 5-30. 7SFG(A) Range Alternatives Drop Zones/Landing Zones (DZ/LZs) and Group 2 SOFs - Acres of Habitats, Cont'd

Identifier	Sandhills	Grasslands/ Shrublands	Flatwoods	Landscaped/ Urban	Wetland/ Riparian	ONA	SBS	HQNC
SOF 11	219	-	-	-	-	-	-	-
SOF 12	-	26	-	-	-	-	-	6
SOF 13	3	-	-	-	-	-	-	-

*SOF 8 location for Alternatives 1, 2, 4, and 5; Alternative 3 SOF 8 habitat acreages are in Table 5-37.
DZ = Drop Zone; HQNC = High Quality Natural Community; LZ = Landing Zone; ONA = Outstanding Natural Area; SBS = Significant Botanical Site; SOF = Special Operations Forces Range

Table 5-31. 7SFG(A) Range Alternative 1 – Group 1 SOFs Acres of Habitats

Identifier	Sandhills	Wetland/ Riparian	HQNC
SOF 1	0.7	-	-
SOF 3	2	2	1
SOF 4	14	-	-
SOF 7	10	-	-

HQNC = High Quality Natural Community; SOF = Special Operations Forces Range

Invasive nonnative grasses, trees, shrubs, vines, and ferns have been documented at multiple interstitial and test area locations on Eglin AFB, primarily in areas close to an urban interface or a body of water (Eglin GIS, 2007c). Eglin has prioritized Chinese tallow, cogon grass, Japanese climbing fern, Chinese privet, and torpedo grass as the most problematic invasive nonnative species impacting Eglin ecosystems (U.S. Air Force, 2006h).

Sensitive Habitats

Sensitive habitats within or adjacent to the ROI include Significant Botanical Sites, Outstanding Natural Areas, High Quality Natural Communities, piping plover critical habitat, Aquatic Preserves, Gulf sturgeon critical habitat, and Essential Fish Habitat (EFH) (Figure 5-35, Figure 5-36, Figure 5-37, Figure 5-38, and Table 5-30).

Both DZ/LZs (drop zones/landing zones) and SOFs 2, 3, 6, 9, and 12 overlap with High Quality Natural Communities (Table 5-30). The south DZ/LZ overlaps the Piney Creek Significant Botanical Site/ Outstanding Natural Area. Appendix H, *Biological Resources*, provides additional information about these sensitive habitats.

Multiple sensitive aquatic habitats are located within the areas where water operations may occur on the Yellow River, East Bay River, East Bay, Santa Rosa Sound, Choctawhatchee Bay, and the nearshore waters of the Gulf of Mexico at SRI. These sensitive aquatic habitats include EFH, Gulf sturgeon critical habitat, and aquatic preserves (Figure 5-37). In addition, piping plover critical habitat is located on the north shore of SRI near TA A-18 (Figure 5-38).

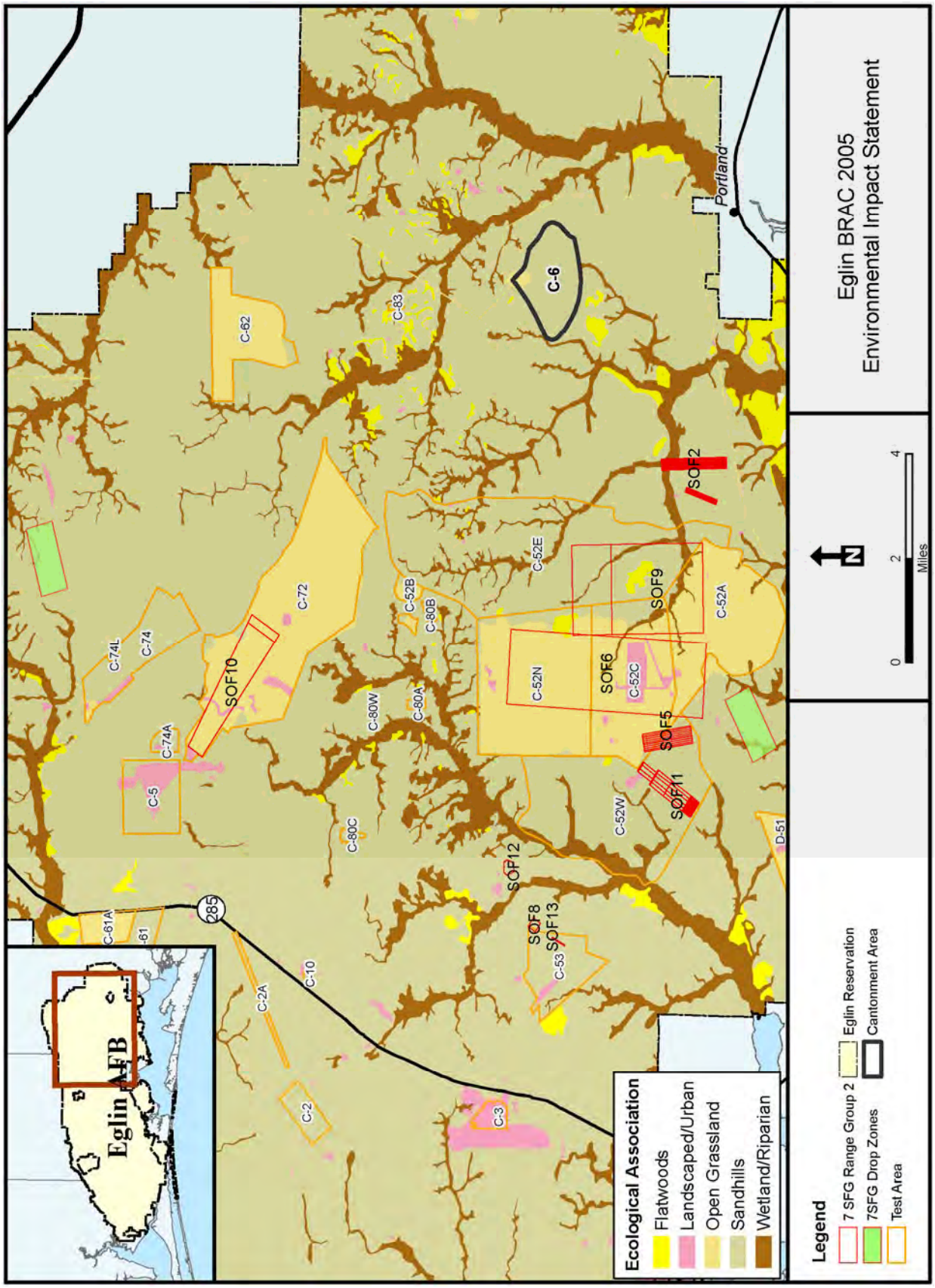

Figure 5-33. 7SFG(A) Range Group 2 – Ecological Associations

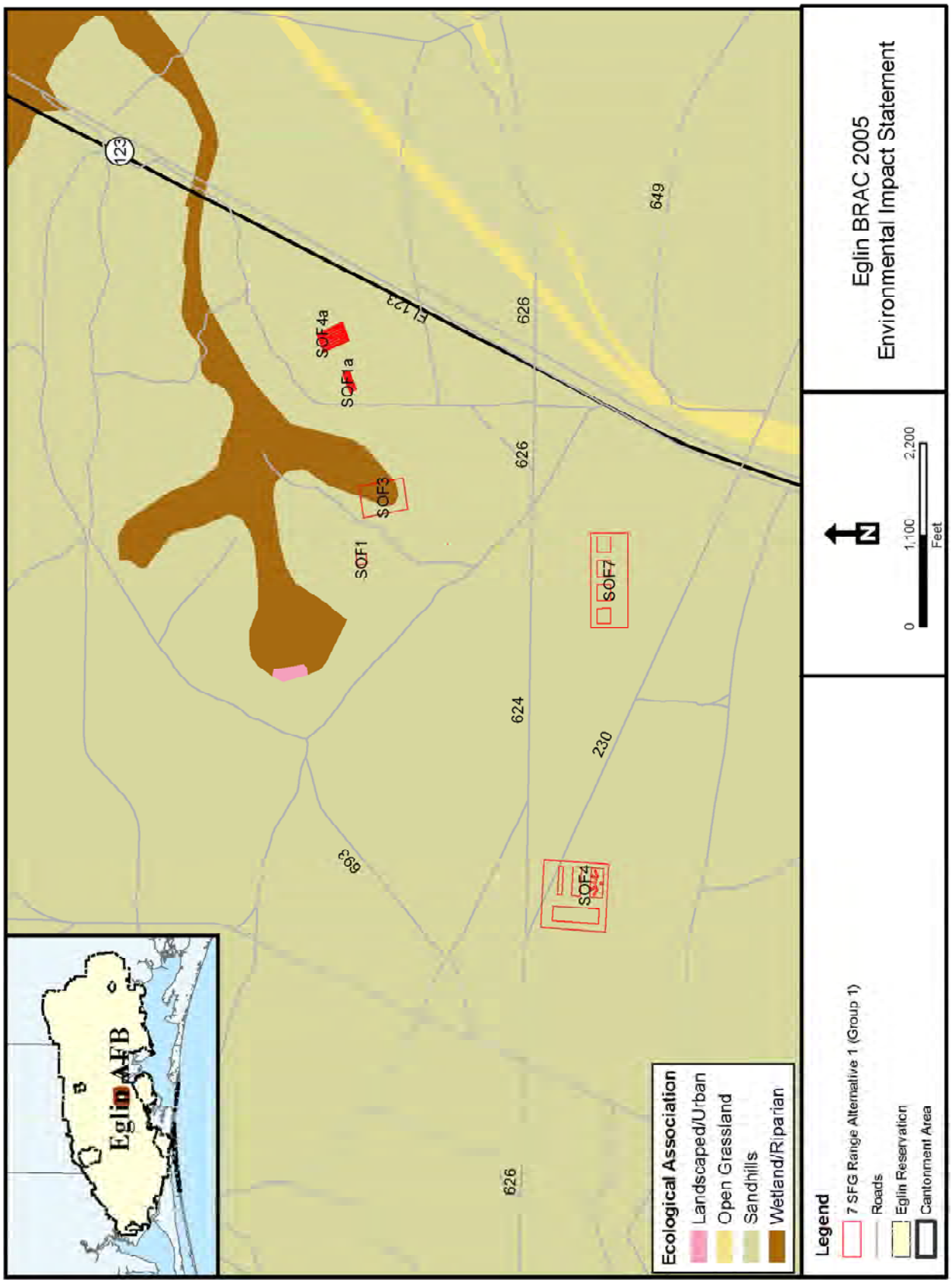

Figure 5-34. 7SFG(A) Range Alternative 1 – Group 1 Ecological Associations

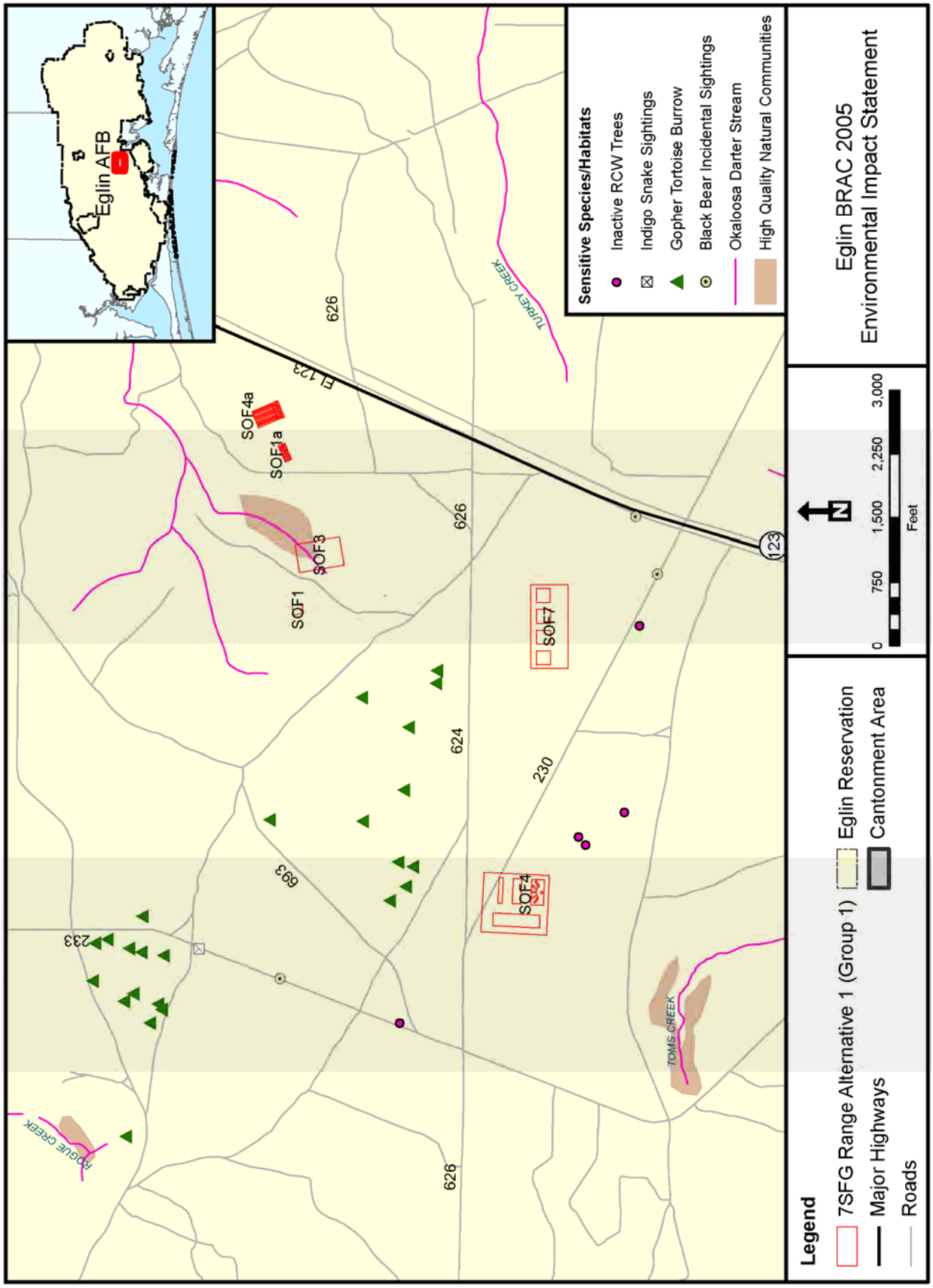

Figure 5-35. 7SFG(A) Range Alternative 1 – Group 1 Sensitive Habitats and Sensitive Species

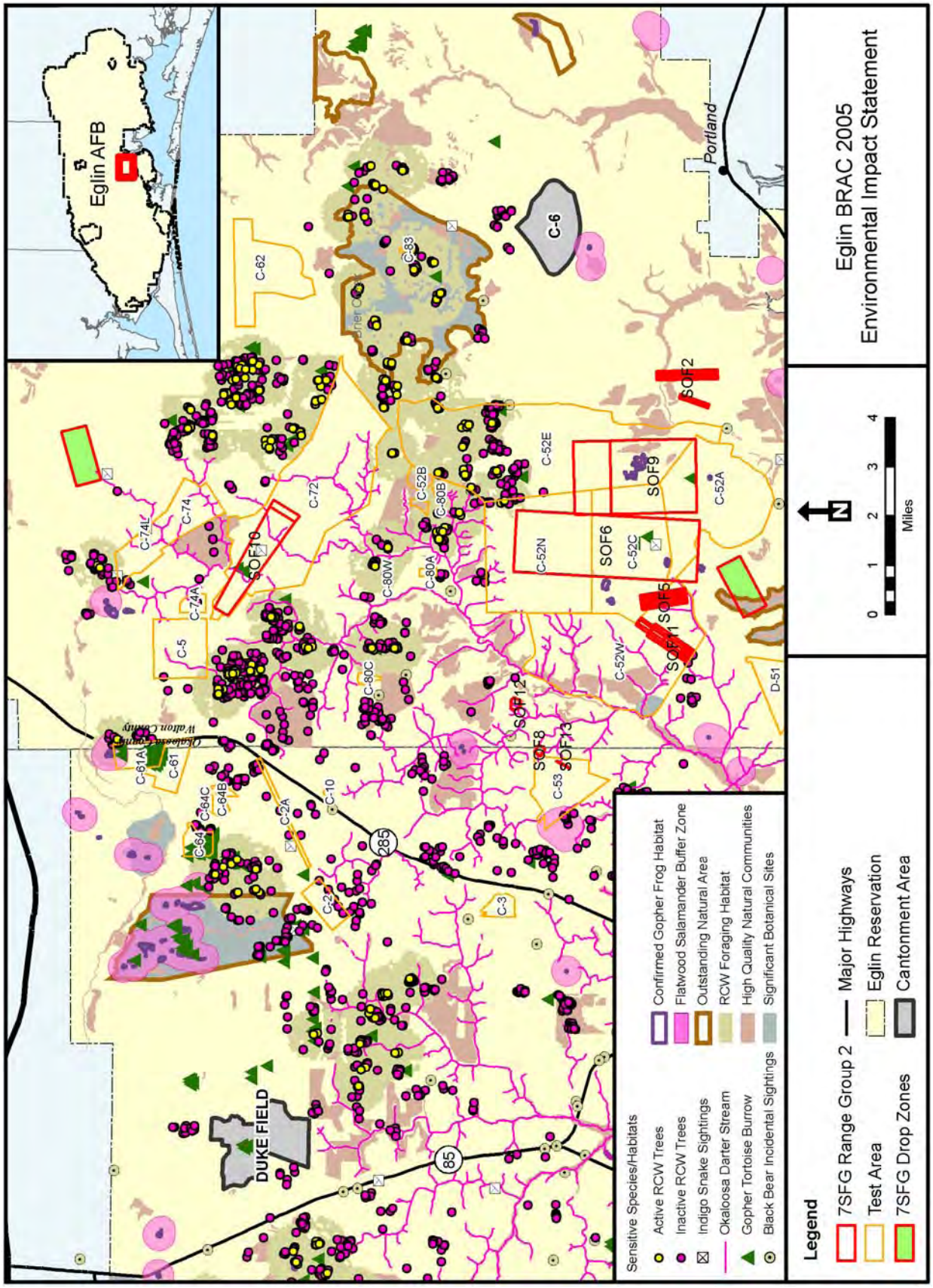

Figure 5-36. 7SFG(A) Range Alternatives – Group 2 Sensitive Habitats and Sensitive Species

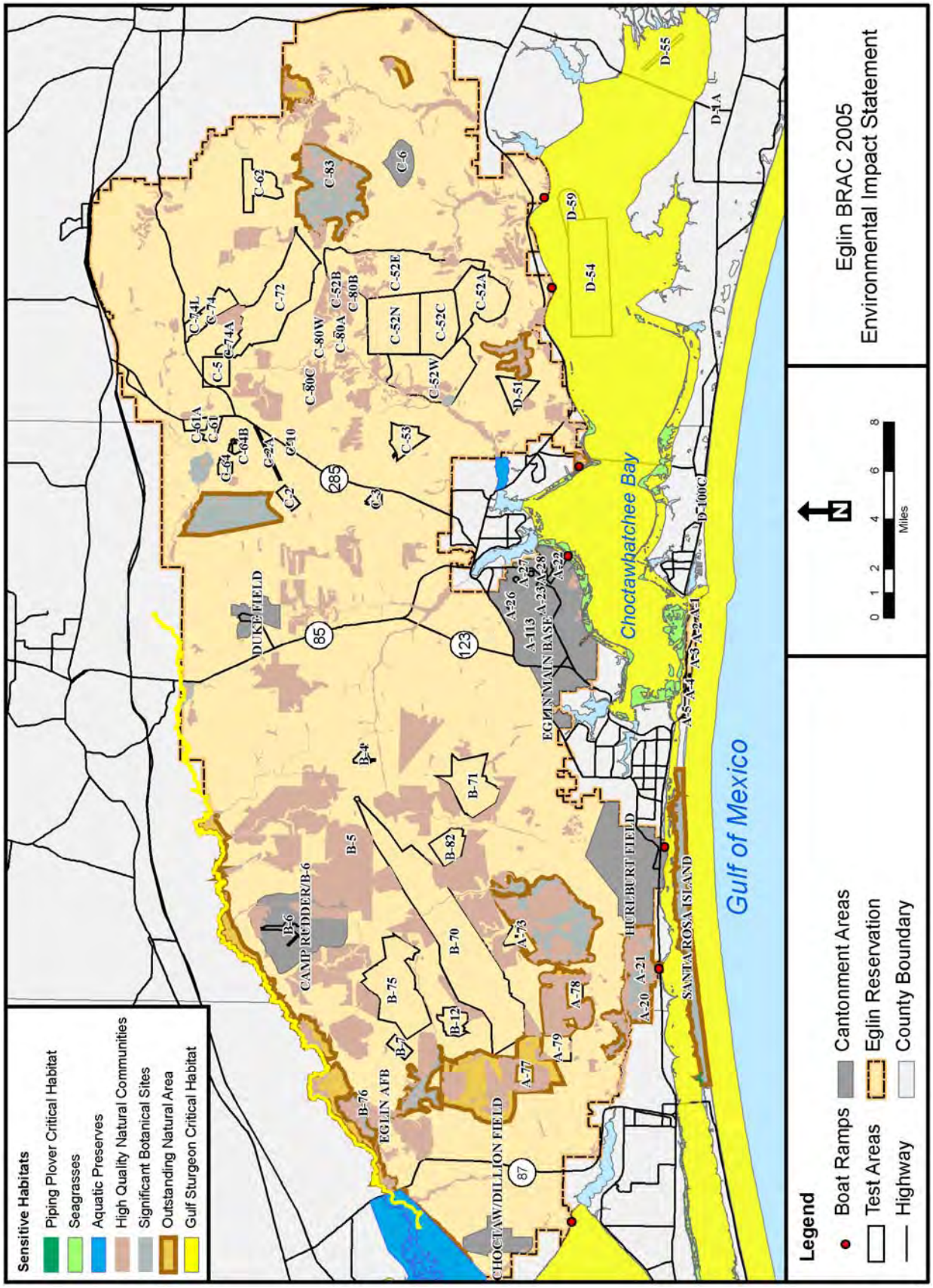

Figure 5-37. 7SFG Range Alternatives – Water Operations and Interstitial Sensitive Habitats

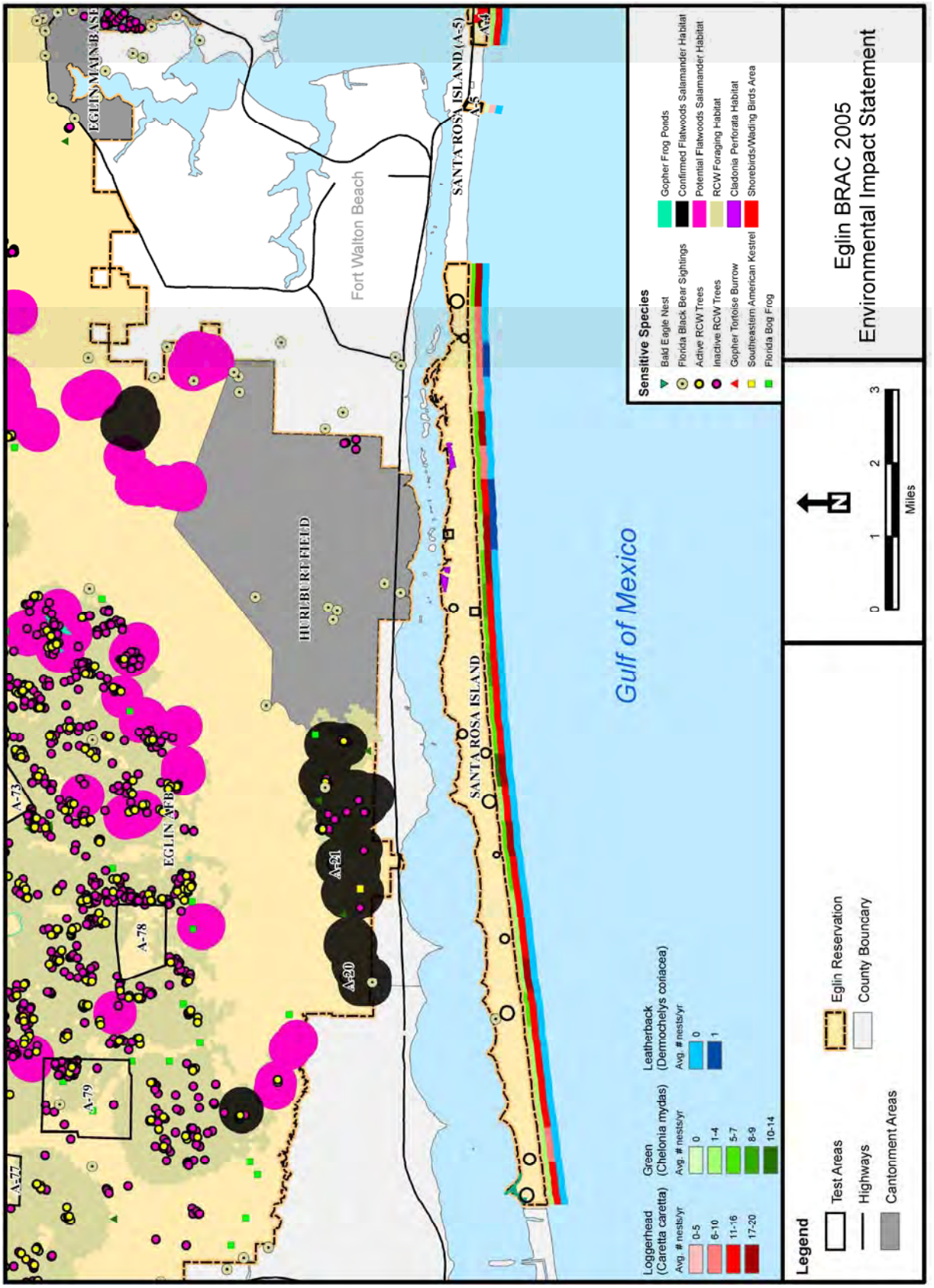

Figure 5-38. 7SFG Range Alternatives – Sensitive Species at SRI and East Bay Flatwoods

The National Marine Fisheries Service (NMFS) has identified EFH for several species within the area encompassed by the Proposed Action. EFH present in the area includes emergent vegetation, oyster beds, and submerged aquatic vegetation (seagrasses) (Figure 5-37).

Gulf sturgeon critical habitat is located adjacent to Eglin AFB in multiple locations, including Choctawhatchee Bay, Santa Rosa Sound, Yellow River, Shoal River, Blackwater Bay, East Bay, and the Gulf of Mexico out to 1 NM offshore of SRI (Figure 5-37).

Portions of the Yellow River Marsh Aquatic Preserve are found on the west side of Eglin (Figure 5-37). Appendix H, *Biological Resources*, provides additional information on the Yellow River Marsh Aquatic Preserve, EFH, piping plover critical habitat, and Gulf sturgeon critical habitat.

Sensitive Species

Based on existing, available information, the species documented to occur or potentially be present within the 7SFG(A) Range Alternative 1 locations are identified in Table 5-32, and Figure 5-35, Figure 5-36, Figure 5-37, Figure 5-38, and Figure 5-39.

SOF ranges 2, 5, 6, 9, and 11 would be in the TA C-52 area. Information on sensitive species at the TA C-52 Complex was drawn from the *Test Area C-52 Complex Final Environmental Baseline Document (EBD)* (U.S. Air Force, 2005f), with updated information on the red-cockaded woodpecker (RCW) provided by Gault (2006).

The Okaloosa darter occurs in the Rocky Creek drainage on the northern and western sides of the TA C-52 Complex (TAs C-52N and C-52W). Potential habitat for the flatwoods salamander occurs within TAs C-52E, C-52C, and C-52W. The RCW occurs within 10 active clusters in the TA C-52 Complex; TA C-52E has 22 active cavity trees, and TA C-52N has four active cavity trees (Gault, 2006). All of the active cavity trees and foraging habitat are north of the proposed SOFs.

The gopher tortoise is known to occur within TAs C-52A, C-52C, and C-52E. The Eastern indigo snake was spotted in TA C-52C, more than likely associated with a gopher tortoise burrow. Confirmed gopher frog ponds and pine barrens tree frog sites also exist on TA C-52. The Florida black bear has been documented on TA C-52, and the Florida burrowing owl has been documented once on TA C-52, but no permanent population exists. Figure 5-38 shows the locations of sensitive species at TA C-52.

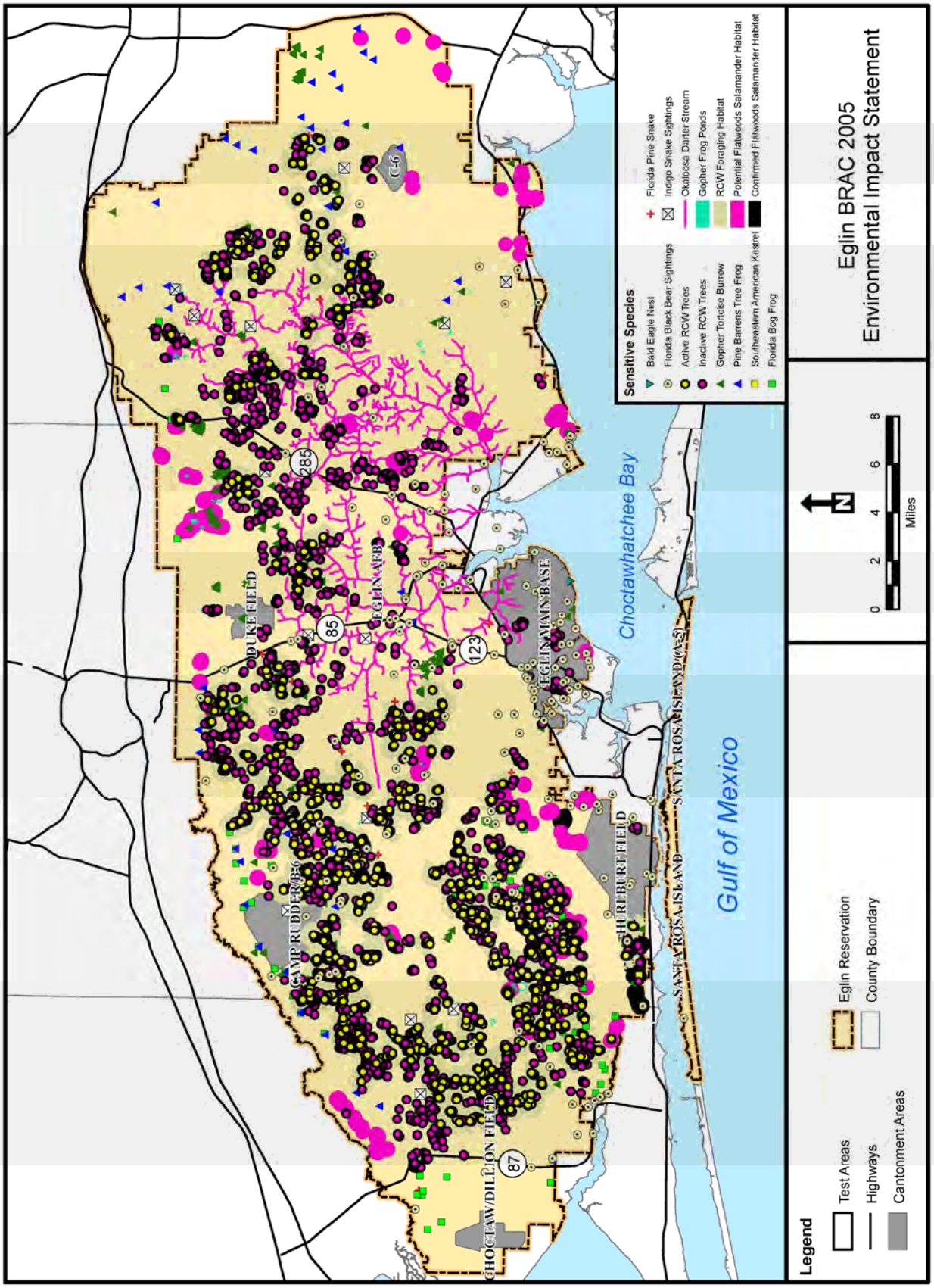

Figure 5-39. 7SFG Range Alternatives – Sensitive Species in Interstitial Areas

Table 5-32. 7SFG(A) Range Alternative 1 – Sensitive Species Potentially Occurring on or Near TAs C-52, C-72, and C-53, SRI, Hwy 123, and Interstitial Areas

Common Name	Scientific Name	State Status	Federal Status	Location
Sensitive Animals*				
Atlantic Green Sea Turtle	*Chelonia mydas*	SE	FE	SRI, Gulf
Atlantic Loggerhead Sea Turtle	*Caretta caretta*	ST	FT	SRI, Gulf
Brown Pelican	*Pelecanus occidentalis*	SSC	--	SRI
Black Skimmer	*Rynchops niger*	SSC	--	SRI
Gopher Frog	*Rana capito*	SSC	--	C-52, I
Eastern Indigo Snake	*Drymarchon corais couperi*	ST	FT	C-52, C-72, C-53, Hwy 123, I
Flatwoods Salamander	*Ambystoma cingulatum*	SSC	FT	C-52, C-72, I
Florida Black Bear	*Ursus americanus floridanus*	ST	--	C-52, C-72, C-53, Hwy 123, I
Florida Burrowing Owl	*Athene cunicularia floridana*	SSC	--	C-52
Florida Pine Snake	*Pituophis melanoleucus mugitus*	SSC	--	C-52, C-72, C-53, Hwy 123, I
Gopher Tortoise	*Gopherus polyphemus*	ST	--	C-52, C-72, C-53, Hwy 123, I
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	SSC	FT	Rivers, bays, and Gulf
Least Tern	*Sterna antillarum*	ST	--	SRI
Leatherback Sea Turtle	*Dermochelys coriacea*	SE	FE	SRI, Gulf
Okaloosa Darter	*Etheostoma okaloosae*	SE	FE	C-52, C-72, C-53, Hwy 123, I
Pine Barrens Tree Frog	*Hyla andersonii*	SSC	-	C-52, I
Piping Plover	*Charadrius melodus*	ST	FT	SRI
Red-cockaded Woodpecker	*Picoides borealis*	ST	FE	C-52, C-72, C-53, I
Santa Rosa Beach Mouse	*Peromyscus polionotus leucocephalus*	--	--	SRI
Southeastern American Kestrel	*Falco sparverius paulus*	ST	--	C-52, C-72, C-53, I
Southeastern Snowy Plover	*Charadrius alexandrinus*	ST	--	SRI
Sensitive Plants*				
Arkansas Oak	*Quercus arkansana*	ST	--	C-53, I
Baltzell's Sedge	*Carex baltzellii*	ST	--	C-52, C-53, C-72, I
Bog Buttons	*Lachnocaulon digynum*	ST	--	C-52, I
Hairy Wild Indigo	*Baptisia calycosa* var. *villosa*	ST	--	C-52, C-53, C-72, I
Naked-Stemmed Panicgrass	*Panicum nudicaule*	ST	--	C-52, I
Orange Azalea	*Rhododendron austrinum*	SE	--	C-53, I
Panhandle Lily	*Lilium iridollae*	SE	--	C-52, C-53, I
Perforate Lichen	*Cladonia perforata*	SE	FE	SRI
Pineland Hoary Pea	*Tephrosia mohrii*	ST	--	C-52, C-72, I
Panhandle Lily	*Lilium iridollae*	SE	--	Hwy 123
Sandhill Sedge	*Carex tenax*	--	--	C-53, I
Sweet Pitcher Plant	*Sarracenia rubra*	ST	--	C-52, I

Sources: Eglin GIS, 2007b; Eglin GIS, 2007c; U.S. Air Force, 2005e; U.S. Air Force, 2006l

FE = federally endangered; FT = federally threatened; Hwy 123 = Group 1 Ranges west of Hwy 123; I = Interstitial Areas; SE = state-endangered; SSC = state species of special concern; ST = state-threatened

*See Appendix H, *Biological Resources*, for complete list of sensitive species found in interstitial areas.

SOF 10 would be located at TA C-72. Active RCW trees exist within 0.62 mile of TA C-72, but none fall within the boundaries of the test area or within the proposed area for SOF 10 on TA C-72. Multiple Okaloosa darter streams flow through TA C-72 (U.S. Air Force, 2006l). Gopher tortoise and indigo snake sightings have been documented at TA C-72. Figure 5-36 shows the locations of sensitive species at TA C-72.

SOF ranges 8, 12, and 13 would be in the TA C-53 area. Multiple Okaloosa darter streams begin on TA C-53 (Eglin GIS, 2007c). A gopher tortoise burrow has been documented near TA C-53 and there has been a nearby sighting of a Florida black bear (Eglin GIS, 2007a). Due to the habitat type and presence of gopher tortoises, there is potential for the presence of indigo snakes and Florida pine snakes, because the snakes utilize gopher tortoise burrows for refuge. Also, numerous inactive RCW trees are adjacent to TA C-53 (Eglin GIS, 2007b). Figure 5-36 shows the locations of sensitive species at TA C-53.

The proposed sites for the 7SFG(A) Range Alternative 1 Group 1 Ranges (west of Hwy 123) include potential habitat for Florida black bear, indigo snakes, and gopher tortoises, which have been documented in the surrounding areas (Figure 5-35). SOF 3 overlaps an Okaloosa darter stream and some of the other SOFs are located near darter streams (Figure 5-35).

Sea turtles (loggerhead, green, and leatherback) nest on SRI beaches; the official sea turtle nesting season is 1 May to 31 October. Piping plover critical habitat is located on the north shore of SRI near TA A-18. Potential Santa Rosa beach mouse habitat covers all of Eglin AFB property on SRI, but their preferred habitat is frontal dune and scrub vegetation within the coastal dune ecosystem. Multiple species of shorebirds and wading birds utilize habitats on SRI, including open, flat areas, wrack line habitats, and coastal ponds. One population of perforate lichen persists just west of the Destin pass and two reintroduced populations are located near test site A-10 on the north side of SRI Figure 5-38 shows the locations of sensitive species on SRI. The federally threatened Gulf sturgeon resides seasonally in riverine, estuarine, and Gulf waters adjacent to Eglin AFB (Figure 5-37).

The list of species found within the interstitial areas of Eglin AFB is extensive. The primary state and federally listed species potentially affected by the proposed activities are listed in Table 5-32 and shown in Figure 5-38. Table H-1 in Appendix H, *Biological Resources,* lists all state and federally protected species found at Eglin. This appendix also offers a more detailed natural history description of all of the sensitive species discussed above.

5.11.1.2 Environmental Consequences (Biological Resources – 7SFG(A) Range Alternative 1)

This section discusses potential impacts to biological resources from the 7SFG(A) Range Alternative 1. Analysis focuses on assessing the potential for impacts to biological resources from land clearing, construction, air operations, water operations, ground maneuvering, munitions use, and pyrotechnics use, and on identifying methods to reduce the potential for negative impacts to biological resources from these activities. Significance is determined by the likelihood of an action to jeopardize the continued existence of the species. Common elements across all five alternatives include DZs/LZs, air operations, water operations, ground maneuvering, land clearing/ construction at Group 2 Ranges, and munitions/pyrotechnics use at Group 2 Ranges.

Land Clearing and Construction Impacts

Land clearing and construction activities have the potential to impact sensitive habitats and species from noise, direct physical impacts, and habitat alteration.

Sensitive Habitats. The north and south DZ/LZ areas may involve clearing of sensitive habitats—a wet seepage slope/ High Quality Natural Community at the north DZ/LZ and a wet High Quality Natural Community/Significant Botanical Site/ Outstanding Natural Area at the south site (Table 5-30). SOFs 2, 3, 9, and 12 overlap with wet High Quality Natural Communities (Table 5-30). According to the *Interstitial EBD Revision 1*, no clearing should occur in wet Significant Botanical Sites or Outstanding Natural Areas; High Quality Natural Communities were not addressed (U.S. Air Force, 2005c). If the DZ/LZs and SOF ranges were designed such that no clearing would be necessary within wet High Quality Natural Communities, Significant Botanical Sites, Outstanding Natural Areas, or seepage slopes, then impacts would be avoided. Instituting a 100-foot vegetative buffer requirement would further protect these sites. If clearing at these sites was necessary, then heavy equipment use could cause hydrologic alteration and soil disturbance, leading to erosion and excess sedimentation. Restricting the use of heavy equipment in wet areas would reduce potential impacts.

If clearing were to occur in wet High Quality Natural Communities, Significant Botanical Sites, Outstanding Natural Areas, and seepage slopes, then erosion and hydrologic alteration would likely occur. However, these wet areas would likely be protected and erosion control measures would be utilized as part of water quality requirements; thus, impacts from 7SFG(A) Range Alternative 1 land clearing and construction activities would not be significant.

Wildlife. Land clearing may have a localized effect on native terrestrial wildlife species such as squirrels, raccoons, and rabbits. However, these species would either move to another location or remain within the area and utilize remaining foliage for habitat. In

addition, the proposed areas represent only a small percentage of the total land area that Eglin maintains. For streams and wetlands, riparian buffers are important to maintaining the health of aquatic communities. Buffers of 100 feet would provide the following benefits: (1) maintenance of stream temperature, (2) contribution of large woody debris habitat, (3) maintenance of diverse stream invertebrates, and (4) removal of excess sediment, nitrogen, phosphorus, and other contaminants (USFWS, 2001). To provide quality habitat for reptiles, amphibians, interior forest species, and migrating birds, larger buffers are better (300 to 1,000 feet) (USFWS, 2001). Site designs would be modified to avoid aquatic habitats and to provide as much riparian buffer as possible; clearing and construction operations would observe all buffer requirements and erosion control measures resulting from permits (Section 4.12.1.2). Impacts to terrestrial and aquatic wildlife under Alternative 1 would not be significant. The remaining sections focus on sensitive species.

Gopher Tortoise. Potential impacts may occur to the state-listed gopher tortoise due to burrow collapse or direct physical impacts during land clearing and construction activities. The potential for direct physical impacts could be reduced by instructing vehicle operators to cease activity upon sighting of a gopher tortoise, and waiting until the tortoise was out of harm's way before resuming activity. The Natural Resources Section would conduct a survey of the construction areas immediately prior to clearing to evaluate the presence of any gopher tortoise burrows. If any burrows were found to be in imminent danger from construction activities, then Eglin would apply for a gopher tortoise relocation permit from the Florida Fish and Wildlife Conservation Commission (FWC) and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., indigo snake). Gopher tortoises would be relocated to another area on Eglin AFB in accordance with FWC guidelines. Surveys and relocation procedures would reduce the likelihood of gopher tortoises being present in the construction areas; therefore, impacts to the gopher tortoise from land clearing and construction activities would not be significant.

Eastern Indigo Snake. The federally threatened Eastern indigo snake may be present anywhere across the Eglin Reservation, primarily in the Sandhills ecological association. Direct physical impacts associated with land-clearing and construction activities are possible from incidental contact with wheeled vehicles and equipment which could result in crushing of individuals. However, this occurrence is unlikely, as a snake would most likely move away from the area if it sensed a general disturbance in its vicinity. The potential for crushing an indigo snake could be reduced by instructing vehicle operators to stop activities if a black snake were seen and to allowing it to move out of the area before resuming activity.

Eglin is currently preparing a programmatic consultation with the U.S. Fish and Wildlife Service (USFWS) to address the potential of finding an indigo snake, relocating it to an appropriate area, and the assignment of take associated with such an action. The

term, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Eglin currently applies for permits from the FWC to relocate gopher tortoises and commensal species (including the indigo snake), but does not have associated take for federal actions on otherwise lawful projects that might result in the take of an endangered or threatened species. The programmatic indigo snake Section 7 consultation would be completed prior to any BRAC activity and would provide Endangered Species Act (ESA) compliance should an indigo snake need to be relocated. The programmatic consultation would entail notification procedures and coordination with the Natural Resources Section in the event an indigo snake was found.

In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for indigo snakes immediately prior to land-disturbing and construction activities, so that they could also be relocated. It is highly unlikely that an indigo snake would be found; however, if located it would be left in place unless construction was imminent. In this case, the Natural Resources Section would relocate the snake in accordance with the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., indigo snake). Potential impacts to indigo snakes while outside of gopher tortoise burrows is discussed at the beginning of this section.

The Proposed Action and increased levels of heavy machinery and other vehicular traffic have the potential to impact indigo snakes and their habitat. However, the potential for encountering an indigo snake is very low. Range land clearing and construction activities are not likely to adversely affect the Eastern indigo snake, and impacts would not be significant.

Florida Pine Snake. The state-listed Florida pine snake utilizes sandhills areas and gopher tortoise burrows as habitat. While the snake has not been documented to occur in any of the project areas, its occurrence is possible given the presence of gopher tortoises and the ecological community types of the project areas. For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., pine snake). In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated. The primary potential impact to pine snakes would be crushing by vehicles. Practices that would reduce impacts include ceasing activities if a snake is sighted and allowing the snake to move away from the site before resuming activities.

While potential adverse impacts to individual snakes could occur if encountered during project activities, the impact to overall populations at Eglin would be minimal, considering Eglin has many thousands of acres that provide suitable habitat for the

species. Thus, impacts to the Florida pine snake from land-clearing and construction activities would not be significant.

Red-cockaded Woodpecker. Alternative 1 would require a maximum of three inactive RCW trees to be cut near TA C-52W. The Natural Resources Section last visited these three trees in 2000 and the cavities were either not completed or were unusable by RCWs (Gault, 2006). Natural Resources Section biologists indicate there is extremely low potential for any of these inactive trees to become active (Gault, 2006). This area is not significant or of importance in future RCW management or emphasis areas as designated by the *Eglin INRMP* (Gault, 2006). No good foraging habitat is available near the trees, with most of the surrounding habitat consisting of sand pine. Additionally, the closest active clusters are over six miles away, and RCWs do not fly this great a distance, particularly with no foraging habitat available; thus, it is extremely unlikely that these nesting cavities would ever be completed.

RCWs have not occupied these inactive RCW cavity trees for over 12 years and the condition of the trees indicates an extremely low potential for re-occupation. Removal of two or three inactive cavity trees in poor quality foraging habitat would have no effect on the RCW, and impacts to the RCW would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of Alternative 1 that are included in the Preferred Alternative (i.e., Group 2 Ranges) (Appendix H, *Biological Resources*).

Southeastern American Kestrel. The state-listed southeastern American kestrel could be affected by noise and human presence associated with land clearing and construction. However, any kestrels present would likely move to a nearby area with suitable habitat, which is abundant on Eglin. Potential kestrel cavity trees may be cut near TA C-52W. The kestrel typically nests in cavities excavated by woodpeckers in snags (dead trees). They most frequently use decayed longleaf pine trees greater than 9 inches (22.5 centimeters) in diameter and 20 feet (6.7 meters) tall (FNAI, 2006). Kestrels frequently locate their nests in the abandoned longleaf pine nest cavities of the RCW. The inactive and abandoned RCW nests in proximity to the alternative sites that are tracked by Eglin's RCW monitoring program may represent potential kestrel nesting sites. As stated above, 7SFG(A) Range Alternative 1 may require the removal of 2 or 3 inactive RCW cavity trees. These trees would be surveyed prior to removal to check for occupation by the kestrel, which would be relocated if found. Although a small area of potential kestrel habitat may be lost, many acres of suitable habitat for the kestrel are available across Eglin. Thus, impacts to the Southeastern American kestrel would not be significant.

Flatwoods Salamander. Eglin has both confirmed and potential habitat for the federally threatened flatwoods salamander. Potential habitat includes areas that meet the criteria necessary for flatwoods salamanders to survive, but have not yet had a confirmed flatwoods salamander sighting. Confirmed habitat includes sites where salamanders have been documented. The only sites with confirmed habitat on Eglin are south of the East Bay River. No confirmed or potential flatwoods salamander habitat is present within any of the SOF ranges or DZ/LZs where land clearing and construction would occur. As a result, 7SFG(A) Alternative 1 construction activities would have no effect on the flatwoods salamander, and impacts would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of 7SFG(A) Range Alternative 1 that are included in the Preferred Alternative (i.e., Group 2 Ranges) (Appendix H, *Biological Resources*).

Okaloosa Darter. Sediment runoff from land clearing and construction activities have the potential to affect the federally endangered Okaloosa darter. Range SOF 10 on C-72 would cross two Okaloosa darter streams (Figure 5-36); however, most of C-72 is considered open grassland/shrubland, therefore minimal clearing would be necessary. SOFs 3, 5, 8, 12, and 13 would overlap the headwater portions of Okaloosa darter streams (Figure 5-35 and Figure 5-36); most of the area is Sandhills and some clearing would be necessary. SOFs 1, 4, 6, and 11, as well as the north DZ/LZ, would be close to Okaloosa darter streams (Figure 5-35 and Figure 5-36); except for SOF 11 (Open Grassland/Shrubland), all of these SOFs are located in Sandhills habitat that would require some clearing.

There is no standard guidance for the size of vegetative buffers along Okaloosa darter streams, although a 100-foot buffer is commonly recommended for stream protection (USFWS, 2001). It should be noted that the range layouts are conceptual, so in those locations where construction appears to impact streams, the final surveys and design layouts would be implemented so that riparian areas would not be impacted. For trees within the buffer that needed to be removed, impacts would be reduced by using hand-cutting techniques, and by avoiding use of heavy machinery within the buffer. Use of erosion control techniques (see *Water Resources* section for 7SFG(A) Range Alternative 1 for details) would also reduce potential impacts.

With the implementation of the potential mitigations in Table 5-43, land clearing and construction are not likely to adversely affect the Okaloosa darter, and impacts would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of 7SFG(A) Range Alternative 1 that are included in the Preferred Alternative (i.e., Group 2 Ranges) (Appendix H, *Biological Resources*).

Florida Black Bear. State-listed Florida black bears have been sighted across the Eglin Reservation, including some of the 7SFG(A) Range Alternative 1 locations (Table 5-31). Habitat loss would be minimal, as the alternative locations represent less than one percent of the total area of undeveloped lands on Eglin AFB, which provides black bear habitat throughout the reservation. Possible impacts are associated with the potential for increased human-bear interaction, primarily bear injury or death due to encounters with vehicles. Impacts to black bears could be reduced if vehicle operators were instructed to cease activity if a bear were sighted, and to wait until the bear was out of sight before resuming activity. The number of vehicles involved in land clearing and construction activities would be small and the likelihood of encounters would be minute, thus impacts to the Florida black bear would not be significant.

Pine Barrens Tree Frog. The state-listed pine barrens tree frog has been documented on SOF 9 in areas which are considered Open Grassland/Shrubland. The restriction of heavy equipment use in wetlands in these areas would minimize the potential for impacts to the pine barrens tree frog. Because these areas are already cleared, it is unlikely any additional clearing would be necessary, thus impacts to the pine barrens tree frog would not be significant.

Gopher Frog. Gopher frogs inhabit multiple habitats, including gopher tortoise burrows and isolated wetlands. For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., gopher frog). In a best attempt to locate the commensals present in affected gopher tortoise burrows, video cameras would be used to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.

Of main concern regarding the state-listed gopher frog is the potential to impact breeding sites from sedimentation and hydrologic alteration. SOF 6 overlaps with a confirmed gopher frog pond. This area is already essentially cleared, so it should not be necessary to take equipment into the pond area. Confirmed ponds also are located west of SOF 6 and south of SOF 9. The restriction of heavy equipment use in wetlands in these areas would minimize the potential for impacts to the gopher frog. Erosion control measures such as silt fencing would reduce sediment runoff into the ponds. Because the gopher frog pond area on SOF 6 is already cleared, it is unlikely any additional clearing would be necessary, and erosion control measures would be utilized for sediment control near the other ponds; thus, impacts to the gopher frog would not be significant.

Invasive Nonnative Species. Construction activities would require great disturbance to soil and vegetation. This disturbance would create conditions that are conducive to the establishment and spread of invasive nonnative species. However, mitigations are available to reduce the potential for invasive nonnative species infestations (Table 5-43).

Impacts to flora and fauna from invasive nonnative plant species would not be significant.

Air Operations

7SFG(A) would use existing HLZs and DZs. Additionally, they would establish two DZ/LZ areas, one north of TA C-74, and one south of TA C-52 (Figure 5-36). Potential effects to sensitive habitats could include soil disturbance and hydrologic alteration in a seepage slope, wet High Quality Natural Community/Outstanding Natural Area/Significant Botanical Site, and proximity to a stream where the federally endangered Okaloosa darter is found. Due to the wet condition and slope of these sensitive habitats, it is unlikely that they would be used for landing areas; however, they might be used as DZs (U.S. Air Force, 2005c). If drops occur in wet sensitive habitats or near streams, the *Interstitial EBD Revision 1* states that troops should minimize disturbance to soils and vegetation to minimize the potential for hydrological alteration, erosion, and sedimentation (i.e., no off-road vehicle use, bivouac, or fighting positions) (U.S. Air Force, 2005c).

The proposed DZ/LZs are sited well away from any federally endangered RCWs: 1.5 miles away for the north DZ/LZ and 4 miles for the south DZ/LZ. Thus, there are no potential noise issues that would impact this species. With regards to other wildlife and sensitive species in the area, the type of noise produced from aircraft engaged in paratroop and equipment drops does not represent a new or novel source of disturbance within the area designated for the DZ/LZs. Currently, helicopters and fixed-wing aircraft utilize virtually all of the airspace above the reservation and adjacent waters, and numerous landing zones are located throughout these areas. Activity associated with the proposed DZ/LZ areas and air operations occurring over SRI, Choctawhatchee Bay, and the Gulf of Mexico is similar in type and intensity to missions currently being conducted at Eglin, and would not increase over baseline levels. Because of their similarity to existing missions, the missions associated with the DZ/LZs would not result in adverse noise impacts to sensitive species.

7SFG(A) Range air operations are not likely to adversely affect the Okaloosa darter and would have no effect on the RCW. Overall, impacts to sensitive habitats and species would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on portions of 7SFG(A) Range Alternative 1 that are included in the Preferred Alternative (i.e., DZ/LZs) (Appendix H, *Biological Resources*).

Water Operations

Eglin has previously approved certain landing sites at the following locations for water operations: Yellow River, East Bay River, East Bay, Santa Rosa Sound, Choctawhatchee Bay, and SRI. These landing sites were approved through the *Estuarine and Riverine*

PEA (U.S. Air Force, 2003d), the *ARG/MEU EA* (U.S. Air Force, 2003e), SRI PEA (U.S. Air Force, 2005i), and *Los Banos EA* (U.S. Air Force, 2004h). The landings associated with 7SFG(A) (140 per year) would not result in any large increase in shoreline, small-boat landings over those which currently occur as part of normal Eglin operations (approximately 1,500 per year at a number of landing sites throughout the reservation). 7SFG(A) may use any of these same areas for Zodiac boat landings without a major impact to any biological resources (Figure 5-38 and Figure 5-39).

Landings would occur only at designated boat landing areas. As discussed in the *Estuarine and Riverine PEA* (U.S. Air Force, 2004a), erosion could potentially occur at boat-landing sites from repeated use. Excess sedimentation could negatively impact mussel species and the Gulf sturgeon by interfering with feeding, reproduction, and respiration. Prevention of erosion in heavily used shoreline areas can be accomplished through restoration/stabilization, rotational use, and avoidance of contact with emergent vegetation along banks and shorelines.

A bald eagle nest was recently established on the north shore of SRI near Test Site A-12. The movement of boats near the eagle nest near TS A-12 on SRI has the potential to disturb the eagle. However, 7SFG(A) water operations would be of a clandestine nature and would involve only a few troops for any particular mission, thus they should not result in any loud noise. Additionally, some of the operations would take place at night, removing the visual presence disturbance.

Eglin observes the restrictions detailed in the *National Bald Eagle Management Guidelines* (USFWS, 2007a). As pertains to 7SFG(A) activities at SRI, if visible from the eagle's nest, boat traffic should maintain a buffer of 330 feet when possible, but small, motorized boats may pass within 330 feet of the nest if the boats minimize trips and avoid stopping in the area.

Due to their shallow draft, Zodiac boats would cause very little disruption to river, bay, and surf zone bottoms, including EFH, mussel habitat, and Gulf sturgeon critical habitat, and have little possibility of direct physical impacts to the federally threatened Gulf sturgeon, or candidate mussel species. Water operations are not likely to adversely affect the Gulf sturgeon or candidate mussel species, and are not likely to adversely modify Gulf sturgeon critical habitat. Impacts to the bald eagle, Gulf sturgeon, Gulf sturgeon critical habitat, EFH, and other aquatic biological resources would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted a Section 7 consultation with the USFWS on portions of 7SFG(A) Range Alternative 1 that are included in the Preferred Alternative (i.e., boat landing sites) (Appendix H, *Biological Resources*).

Ground Maneuvering

The primary potential impacts of concern for biological resources would be crushing, trampling, and erosion from the use of HMMWVs, heavy trucks and ATVs/motorcycles, and troops (typically small groups of less than 12) moving from boat landing sites and DZ/LZs to SOF ranges, within SOF ranges, and between SOF ranges. Ground maneuvers may occur in any interstitial area on Eglin, including SRI. However, as stated in Chapter 2 (Section 2.4.2.1, Common Elements Among Alternatives), certain operating constraints exist based on current agreements with the USFWS for threatened and endangered (T&E) species protection.

Sensitive Habitats. Within property administered by Eglin, piping plover critical habitat is situated on the north shore of SRI near A-18 (Figure 5-38). The critical habitat area is posted with endangered species signs and admittance is not allowed. Activities associated with the 7SFG(A) mission would not occur in piping plover critical habitat; therefore, the proposed activities would have No Effect on designated piping plover critical habitat on SRI, and impacts to piping plover critical habitat would not be significant.

High Quality Natural Communities, Significant Botanical Sites, and Outstanding Natural Areas are located within portions of the ROI, and units may travel through them during various missions, potentially trampling sensitive plant species, causing soil disturbance, and altering hydrology. The *Interstitial EBD Revision 1* states that troops should not conduct any land disturbing activities (i.e., off-road vehicle use, bivouac, or fighting positions) within wet High Quality Natural Communities, Significant Botanical Sites, or Outstanding Natural Areas, and that large troop movements should be avoided in these areas (U.S. Air Force, 2005c). High Quality Natural Communities, Significant Botanical Sites, and Outstanding Natural Areas would be marked on maps. Similar ground operations currently occur on Eglin, with minimal impacts to sensitive habitats.

Because ground movements would be restricted in piping plover habitat, High Quality Natural Communities, Significant Botanical Sites, and Outstanding Natural Areas, impacts to sensitive habitats from ground maneuvering would not be significant.

Gopher Tortoise. Certain operations may take place in close proximity to state-listed gopher tortoise burrows. While it is possible that vehicles could crush an individual tortoise, burrow, or egg clutch during these exercises, this risk is minimized by the fact that vehicle activity would be limited for the most part to established roads and trails. In the event that a gopher tortoise or burrow was spotted, impacts could be avoided if personnel would avoid the animal and burrow. Eglin's Natural Resources Section should be notified of the location. In areas where frequent off-road activity may occur, Eglin's Natural Resources Section would evaluate the need for relocation. Impacts to gopher tortoises from ground maneuvering would not be significant.

Eastern Indigo Snake. Incidental contact with vehicles and troops on foot could result in trampling or crushing of federally threatened indigo snakes, but this occurrence is unlikely, as the snake would most likely move away from the area if it sensed a general disturbance in its vicinity. However, if an indigo snake were sighted, impacts could be avoided if personnel would cease activities until the snake had moved away from the area. Eglin is currently preparing a programmatic Section 7 ESA consultation with the USFWS for the indigo snake. This Section 7 consultation would be completed prior to any BRAC activity and would provide ESA compliance. Thus, ground maneuvers are not likely to adversely affect the indigo snake, and impacts to indigo snakes would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted a Section 7 consultation with the USFWS on portions of 7SFG(A) Range Alternative 1 that are included in the Preferred Alternative (i.e., Group 2 Ranges) (Appendix H, *Biological Resources*).

Florida Pine Snake. Incidental contact with vehicles and troops on foot could result in trampling or crushing of the state-listed Florida pine snake. However, this occurrence is unlikely, as the snake would most likely move away from the area if it sensed a general disturbance in its vicinity. While potential adverse impacts to individual snakes could occur if encountered during project activities, impacts to overall populations at Eglin would be minimal, considering Eglin has many thousands of acres that provide suitable habitat for the species. Thus, impacts to the Florida pine snake from ground maneuvering would not be significant.

Flatwoods Salamander. Eglin has both confirmed and potential flatwoods salamander habitat. Potential habitat includes areas that meet the criteria necessary for flatwoods salamanders to survive, but have not yet had a confirmed sighting of a salamander. Confirmed habitat includes sites where federally threatened flatwoods salamanders have been documented. The only sites with confirmed habitat on Eglin are south of the East Bay River. Vehicles, troops, and equipment may traverse areas with potential flatwoods salamander habitat when moving between SOF ranges (Figure 5-35 and Figure 5-36). Restricting vehicle traffic to established roads and prohibiting ground-disturbing activities (i.e., digging) within the 1500-foot (457-meter) buffer around salamander ponds would minimize the potential for impacts from ground movements.

No confirmed flatwoods salamander habitat is present within any of the SOFs or DZ/LZs; however, interstitial troop movements may occur in areas with confirmed habitat south of the East Bay River (Figure 5-38). As stated in Chapter 2 (Section 2.4.2.1, Common Elements Among Alternatives), certain operating constraints exist based on current agreements with the USFWS for T&E species protection. 7SFG(A) would maintain a 1,500-foot (457-meter) buffer from known flatwoods salamander habitat, which would be identified by the Eglin Natural Resources Section. South of the East

Bay River, large troop movements and vehicle traffic would be restricted to established roads.

None of the SOF or DZ/LZ areas are considered good potential flatwoods salamander habitat, and vehicles and troops would be restricted to established roads near identified salamander habitat constraint areas. As a result, ground maneuvers are not likely to adversely affect the flatwoods salamander and impacts to the salamander would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on portions of 7SFG(A) Range Alternative 1 that are included in the Preferred Alternative (i.e., interstitial areas) (Appendix H, *Biological Resources*).

Okaloosa Darter. Excess sedimentation is the major threat to stream habitats of the federally endangered Okaloosa darter; therefore, minimization of erosion in Okaloosa darter watersheds is extremely important. As stated in Chapter 2 (Section 2.4.2.1), certain operating constraints exist based on current agreements with the USFWS for T&E species protection. To protect the habitat of the Okaloosa darter, 7SFG(A) would use established roads, trails, and bridges when troops and vehicles are crossing Okaloosa darter streams. Additionally, ground-disturbing activities, such as off-road vehicle use, bivouac, or fighting positions, would be prohibited near darter streams. Okaloosa darter streams would be marked on field maps.

With the restriction of vehicle use and other ground-disturbing activities near Okaloosa darter streams, 7SFG(A) ground movements are not likely to adversely affect the Okaloosa darter, and impacts to the darter would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on portions of 7SFG(A) Range Alternative 1 that are included in the Preferred Alternative (i.e., interstitial areas) (Appendix H, *Biological Resources*).

Red-cockaded Woodpecker. Vehicle movement and foot traffic would potentially create noise and disturbance that could affect the federally endangered RCW. Depending on the type of vehicle, noise levels can be quite loud and accompanied by heavy vibration. Delaney et al. (2002) monitored nesting RCWs as a convoy of vehicles passed (Table 5-33). Birds flew away as a result of the passing of the convoy, but returned shortly thereafter. Vehicle use associated with this alternative along existing roadways does not represent a novel noise and disturbance source such that birds would abandon the area. Birds near these areas are likely acclimated to the presence of vehicles.

Table 5-33. Red-cockaded Woodpecker Response to Vehicle Noise and Disturbance

Noise Source	Noise Level (SEL)	Distance (meters)	Notes
Vehicles (convoy of Bradley Fighting Vehicles and civilian vehicle)	<75	>50	Bird returned 10 minutes after convoy had passed. Birds returned after 3 minutes when civilian vehicle had passed.

SEL = Sound Exposure Level

As stated in Chapter 2 (Section 2.4.2.1), there are certain operating constraints based on current agreements with the USFWS for T&E species protection. Eglin follows the *Management Guidelines for the Red-Cockaded Woodpecker on Army Installations*, which details allowed and restricted activities near active RCW trees (U.S. Army, 2006). Military training within 200 feet of marked cavity trees is limited to military activities of a transient nature (less than two hours of occupation). Military vehicles are prohibited from occupying a position or traversing within 50 feet of a marked cavity tree, unless on an existing road, maintained trail, or firebreak. Activities that are not allowed within the 200-foot buffer include bivouacking, excavating, digging, and establishing command posts. A 200-foot buffer would be required around active RCW clusters where ground movement would take place. The 200-foot buffer would be marked with diagonal yellow woodpecker signs. RCW trees would be marked prior to any field maneuvering training by the 7SFG(A). U.S. Army (2006) provides a detailed list of allowable activities within RCW buffer zones.

In accordance with the Army guidelines discussed above, transient foot and vehicle traffic would be limited to two hours or less, vehicles would use established trails and roads, and no digging/excavating or bivouacking would occur within the 200-foot RCW buffer. Therefore, RCWs are not likely to be adversely affected by ground movements, and impacts to the RCW would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on portions of 7SFG(A) Range Alternative 1 that are included in the Preferred Alternative (i.e., interstitial areas) (Appendix H, *Biological Resources*).

Southeastern American Kestrel. The state-listed southeastern American kestrel may be affected by noise and human presence associated with troop and vehicle movements. However, 7SFG(A) ground maneuvers typically are clandestine operations comprised of a small number of troops (12 people), who would not stay in any area for long and would be relatively quiet except for some vehicle noise on established roads. Given the quiet, transient nature of 7SFG(A) ground maneuvers, impacts to the Southeastern American kestrel would not be significant.

Florida Black Bear. The state-listed black bear is a transient species that may pass through the action areas. The primary potential impact from ground maneuvers would be from vehicle strikes. Such impacts could be avoided if personnel would cease activities until the animal had cleared the area. Encounters with black bears would be unlikely, and simple avoidance measures would minimize the potential for injury or death to bears. Thus, impacts to black bears from ground movements would not be significant.

Pine Barrens Tree Frog. The state-listed pine barrens tree frog is typically found in herbaceous and shrubby bogs of the Wetland/Riparian ecological association. Sporadic 7SFG(A) ground maneuvering would occur in these areas, with little to no disturbance; however, restriction of driving and digging in these areas would minimize the potential for impacts to the pine barrens tree frog. Transient ground maneuvers would occur infrequently and with minimal disturbance within pine barrens tree frog habitat; therefore, impacts to the pine barrens tree frog from ground maneuvering would not be significant.

Gopher Frog. Of main concern regarding the state-listed gopher frog is the potential to impact breeding sites. As stated in Chapter 2 (Section 2.4, Operational Requirements for 7SFG(A) Range Training), vehicles would not traverse wetlands (including gopher frog ponds), thereby reducing the potential for impacts to the gopher frog. Incidental trampling may occur from foot traffic and/or vehicle use in the vicinity of breeding sites. However, the chances of this occurring are minimal (the species would likely move if it sensed a large movement nearby) and not considered major in terms of impacting population viability or sustainability; thus, impacts to the gopher frog from ground maneuvering would not be significant.

Sea Turtles. Federally threatened and endangered sea turtles nest on Eglin SRI property. Sea turtle season on Eglin is 1 May to 31 October. The peak nesting period for loggerhead sea turtles occurs in June, earlier than the peak green turtle nesting period, which occurs in July. Movement of 7SFG(A) personnel would occur on established roads and along or across pre-approved areas on SRI. Vehicles would not be driven on the beachfront, thus eliminating the potential for direct physical impacts from vehicles. There is a risk of impact to nesting females, hatchlings, and nests by direct strike of an animal by stepping on them during a mission. Additionally, even small troop movements such as 7SFG(A) teams may obscure evidence of sea turtle crawls and nests.

Nesting females may be deterred from entering landing corridors during nighttime operations; however, due to the clandestine nature of the 7SFG(A) mission, very little disturbance would occur. Deterrence effects to nesting sea turtles from noise occurring in the absence of visual disturbance is not well understood, and the amount and intensity of noise necessary to deter nesting females remains undocumented (Lutz et al.,

2002). If noise levels sufficient to deter nesting emergences were to occur, this noise would have a localized effect on the beachfront. The peak rate of nesting emergences per night per unit area of beach front was estimated to help determine how many nesting emergences, if any, may be deterred during the course of these activities (see Appendix H, *Biological Resources*). The peak rate of loggerhead turtle nesting emergences is 0.01 nests per night per half-mile, and the peak rate of green turtle nesting emergences is 0.004 nests per night per half-mile. These low rates of nesting emergences during peak nesting season greatly reduce the probability that nesting sea turtles would be deterred by 7SFG(A) activities, which would have a duration of less than 5 minutes. This probability would be further reduced if exercises were conducted outside of the peak nesting seasons for each species (June and July).

Actively nesting females may be deterred from completing the egg-laying process if there was an encounter with 7SFG(A) on the beach. This is highly unlikely given the low nesting activity. Even in the most active nesting months (June and July), the combined loggerhead and green turtle density is 0.012 turtles per night per half mile (Eglin DSS, 2007). The time the troops would be on the beach is less than five minutes. The probability that a nesting turtle and a mission would coincide is extremely low; however, the potential exists.

As stated in Chapter 2 (Section 2.4.2.1, Common Elements Among Alternatives), certain mission restrictions apply during sea turtle season (1 May to 31 October) to protect nesting and hatching sea turtles. These restrictions are based on the Terms and Conditions in the *SRI Mission Utilization Plan Biological Opinion* (USFWS, 2005a). No beachfront activities may occur until after Eglin AFB has marked or relocated nests daily during sea turtle season. Troops and personnel must avoid designated sea turtle nests by at least 50 feet, and must not interfere with nesting sea turtles, impede hatchling sea turtles from emerging from the nest and crawling to the Gulf of Mexico, or obscure signs of sea turtle activity. Vehicles, helicopters, and watercraft must be staged at least 200 feet away from any nest past day 60 incubation. Troops must avoid sand dunes greater than five feet high, and any beach and dune habitats that are impaired by mission activities must be restored. Immediately after an operation is completed during August and September, all holes must be refilled and all ruts deeper than 2 inches must be removed at nests that are at incubation day 60 or greater. Eglin AFB must distribute a handbook to mission participants that provides information about the coastal ecosystem and protected species, Eglin's policies related to natural resource protection, and the requirements to be implemented for the activities.

Eglin Natural Resources believes 7SFG(A) activities on SRI may affect sea turtles. Potential impacts associated with 7SFG(A) activities are covered under the *SRI Mission Utilization Plan Biological Opinion* (USFWS, 2005a) mentioned above; the Terms and Conditions from that Biological Opinion (BO) would be implemented as part of 7SFG(A) action (Miller, 2007b). If the activity level escalates beyond that which was

analyzed in the *SRI Programmatic Biological Assessment* (U.S. Air Force, 2000), then a separate analysis would be required. An ESA Section 7 consultation with the USFWS has been conducted for all of the federally listed species potentially affected by BRAC activities, and sea turtle impacts and requirements are included by reference to the *SRI BO* (USFWS, 2005a). As determined in the *SRI Mission Utilization Plan Biological Opinion* (USFWS, 2005a), sea turtles are likely to be adversely affected by ground maneuvers. However, overall impacts would not be significant.

Piping Plover. Federally threatened piping plovers have only been documented using critical habitat areas on the north shore of SRI and one area on the eastern portion of Eglin SRI property just west of A-3 (Gault, 2007b). However, research indicates that patterns of piping plover habitat usage can be very complex. Plovers could feasibly use several locations on the island for foraging, roosting, or sheltering at any time, day or night. Piping plovers are known to forage in exposed wet sand areas such as wash zones, intertidal ocean beachfronts, wrack lines, washover passes, mud and sand flats, ephemeral ponds, and salt marshes. They are also known to use adjacent areas for sheltering in dunes, debris, and sparse vegetation. All of these habitat types can be found on Eglin's portion of SRI. Although it is possible that piping plovers could use any one of these habitat types at any time during the wintering season, studies have shown that wintering plovers spend 76 percent of their time foraging for invertebrates found just below the surface of wet sand (Johnson and Baldassarre, 1988). Therefore, during the wintering season (15 July to 15 May), 7SFG(A) is more likely to encounter piping plovers in shoreline areas than in inland movement corridors.

If the Proposed Action takes place during the piping plover wintering season (mid-July through early-March), it is possible that piping plovers may be present in the action area. In the unlikely event that a piping plover is found in or near the mission area, noise may flush the bird from the landing area, possibly causing stress and extra caloric expenditure. Displaced plovers may simply move on to undisturbed foraging areas nearby. 7SFG activities on SRI would be of a transient nature, and any disturbances would be of short duration. Thus, the Proposed Action is not likely to adversely affect the wintering piping plover population, and 7SFG(A) activities that take place outside the plover wintering period would have no effect on wintering piping plover populations. Impacts from ground maneuvers would not be significant. An ESA Section 7 consultation with the USFWS has been conducted for all of the federally listed species potentially affected by BRAC activities, and piping plover impacts and requirements are included by reference to the *SRI BO* (USFWS, 2005a).

Perforate Lichen. There is one large population of the federally endangered perforate lichen on the eastern portion of Eglin's SRI property and two small reintroduction sites just east of TA A-10 on SRI (Figure 5-38). 7SFG(A) activities would occur in close proximity to the lichen reintroduction population; however, troop movements would

be situated a safe distance away from lichen populations. The lichen sites are posted with endangered species signs and admittance is not allowed. Because 7SFG(A) activities would not occur in designated perforate lichen habitat, the proposed activities would have no effect on populations of perforate lichen on SRI, and impacts would not be significant. An ESA Section 7 consultation with the USFWS has been conducted for all of the federally listed species potentially affected by BRAC activities, and perforate lichen impacts and requirements are included by reference to the *SRI BO* (USFWS, 2005a).

Bald Eagle. A bald eagle nest was recently established on the north shore of SRI near Test Site A-12. The movement of troops near the eagle nest near TS A-12 on SRI has the potential to disturb the eagle. However, 7SFG(A) operations on SRI would be of a clandestine nature and would involve only a few troops for any particular mission, thus should not result in any loud noise. Additionally, some of the operations would take place at night, removing the visual presence disturbance.

Eglin observes the restrictions detailed in the *National Bald Eagle Management Guidelines* (USFWS, 2007a). As pertains to 7SFG(A) activities at SRI, if visible from the eagle's nest, foot traffic is to remain at least 330 feet from the nest. Given the clandestine nature of 7SFG(A) operations on SRI, impacts to the bald eagle would not be significant.

Shorebirds and Wading Birds. Some state-listed shorebirds and wading birds may be temporarily displaced as a result of noise or movements of 7SFG(A) activities on SRI. State-listed wading birds, such as the snowy egret, little blue heron, tricolored heron, and white ibis, forage mainly in wetland areas or along shorelines of saltwater and freshwater water bodies. Colonies or individual nests of several state-listed shorebird species (least terns, southeastern snowy plovers, and black skimmers) are usually found along the rack line or other suitable habitat along the beach and have the potential to occur within the proposed action areas. Land-based activities near shorebird nesting areas may result in a flush/startle response. During nesting season, this may result in a potentially increased vulnerability of eggs and chicks to predation. However, foraging species would typically move on to other areas, while nesting species would return after the general disturbance was over. These activities would also likely scare other species such as predators (e.g., feral cats, coyotes, etc.) from the area, thus reducing the chances of nest predation should nesting birds be flushed.

Recent hurricane events have created prime shorebird nesting habitat all along the barrier island within Eglin boundaries. Eglin's Natural Resources Section has documented several shorebird nesting areas on SRI. Avoidance of 7SFG(A) activities in these areas, and coordination of all ground movement operations on SRI through Eglin's Natural Resources Section would greatly reduce the potential for impacts. 7SFG(A) activities on SRI would be of a transient nature, and any disturbances would be of short duration. Thus, impacts to wading bird and shorebird species from 7SFG(A) activities would not be significant.

Santa Rosa Beach Mouse. 7SFG(A) activities on SRI may directly and indirectly affect the Santa Rosa beach mouse. The chances of an encounter with troops is very low due to the fact that beach mice tend to spend much of their time in burrows that they excavate in the dunes, but encounters are possible given the increased foot traffic in beach mouse habitat. Indirect impacts from night maneuvers may include habitat degradation and fragmentation, and the alteration of foraging patterns due to increased use of existing trails/roads and staging areas for ground maneuvers. USFWS requirements restrict activities on dunes greater than five feet high; this restriction would reduce the potential for direct physical impacts and habitat impacts. Avoiding dunes would also reduce impacts to the dune vegetation, which serves as a food source for this species. Vehicle use would be concentrated on established roads and in previously approved areas, and troop movements would leave minimal traces due to their clandestine nature. Thus, impacts to the Santa Rosa beach mouse from ground maneuvers would not be significant.

Invasive Nonnative Species. Increased vehicle traffic and ground movements by troops have the potential to introduce and spread invasive nonnative species. Humans can act as vectors for the spread of invasive nonnative species. However, mitigations are available to reduce this potential (see below). Impacts to flora or fauna from invasive nonnative species would not be significant.

Munitions and Pyrotechnics Use

Munitions use may impact sensitive habitats and species from noise, direct physical impacts, chemical impacts, and wildfires started by munitions and pyrotechnics. Increases in mission activity at the ranges would also make it more difficult to conduct prescribed fires, leading to decreased ecosystem health and a likely increase in the number and intensity of wildfires.

Wildfires

The use of munitions and pyrotechnics increases the risk of wildfires. Over the past five years (2002-2006), 48,628 acres have burned from wildfires; 36,892 acres of that total were started by mission activities (Eglin DSS, 2007). Fires are usually beneficial in restoring natural communities, but it is unknown whether the wildfires potentially associated with the Proposed Action would have a net positive or negative effect on sensitive habitats and species. Wildfires can cause damage to sensitive habitats if they burn too hot, smolder, or if fire suppression activities are necessary.

Multiple federally listed species, including the flatwoods salamander and RCW, require frequent fire to keep scrubby vegetation to a minimum. Wildfires may achieve this purpose. However, with every wildfire, there is the potential for the alteration of the hydrology of flatwoods salamander and gopher frog habitat from fire suppression

activities, and for active RCW cavity trees to be killed. Prescribed fire is the preferred option for maintaining these habitats.

The Eglin Natural Resources Section predicts that an increase in explosives and munitions use from 7SFG(A) Range activities would approximately double the average number of wildfire starts per year (Furman, 2007b). This increase, in combination with additional structures in the wildlands and an increased need for prescribed fire for hazard mitigation in these live fire areas, would require additional wildland firefighting resources at Eglin. If wildland fire responses double, additional funding would be required for additional resources such as U.S. Forest Service support/reinforcements and additional qualified federal firefighters (Furman, 2007b). Section 12.5.13.2 of AFI 32-7064 states that the organization responsible for the increase in wild land fires must provide the additional funding required for additional resources necessary for wild land fire management.

For 7SFG(A) training, a Wildfire Operational Plan would be developed with Eglin's Natural Resources Section to identify high wildfire risk conditions and notification procedures that units would follow to engage fire response personnel when needed. Munitions and pyrotechnics use would follow Eglin's Wildfire Specific Action Guide Restrictions, which rate fire danger from low to extreme (U.S. Air Force, 2006n). During days with low fire danger, there are no restrictions on missions, but on days with extreme fire danger, no pyrotechnics are allowed without prior approval from the Wildland Fire Program Manager at Eglin's Natural Resources Section.

Negative and beneficial impacts to sensitive habitats and species from wildfires associated with munitions and pyrotechnics use are possible, but overall impacts to biological resources would not be great enough to be considered significant. Wildfires are not likely to adversely affect the RCW or flatwoods salamander. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of Alternative 1 that are part of the Preferred Alternative (e.g., Group 2 Ranges) (Appendix H, *Biological Resources*).

Direct Physical Impacts

The potential exists for sensitive species to be hit by munitions. However, most animals would move from the area if they sensed a general disturbance, especially loud noises. Direct impact to the cavity tree of a federally endangered RCW from munitions is possible. Where there is a high risk of projectile damage to foraging or nesting habitat, the 2006 Army guidelines state that, when practical and economically feasible, range layout should be modified/shielded to protect RCW foraging and nesting habitat (U.S. Army, 2006).

Although some sensitive species may traverse the SOF ranges, no sensitive species would have permanent habitat (i.e., RCW cavity tree, gopher tortoise burrow) on the

ranges, making the likelihood of a direct physical impact very low. The RCW is not likely to be adversely affected due to direct physical impacts from munitions and overall impacts to biological resources from direct physical impacts associated with munitions would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of Alternative 1 that are part of the Preferred Alternative (e.g., Group 2 Ranges) (Appendix H, *Biological Resources*).

Noise Impacts

Red-cockaded Woodpecker. Noise impacts to the federally endangered RCW are possible from munitions use. Table 5-34 contains information from the Fort Stewart study addressing flush response of RCWs to small-arms noise. Birds did not flush (i.e., take flight) when the distance of the small-arms fire was greater than 152.4 meters and the noise level was less than 80 dB. Overall, Delaney et al. (2002) found that military training exercises of short duration (less than two hours) conducted near active RCW cavity trees would not significantly affect the ability of the individuals to successfully reproduce. Activity longer than two hours was not tested.

Table 5-34. 7SFG(A) Range – Red-cockaded Woodpecker Response to Small-Arms Noise

Noise Source	Noise Level (SEL)	Distance (meters)	Notes
Small Arms (.50 cal blank)	<80	>152.4	Birds returned to nest an average of 6.3 minutes after noise ceased. Longest flush time was 26.8 minutes.

Source: Delaney et al., 2002
cal = caliber; SEL = Sound Exposure Level

Eglin's Natural Resources Section already requires that a buffer of 200 feet for patrols, bivouacking, and blank fire be observed around active cavity trees. Any new units or missions would continue to adhere to these measures. The closest active RCW tree is located over 1,500 meters from any proposed SOF and associated small-arms noise. Therefore, noise from munitions use associated with 7SFG(A) Range Alternative 1 is not likely to adversely affect the RCW, and impacts would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of 7SFG(A) Range Alternative 1 that are part of the Preferred Alternative (e.g., Group 2 Ranges) (Appendix H, *Biological Resources*).

Southeastern American Kestrel. The state-listed kestrel inhabits similar pine forest habitat as the RCW, but perches on snags along the perimeter of cleared areas when looking for prey. Research on noise and predatory birds indicates they will startle in response to aircraft overflights but have been observed to acclimate to this type of disturbance (Anderson et al., 1989). This species may be more likely to occur in closer

proximity to small-arms ranges because of its preference for open areas (Lane, 1997). Kestrels would be exposed intermittently to noise from small-arms fire but would likely acclimate to the disturbance over time (Larkin, 1996). Thus, impacts to the Southeastern American kestrel from munitions noise would not be significant.

Indigo Snake. Some reptiles and amphibians exhibit a response to low frequency impulse noise and may experience a temporary decrease in hearing sensitivity after prolonged exposure to 95 dB (Dufour, 1980; Manci et al., 1988). The noise levels to which federally threatened indigo snakes would be exposed from 7SFG munitions use are unknown and cannot be predicted. However, the lack of sightings of this species on Eglin in recent years (U.S. Air Force, 2006h) suggests a low risk of impacts. Individuals that may be present would likely be associated with some type of burrow, which would provide some protection from loud noise. Thus, the Eastern indigo snake is not likely to be adversely affected by munitions noise and impacts would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of 7SFG(A) Range Alternative 1 that are part of the Preferred Alternative (e.g., Group 2 Ranges). The Programmatic Indigo Snake ESA Section 7 consultation currently underway with the USFWS would be completed prior to the initiation of BRAC activities and impacts would be covered by this consultation.

Gopher Tortoise. There are no noise criteria or thresholds for hearing impacts to this species, though Bowles et al. (1999) studied sonic boom effects on the desert gopher tortoise. For occasional exposures to impulse noise (sonic booms), Bowles found that gopher tortoise hearing was not affected, but did caution against daily repeated exposures. As with the sonic booms studied by Bowles et al. (1999), bomb events are a low frequency impulse noise, but also have the potential for greater effect due to pressure, heat, and other blast effects. There have been few documented occurrences of the state-listed gopher tortoise within the proposed SOFs; however, these areas would be surveyed immediately prior to land clearing. If any burrows were located, Eglin would apply for a relocation permit from the FWC and relocate any tortoises in imminent danger from clearing for the ranges. Therefore, impacts to the gopher tortoise from munitions noise would not be significant.

Florida Black Bear. The state-listed Florida black bear potentially occurs within many of the proposed SOF areas and may be exposed to repetitive impulsive noise from munitions. This species uses a number of different habitats on Eglin, as indicated by documented sightings throughout the Eglin Reservation. Bears are not limited to any particular geographic area on Eglin and would be free to avoid noise and disturbance from munitions. Thus, impacts to the Florida black bear from munitions noise would not be significant.

Chemical Impacts

Pyrotechnics and munitions have the potential to impact sensitive species health if ingested or accumulated in soils and water. Species potentially affected include the federally listed RCW, Okaloosa darter, flatwoods salamander, and Eastern indigo snake, and the state-listed pine barrens tree frog, gopher frog, Southeastern American kestrel, Florida black bear, and gopher tortoise.

Potential effects on wildlife from the use of flares are inhalation of flare ash and ingestion of or contact with the chemical constituents of flares. The toxic effects of flare ash residue were tested on mammals, plants, and fish with concentrations of flare ash representing the high range that would be found in a pyrotechnic test area. Results indicated that the effects of flare ash residue are very minimal and not particularly dangerous to the environment (U.S. Air Force, 1997). Furthermore, the chemical constituents of flares are not of sufficient quantities to change soil, water, or air chemistry. None of the threatened or endangered species are known to be especially sensitive to the chemical constituents of flares.

Wildlife could be potentially exposed to dye-colored smoke through inhalation, ingestion, direct contact, or bioconcentration. The most likely opportunity for such exposure would be immediately after the smoke has been dispelled, but since wildlife would most likely leave the area during training exercises, the likelihood of direct exposure to toxic levels of emissions would be low. Ingestion or inhalation of particles in sufficient amounts to cause harm is unlikely because of the wind-driven distribution of smoke particles.

Munitions use has the potential to affect sensitive species, especially the Okaloosa darter, gopher frog, and flatwoods salamander, from chemical impacts. The north DZ/LZ and certain Group 1 SOF ranges (1, 3, and 4) and Group 2 SOF ranges (5, 6, 8, 10, 11, 12, and 13) would either overlap or be close to portions of Okaloosa darter streams (Figure 5-35 and Figure 5-36). Confirmed gopher frog ponds are located on SOF 6 (Figure 5-36). Containment of bullets within collection berms and periodic cleanup and disposal procedures would substantially reduce the potential for leaching from munitions to enter groundwater or runoff to water bodies. The risk to surface waters is assumed to be minimal if the lead source is more than 0.25 mile away (USFWS, 2008). 7SFG(A) Range Alternative 1 small arms ranges are located within 0.25 mile from creeks and streams. Thus, there is a risk that lead from Alternative 1 small arms ranges would leach into groundwater and eventually reach surface waters. Location of the impact areas away from gopher frog ponds, flatwoods salamander ponds, and Okaloosa darter streams would substantially reduce the potential for chemical and sedimentation impacts.

Impacts from chemicals associated with munitions and pyrotechnics may negatively affect some sensitive species. Suggested mitigations would greatly reduce this

potential. However, overall impacts to biological resources would not be of a magnitude to be considered significant. Chemicals are not likely to adversely affect the RCW, Okaloosa darter, flatwoods salamander, or Eastern indigo snake. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of Alternative 1 that are part of the Preferred Alternative (e.g., Group 2 Ranges) (Appendix H, *Biological Resources*).

Summary

Although some adverse impacts to sensitive habitats and species are possible, overall impacts to biological resources from 7SFG(A) Range Alternative 1 activities would not be of a magnitude to be considered significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS on the portions of Alternative 1 that are part of the Preferred Alternative (e.g., Group 2 Ranges, DZs/LZs, SRI, boat landing sites, interstitial areas) (Appendix H, *Biological Resources*).

5.11.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.11.2.1 Existing Conditions (Biological Resources – 7SFG(A) Range Alternative 2)

Land clearing/construction activities and munitions/pyrotechnics use at Group 2 SOF ranges, water operations, ground maneuvering, air operations, and DZs/LZs are the same as those discussed under 7SFG(A) Range Alternative 1. Only the 7SFG(A) Range Alternative 2 Group 1 SOF ranges are discussed in the Existing Conditions and Environmental Consequences sections here.

Flora and Fauna

All of the 7SFG(A) Range Alternative 2 Group 1 SOFs would be in Sandhills (Figure 5-40). Table 5-35 shows approximate acreages that potentially would be cleared for 7SFG(A) Range Alternative 2 Group 1 Ranges.

Table 5-35. 7SFG Range Alternative 2 – Group 1 SOFs Acres of Habitats

Identifier	Sandhills	ONA	SBS
SOF 1	0.7	-	-
SOF 3	4	-	-
SOF 4	14	12	12
SOF 7	10	10	10

ONA=Outstanding Natural Area; SBS=Significant Botanical Site; SOF=Special Operations Forces Range

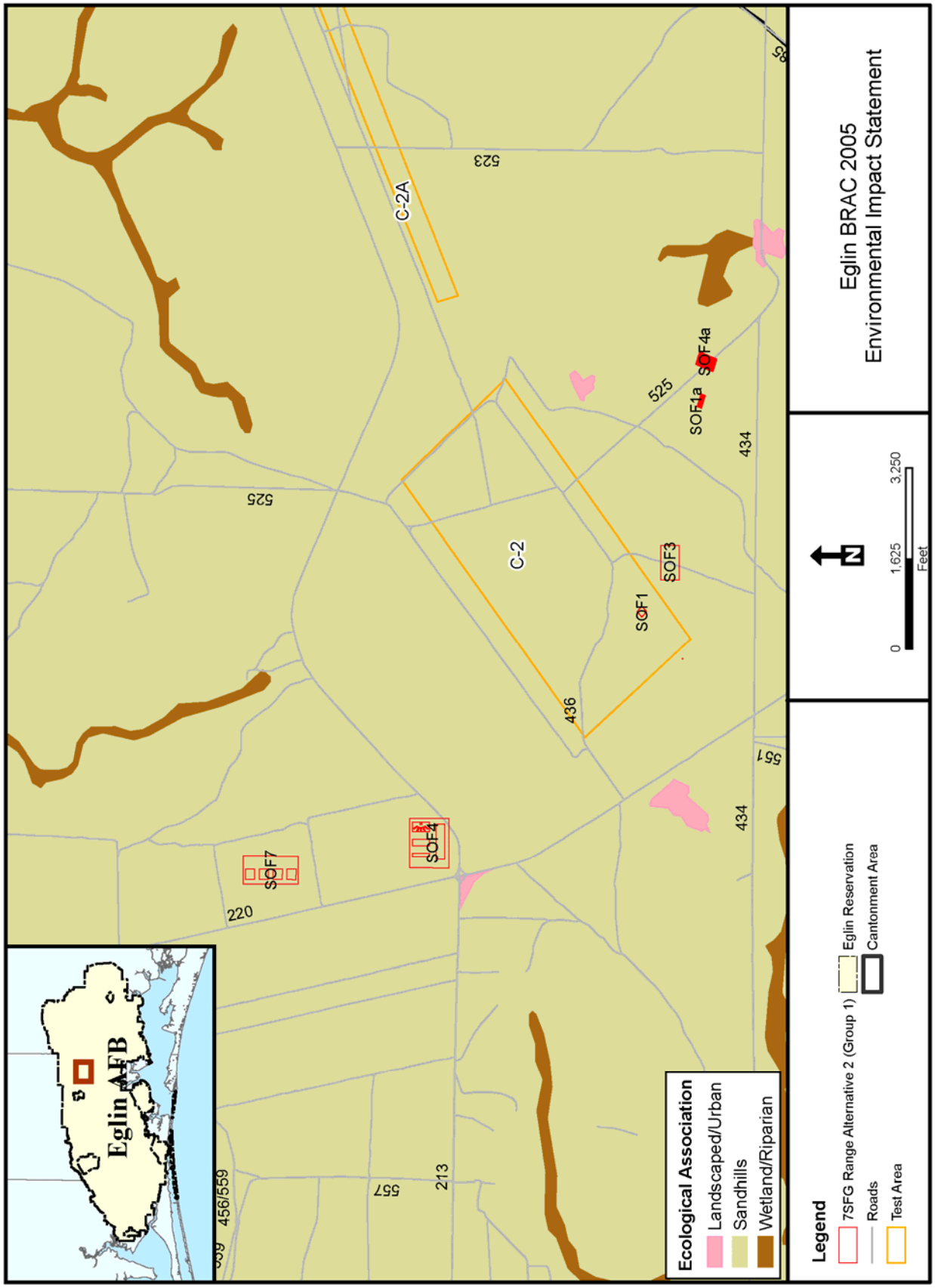

Figure 5-40. 7SFG(A) Range Alternative 2 – Group 1 Ecological Associations

Sensitive Habitats and Species

Under 7SFG(A) Range Alternative 2, the Group 1 Ranges are located around TA C-2 (Figure 5-41). The 7SFG(A) Range Alternative 2 SOF 4 and SOF 7 ranges overlap with approximately 12 acres and 10 acres, respectively, of the Spenser Flats Wetlands Outstanding Natural Area/Blue Spring Creek Lakes Significant Botanical Site north of TA C-2 (Figure 5-41).

Based on existing, available information, the species documented to occur or that may potentially be present within the 7SFG(A) Range Alternative 2 locations around TA C-2 are identified in Table 5-36 and Figure 5-41. Okaloosa darter streams begin to the east and west of TA C-2, with SOF 1a and SOF 4a located very close to darter streams (Eglin GIS, 2007c). The Eastern indigo snake has been documented in the area north of TA C-2 (Eglin GIS, 2007c). Inactive RCW trees are located near each of the Alternative 2 Group 1 SOFs, and historic gopher tortoise burrow locations are near SOF 7 (Eglin GIS, 2007c). No sensitive plants are located near the ranges proposed on and around TA C-2. Appendix H, *Biological Resources*, offers a more detailed natural history description of the species in Table 5-36.

Table 5-36. 7SFG(A) Range Alternative 2 – Group 1 SOF Ranges Sensitive Species Potentially Occurring on or Near the TA C-2 Area

Common Name	Scientific Name	State Status	Federal Status
Sensitive Animals			
Eastern indigo snake	*Drymarchon corais couperi*	ST	FT
Florida black bear	*Ursus americanus floridanus*	ST	--
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC	--
Gopher tortoise	*Gopherus polyphemus*	ST	--
Okaloosa darter	*Etheostoma okaloosae*	SE	FE
Red-cockaded woodpecker*	*Picoides borealis*	ST	FE
Southeastern American kestrel	*Falco sparverius paulus*	ST	--

Source: Eglin GIS, 2007a; Eglin GIS, 2007b; Eglin GIS, 2007c
FE = federally endangered FT = federally threatened; SE = state endangered; ST = state threatened; SSC = state species of special concern
*inactive RCW trees

5.11.2.2 Environmental Consequences (Biological Resources – 7SFG(A) Range Alternative 2)

This section discusses potential impacts to biological resources from activities associated with 7SFG(A) Range Alternative 2 Group 1 SOF ranges. For the species listed in Table 5-36, the types of potential impacts from 7SFG(A) Range Alternative 2 land clearing/construction and munitions/pyrotechnics activities (i.e., sedimentation, chemical impacts) would be the same as those detailed above for Alternative 1, but would occur in the TA C-2 area. 7SFG(A) Range Alternative 2 Group 1 range activities may result in additional impacts to certain sensitive habitats, as well as the RCW, Okaloosa darter, and gopher tortoise; these impacts are discussed below.

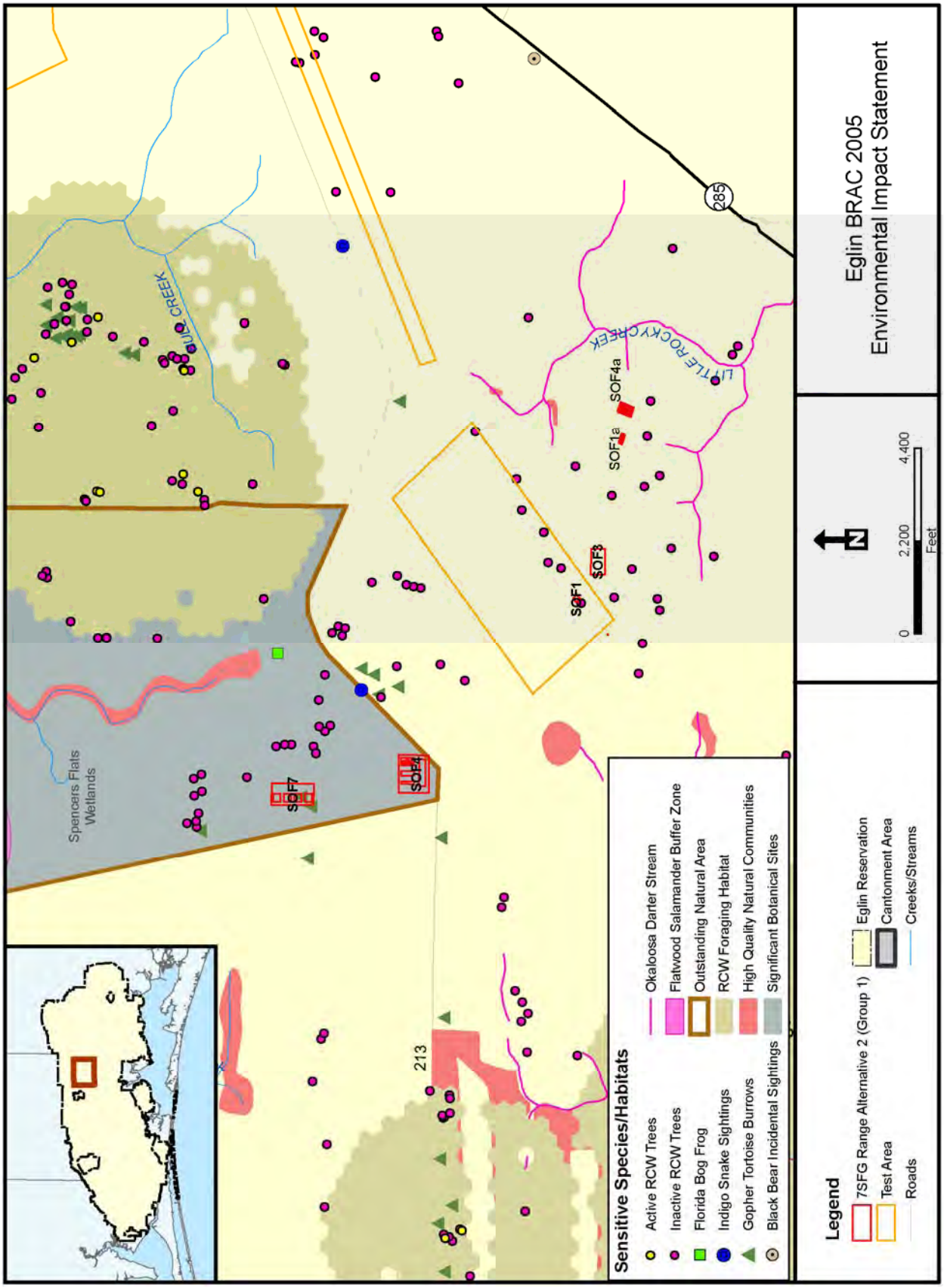

Figure 5-41. 7SFG(A) Range Alternative 2 – Group 1 Sensitive Habitats and Sensitive Species

Land Clearing and Construction Impacts

Under Alternative 2, land clearing and construction would occur in the Spenser Flats Wetlands Outstanding Natural Area/Blue Spring Creek Lakes Significant Botanical Site for Ranges SOF4 (12 acres) and SOF7 (10 acres). Up to 22 acres of high quality sandhills may be cleared for these ranges; however, this is only a small portion of the Outstanding Natural Area/Significant Botanical Site and no wetlands or sensitive plants are located on these sites. The nearest wetland is approximately one mile from S0F 7. Land clearers would coordinate with Eglin's Natural Resources Section prior to activities in or near sensitive habitats. Development within the Outstanding Natural Area/Significant Botanical Site would make it much more difficult to maintain a regular prescribed fire rotation, thus this Outstanding Natural Area/Significant Botanical Site may be affected due to fire suppression, resulting in changes to the vegetation composition and structure. However, overall impacts to sensitive habitats would not be of a magnitude to be considered significant.

The state-listed gopher tortoise has been sighted at the SOF 7 location. As discussed for 7SFG(A) Range Alternative 1, potential impacts would include burrow collapse and direct physical impacts during land clearing and construction activities. The Natural Resources Section would conduct a survey of the areas immediately prior to clearing to evaluate the presence of gopher tortoise burrows. If any tortoise burrows were found, Eglin would apply for a relocation permit from the FWC, and would relocate any gopher tortoises found to be in imminent danger from construction activities. Therefore, impacts to the gopher tortoise from land clearing and construction activities would not be significant.

7SFG(A) Range Alternative 2 may involve some clearing of trees near TA C-2. Up to five inactive RCW trees may be cut, but no foraging habitat would be cleared. None of the inactive cavity trees belong to an active cluster of the federally endangered RCW. Natural Resources Section biologists indicate there is a small potential for this cluster to become active but not in the near future (Gault, 2006). Therefore, the removal of inactive RCW trees for 7SFG(A) Range Alternative 2 is not likely to adversely affect the RCW or its habitat, and impacts would not be significant.

The types of possible impacts to the federally endangered Okaloosa darter (such as sediment runoff from land clearing and construction activities) are the same as for 7SFG(A) Range Alternative 1, except that the Group 1 SOF range locations would be in the TA C-2 area. Ranges SOF1a and SOF4a would be located close to Okaloosa darter streams under 7SFG(A) Range Alternative 2 (Figure 5-41). Note that the range layouts are conceptual and in locations where construction appears to impact streams, the final surveys and design layouts would be implemented so that riparian areas would not be impacted. Land clearing and construction for 7SFG(A) Range Alternative 2 is not likely to adversely affect the Okaloosa darter, and impacts would not be significant.

Munitions and Pyrotechnics Use

Under Alternative 2, munitions and pyrotechnics use would occur in the Spenser Flats Wetlands Outstanding Natural Area/Blue Spring Creek Lakes Significant Botanical Site at Ranges SOF4 and SOF7, potentially causing an increase in wildfires. Wildfires could have beneficial impacts on these fire-adapted habitats, but due to the potential for ground-disturbing fire suppression activities (e.g., bulldozers) to protect structures and for the wildfires to burn extremely hot, it is preferable to avoid wildfires and instead use prescribed fire. To reduce the potential for wildfires impacting this Outstanding Natural Area/Significant Botanical Site, a Wildfire Operational Plan would be developed with Eglin's Natural Resources Section to identify high wildfire risk conditions and notification procedures that units would follow to engage fire response personnel when needed. Munitions and pyrotechnics use would follow Eglin's Wildfire Specific Action Guide Restrictions (U.S. Air Force, 2006n). Implementation of the Wildfire Operational Plan would reduce the potential for wildfires and associated negative effects. Thus, impacts to sensitive habitats from Alternative 2 munitions and pyrotechnics use would not be significant.

No active RCW trees or foraging habitat are located near the ranges around TA C-2, thus, there would be no effect to the RCW from munitions or pyrotechnics use, and impacts would not be significant. The types of possible impacts to Okaloosa darters (such as chemical impacts) are the same as for Alternative 1, except that the Group 1 range locations would be in the TA C-2 area. Munitions and pyrotechnics use for 7SFG(A) Range Alternative 2 is not likely to adversely affect the Okaloosa darter, and impacts would not be significant.

Summary

Although some adverse impacts to sensitive habitats and species are possible, overall impacts to biological resources from 7SFG(A) Range Alternative 2 activities (including Group 2 SOFs, SRI, etc.) would not be of a magnitude to be considered significant.

5.11.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.11.3.1 Existing Conditions (Biological Resources – 7SFG(A) Range Alternative 3)

Land clearing/construction activities and munitions/pyrotechnics use at Group 2 SOF ranges, water operations, ground maneuvering, air operations, and DZs/LZs are the same as those discussed under 7SFG(A) Range Alternative 1, with the exception of SOF 8, which moves from the TA C-53 area to an area east of Camp Rudder. Only the 7SFG(A) Range Alternative 3 Group 1 SOF ranges and SOF 8 are discussed in the Existing Conditions and Environmental Consequences sections here.

Flora and Fauna

All of the Alternative 3 Group 1 SOFs and SOF 8 would be in Sandhills (Figure 5-42). Table 5-37 shows approximate acreages that potentially would be cleared for 7SFG(A) Range Alternative 3 Group 1 Ranges and SOF 8.

Table 5-37. 7SFG Range Alternative 3 – Group 1 SOFs and SOF 8 Acres of Habitats

Identifier	Sandhills
SOF 1	0.7
SOF 3	4
SOF 4	14
SOF 7	10
SOF 8	18

SOF=Special Operations Forces Range

Sensitive Habitats and Species

Based on existing, available information, the species documented to occur or that may potentially be present within the 7SFG(A) Range Alternative 3 locations east of Camp Rudder are identified in Table 5-38 and Figure 5-43. Active RCW trees and RCW foraging habitat exist throughout most of this proposed area east of Camp Rudder (Eglin GIS, 2007b). Black bear have been sighted here also (Eglin GIS, 2007a). Appendix H, *Biological Resources*, offers a more detailed natural history description of these species.

Table 5-38. 7SFG(A) Range Alternative 3 – Group 1 SOF Ranges and SOF 8 Sensitive Species Potentially Occurring on or Near the Sites

Common Name	Scientific Name	State Status	Federal Status
Sensitive Animals			
Eastern indigo snake	*Drymarchon corais couperi*	ST	FT
Florida black bear	*Ursus americanus floridanus*	ST	--
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC	--
Gopher tortoise	*Gopherus polyphemus*	ST	--
Red-cockaded woodpecker	*Picoides borealis*	ST	FE
Southeastern American kestrel	*Falco sparverius paulus*	ST	--
Sensitive Plants			
Hairy Wild Indigo	*Baptisia calycosa var villosa*	ST	--
Panhandle Lily	*Lilium iridollae*	SE	--
Sweet Pitcher Plant	*Sarracenia rubra*	ST	--

Source: Eglin GIS, 2007a; Eglin GIS, 2007b; Eglin GIS, 2007c
FE = federally endangered; FT = federally threatened; SE = state endangered; ST = state threatened; SSC = state species of special concern

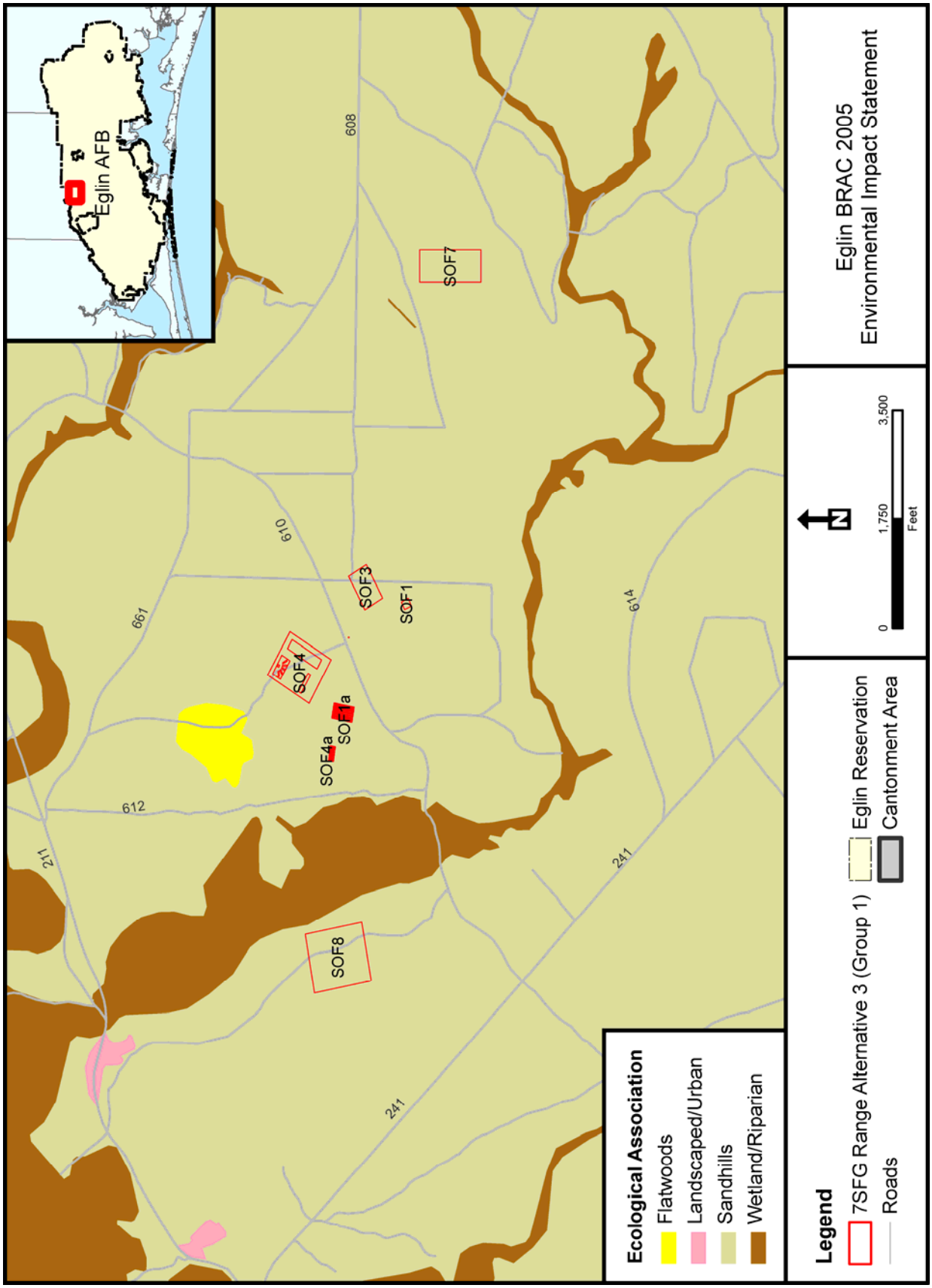

Figure 5-42. 7SFG(A) Range Alternative 3 – Group 1 and SOF 8 Ecological Associations

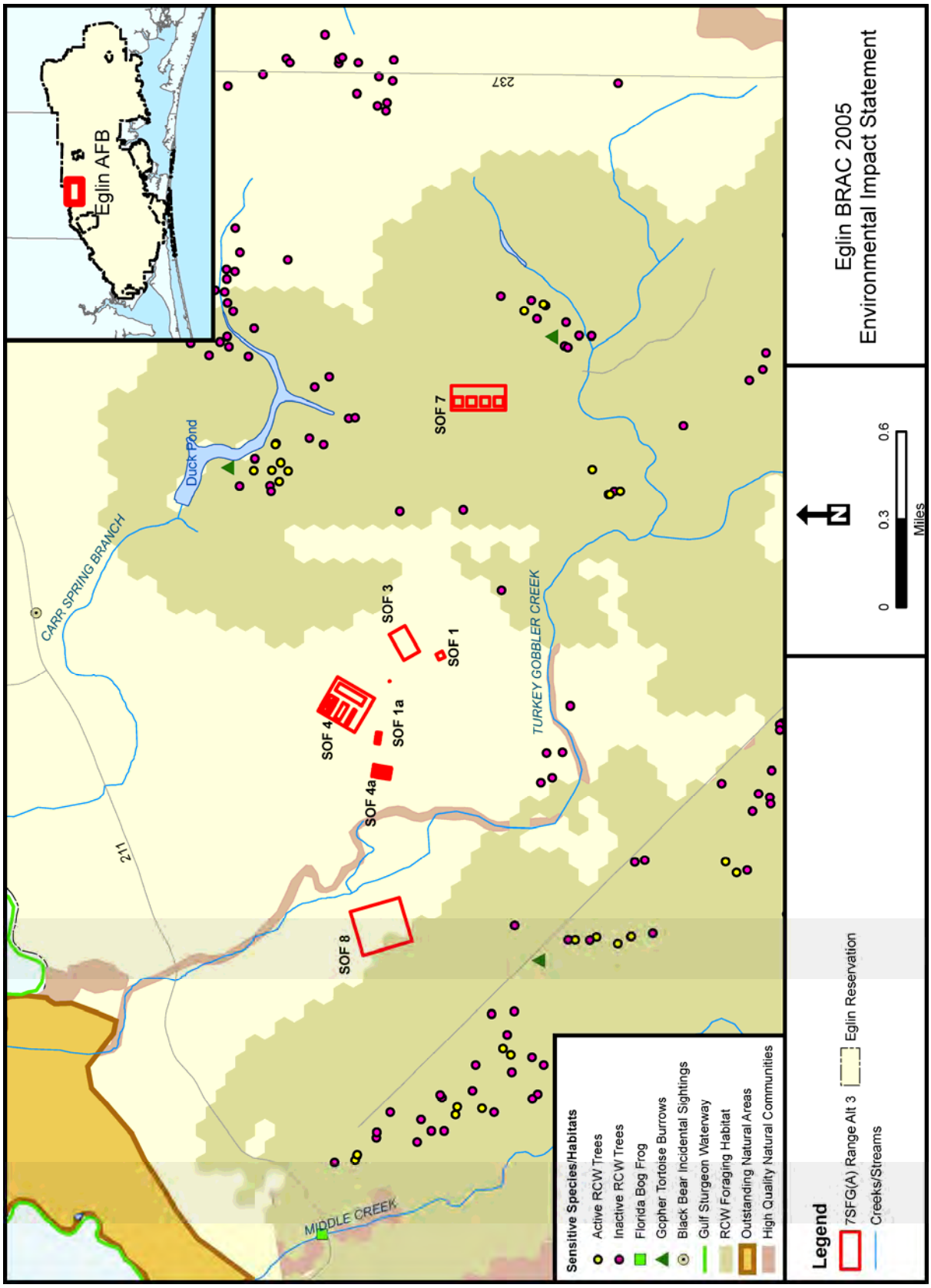

Figure 5-43. 7SFG(A) Range Alternative 3 – Group 1 and SOF 8 Sensitive Habitats and Sensitive Species

5.11.3.2 Environmental Consequences (Biological Resources – 7SFG(A) Range Alternative 3)

This section discusses potential impacts to biological resources from the 7SFG(A) Range Alternative 3 (Preferred Alternative) Group 1 SOF ranges and SOF 8. For the species listed in Table 5-38, the types of potential impacts from 7SFG(A) Range Alternative 3 land clearing/construction and munitions/pyrotechnics activities (i.e., sedimentation, chemical impacts) would be the same as those detailed above for Alternative 1, but would occur in the area east of Camp Rudder. 7SFG(A) Range Alternative 3 range activities would result in additional impacts to the federally endangered RCW; these impacts are discussed below. Due to the overall potential for impacts to federally listed species, Eglin has conducted a Section 7 consultation with the USFWS for Alternative 3 (Preferred Alternative). Table 5-43 details potential mitigations for 7SFG(A) Range Alternative 3 (Appendix H, *Biological Resources*).

Land Clearing and Construction Impacts

Based on the calculations of the Eglin RCW model and the location of 7SFG(A) Range Alternative 3 in reference to the foraging habitat, the habitat loss to RCW cluster 102F from the tree clearing from SOF 7 would be 10.2 acres (Figure 5-43). Of the 10.2 acres, only 2.9 acres would be optimal habitat and 7.3 acres would be considered marginal habitat. Therefore, even with the removal of 10.2 acres, 28 percent would be considered optimal habitat (Eglin GIS, 2007b). Even though the 1 acre to be removed from cluster 101B due to SOF 8 would be optimal habitat, Alternative 3 would still leave 583 acres of foraging habitat which is above the managed stability standard and the recovery standard (Eglin GIS, 2007b; U.S. Air Force, 2006l). Therefore, even with 11.2 acres being removed from both clusters, only a small fraction (2.9 acres from cluster 102F and 1 acre from cluster 101B) would be considered optimal habitat. As described in Chapter 4, Section 4.12.2.2, Environmental Consequences, if the proposed action affects less than 1 percent of the foraging resources, and the foraging resources are above Eglin's Managed Stability Standard, then no consultation with the USFWS would be required.

All criteria would be well above the recovery standards set for the Eglin RCW population (U.S. Air Force, 2006l) and a "no effect" determination would be made by Eglin's Natural Resources Section for land clearing and construction activities for 7SFG(A) Group 1 Ranges; consultation would not be required (Gault, 2006) based on the foraging partition analysis (USFWS, 2005c) and the *Threatened and Endangered Species Component Plan* (U.S. Air Force, 2006l). However, cumulatively, the 7SFG(A) Alternative 3 ranges may affect the RCW and Eglin has conducted an ESA Section 7 consultation with the USFWS.

Prescribed fire is the preferred method for managing RCW foraging habitat in Sandhills. However, development of the 7SFG(A) Group 1 Ranges and SOF 8 would

limit the ability of the Natural Resources Section to conduct prescribed burns in this foraging habitat. Eglin Natural Resources Section would not be able to burn the area as frequently or as well due to smoke management problems with the ranges. This, in turn, would lead to the degradation of quality RCW foraging habitat around the 7SFG(A) Group 1 Ranges and SOF 8 if there is fire suppression and no alternative means (herbicides or mechanical) to control midstory vegetation. A decrease in the frequency of prescribed fires (to reduce fuel loads) may also lead to an increase in the number and severity of wildfires surrounding the ranges, which have the potential to damage RCW cavity trees.

Although the Proposed Action may limit the ability of the Natural Resources Section to conduct prescribed burns in the area, it may be possible to conduct enough burns in the area to continue RCW habitat maintenance, through coordination with 7SFG(A) and mission personnel. Additional manpower would be required to burn these areas and to coordinate with 7SFG(A) personnel at the cantonment area and ranges. Alternate means of controlling undergrowth are also available and could be used here. These methods include using specific herbicides that target understory or midstory vegetation and mechanical means. Although chemical or mechanical means are not as beneficial to the habitat as prescribed fire, the Natural Resources Section believes habitat degradation due to fire suppression may be significant enough to warrant "take" of the species and formal consultation (Hagedorn, 2007).

Fire suppression may affect the quality of RCW foraging habitat, but other means of understory vegetation control (i.e., chemical or mechanical methods) would be utilized to simulate fire and maintain RCW foraging habitat. Cumulatively, the 7SFG(A) Alternative 3 ranges may affect the RCW and are likely to adversely affect the species; however, impacts to the RCW would not be significant. Due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS (Appendix H, *Biological Resources*).

Munitions and Pyrotechnics Use

The location of the Group 1 Ranges and SOF 8 east of Camp Rudder would increase the possibility for RCW impacts due to the proximity of RCWs and RCW foraging habitat. As discussed for 7SFG(A) Range Alternative 1, munitions and pyrotechnics use may cause potential direct physical impacts, foraging habitat alteration (i.e., wildfires), and noise impacts. These same types of impacts would be possible at the 7SFG(A) Range Alternative 3 Group 1 Ranges and SOF 8. The closest active RCW tree is located over 400 meters from any proposed SOF and associated small-arms noise (Table 5-34). Requirements from Chapter 2 (Section 2.4.2.1, Common Elements Among Alternatives) including the management guidelines for the RCW on Army installations (U.S. Army, 2006), would be implemented at 7SFG(A) Range Alternative 3 Group 1 Ranges and SOF 8 to reduce potential impacts. Thus, munitions and pyrotechnics use associated

with 7SFG(A) Range Alternative 3 is not likely to adversely affect the RCW, and impacts would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS (Appendix H, *Biological Resources*).

Summary

Although some adverse impacts to sensitive habitats and species are possible, overall impacts to biological resources from 7SFG(A) Range Alternative 3 activities (including Group 2 SOFs, SRI, etc.) would not be of a magnitude to be considered significant. Eglin has conducted an ESA Section 7 consultation with the USFWS for Alternative 3 (Preferred Alternative) (Appendix H, *Biological Resources*).

5.11.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.11.4.1 Existing Conditions (Biological Resources – 7SFG(A) Range Alternative 4)

Land clearing/construction activities and munitions/pyrotechnics use at Group 2 SOF ranges, water operations, ground maneuvering, air operations, and DZs/LZs are the same as those discussed under 7SFG(A) Range Alternative 1. Only 7SFG(A) Range Alternative 4 Group 1 SOF ranges are discussed in the Existing Conditions and Environmental Consequences sections here.

Flora and Fauna

7SFG(A) Range Alternative 4 Group 1 SOFs would be in Sandhills and Wetland/Riparian areas (Figure 5-44). Table 5-39 shows approximate acreages that potentially would be cleared for 7SFG(A) Range Alternative 4 ranges.

Table 5-39. 7SFG Range Alternative 4 – Group 1 SOFs Acres of Habitats

Identifier	Sandhills	Wetland/ Riparian
SOF 1	0.7	-
SOF 3	4	
SOF 4	14	-
SOF 7	7	3

SOF = Special Operations Forces Range

Sensitive Habitats and Species

A few High Quality Natural Communities exist north of SOF 4 and SOF 7 (Figure 5-45).

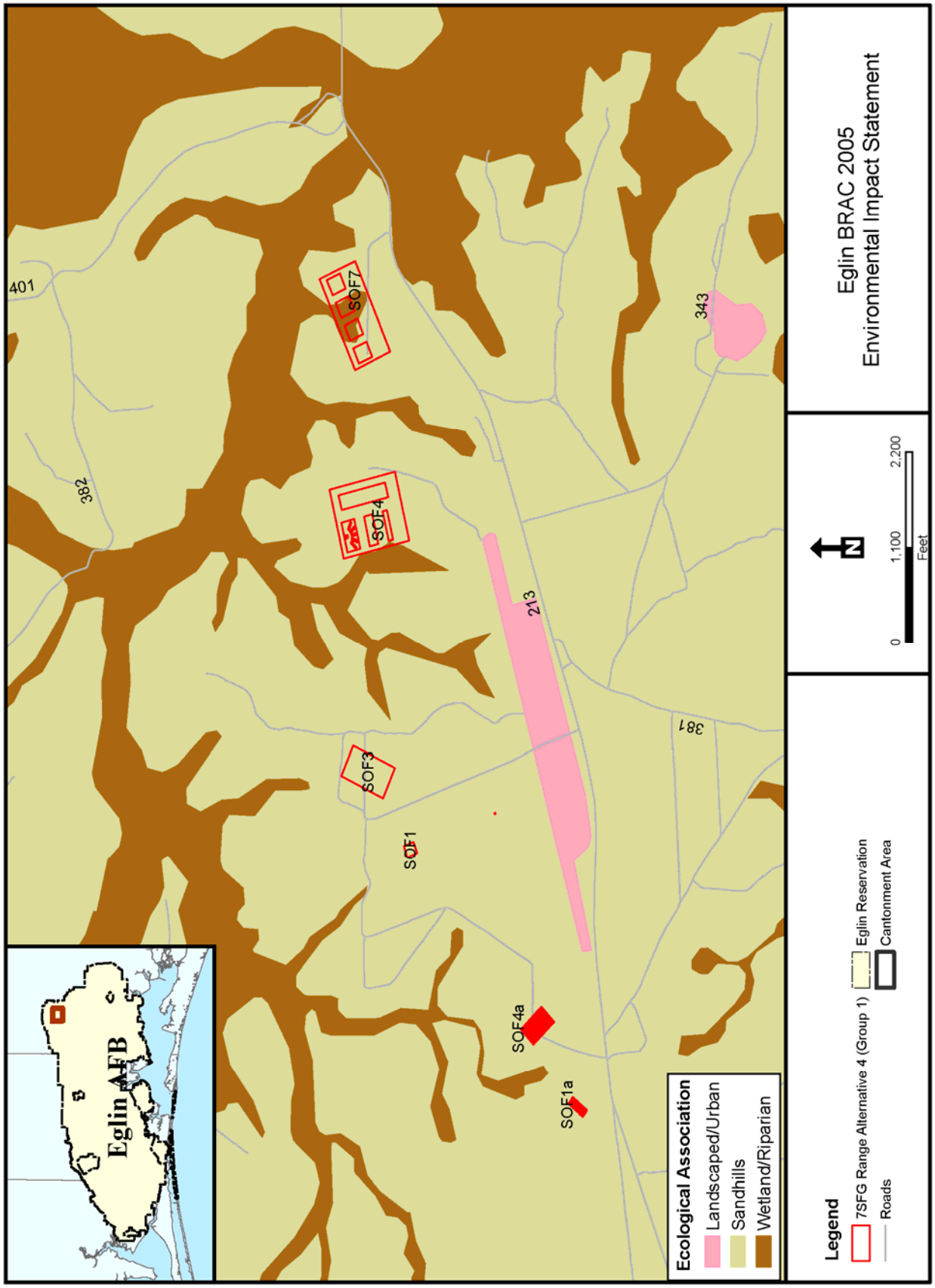

Figure 5-44. 7SFG(A) Range Alternative 4 – Group 1 Ecological Associations

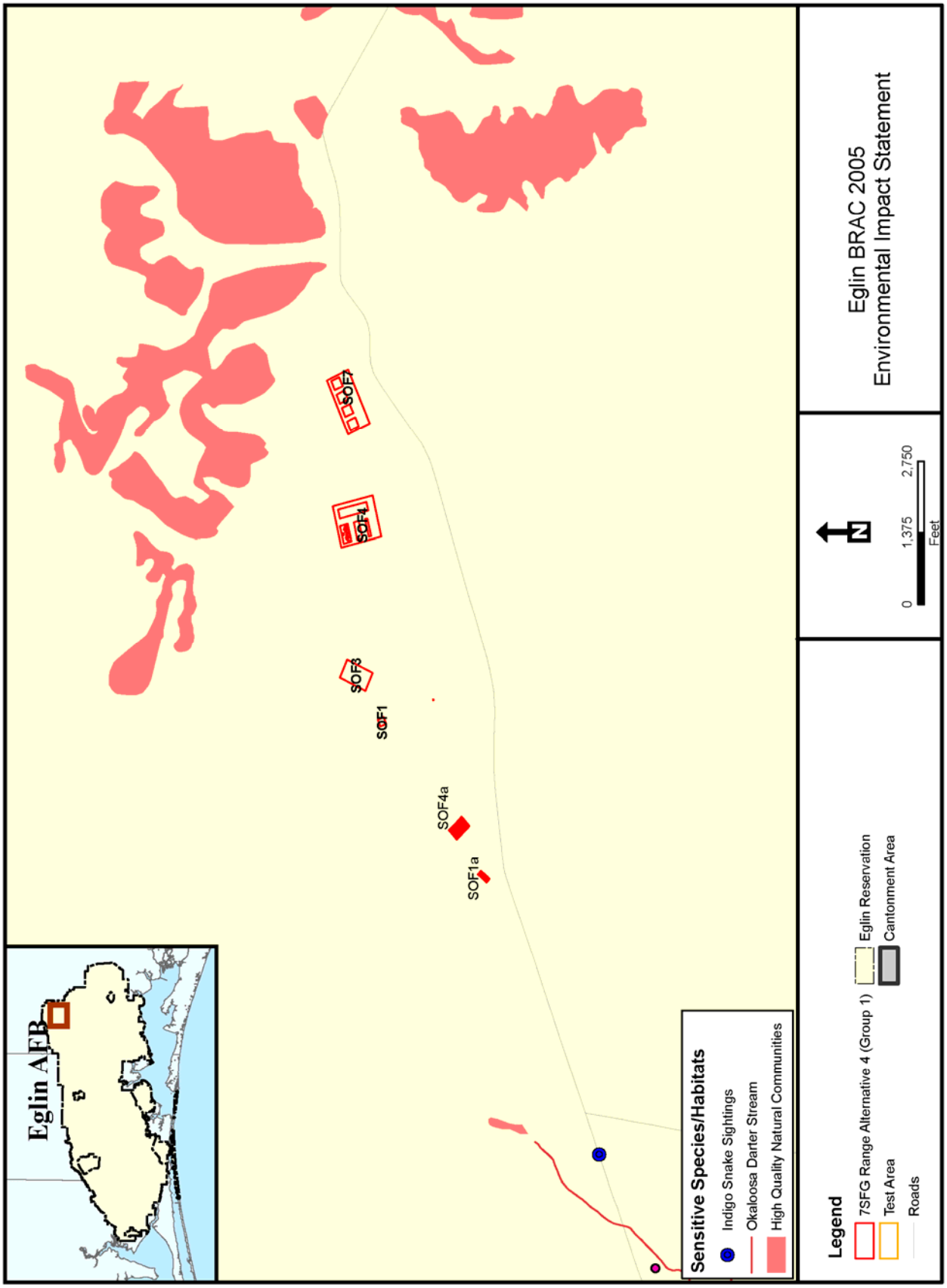

Figure 5-45. 7SFG(A) Range Alternative 4 – Group 1 Sensitive Habitats and Sensitive Species

Based on existing, available information, the species documented to occur or that may potentially be present within 7SFG(A) Range Alternative 4 locations are identified in Table 5-40 and Figure 5-45. No sensitive animal or plant species have been documented at the sites, but the indigo snake, black bear, and pine snake may traverse the areas. Appendix H, *Biological Resources*, offers a more detailed natural history description of these species.

Table 5-40. 7SFG(A) Range Alternative 4 – Group 1 SOF Ranges Sensitive Species Potentially Occurring in or Near the Sites

Common Name	Scientific Name	State Status	Federal Status
Eastern Indigo Snake	*Drymarchon corais couperi*	ST	FT
Florida Black Bear	*Ursus americanus floridanus*	ST	--
Florida Pine Snake	*Pituophis melanoleucus mugitus*	SSC	--

Source: Eglin GIS, 2007a; Eglin GIS, 2007c
FT = federally threatened; SC = state species of special concern; ST = state threatened

5.11.4.2 Environmental Consequences (Biological Resources – 7SFG(A) Range Alternative 4)

This section discusses potential impacts to biological resources from 7SFG(A) Range Alternative 4 Group 1 SOF ranges (Figure 5-45). Because no sensitive species have been documented in 7SFG(A) Alternative 4 area, the location of the Group 1 SOFs in the northwest portion of Eglin would reduce potential impacts to all sensitive species compared to the other alternatives. The same types of potential impacts would apply to 7SFG(A) Alternative 4 for transient species such as the indigo snake, pine snake, and black bear as those for 7SFG(A) Alternative 1. Table 5-43 details potential mitigations for 7SFG(A) Range Alternative 4.

Although some adverse impacts to sensitive habitats and species are possible, the overall impacts to biological resources from 7SFG Range Alternative 4 activities (including Group 2 SOFs, SRI, etc.) would not be of a magnitude to be considered significant.

5.11.5 7SFG(A) Range Alternative 5: East Side Training

5.11.5.1 Existing Conditions (Biological Resources – 7SFG(A) Range Alternative 5)

Land clearing/construction activities and munitions/pyrotechnics use at Group 2 SOF ranges, water operations, ground maneuvering, air operations, and DZs/LZs are the same as those discussed under 7SFG(A) Range Alternative 1. Only 7SFG(A) Range

Alternative 5 Group 1 SOF ranges are discussed in the Existing Conditions and Environmental Consequences sections here.

Flora and Fauna

The 7SFG(A) Range Alternative 5 Group 1 SOFs would be in Sandhills and Landscaped/Urban areas in the TA C-53 area (Figure 5-46). Table 5-41 shows approximate acreages that potentially would be cleared for 7SFG(A) Range Alternative 5 Group 1 Ranges.

Table 5-41. 7SFG(A) Range Alternative 5 – Group 1 SOFs Acres of Habitats

Identifier	Sandhills	Landscaped/Urban
SOF 1	0.7	-
SOF 3	4	-
SOF 4	14	-
SOF 7	6	4

SOF=Special Operations Forces Range

Sensitive Habitats and Sensitive Species

No sensitive habitats occur at or near the 7SFG(A) Alternative 5 Group 1 Ranges (Figure 5-47).

Based on existing, available information, the species documented to occur or that may potentially be present within the 7SFG(A) Range Alternative 5 Group 1 SOF locations are identified in Table 5-42 and Figure 5-47. Multiple Okaloosa darter streams begin on TA C-53 (Eglin GIS, 2007c). A gopher tortoise burrow has been documented near TA C-53 and there has been a nearby sighting of a Florida black bear (Eglin GIS, 2007a). Due to the habitat type and presence of gopher tortoises, there is potential for the presence of indigo snakes and Florida pine snakes, as the snakes utilize gopher tortoise burrows for habitat. Also, numerous inactive RCW trees are adjacent to TA C-53, and potential flatwoods salamander habitat is located to the west of SOF 7 and north of SOF 4 (Eglin GIS, 2007b). Figure 5-47 shows the locations of sensitive species at TA C-53. Appendix H, *Biological Resources*, offers a more detailed natural history description of all of the sensitive species discussed above.

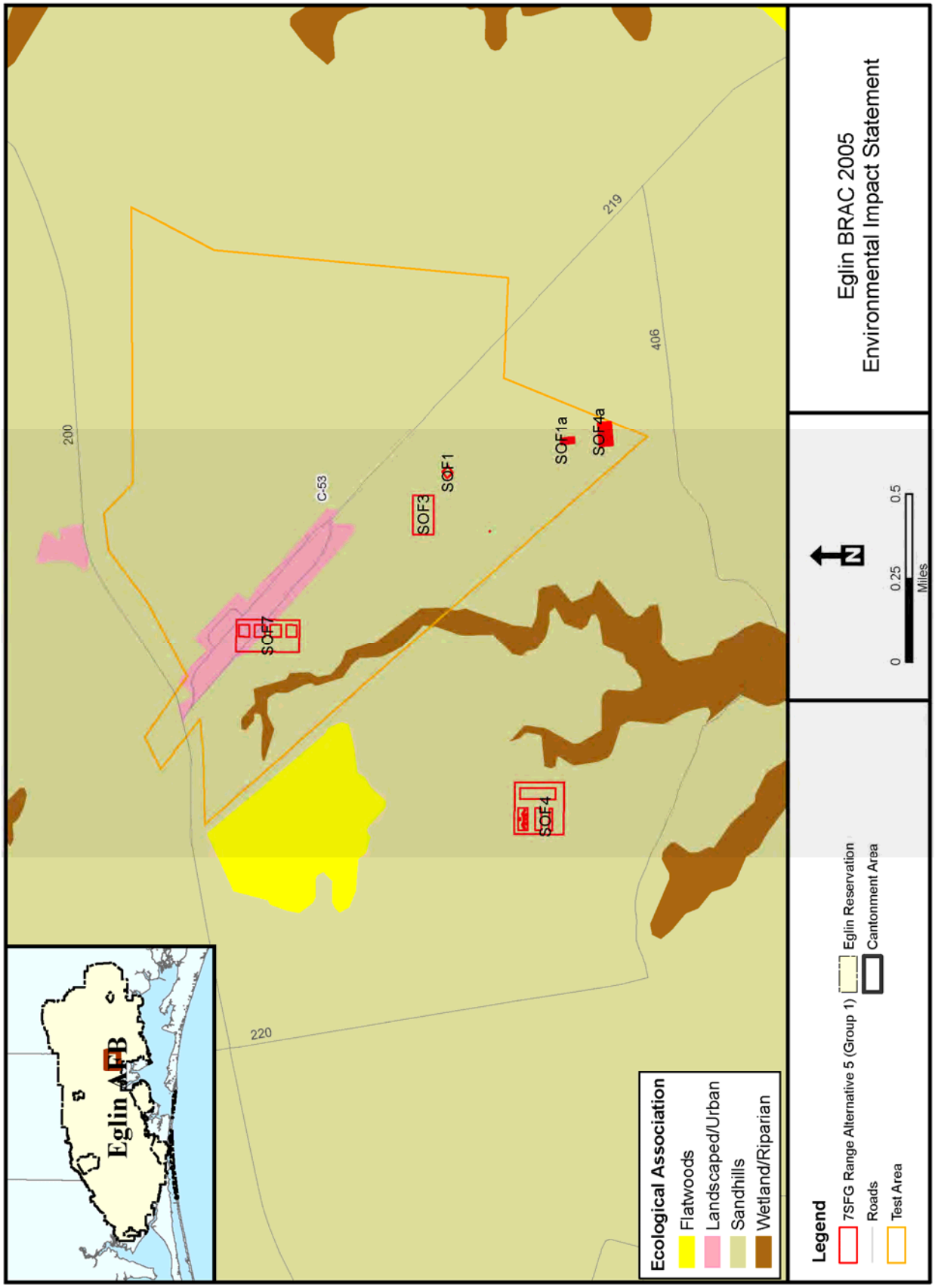

Figure 5-46. 7SFG(A) Range Alternative 5 – Group 1 SOFs Ecological Associations

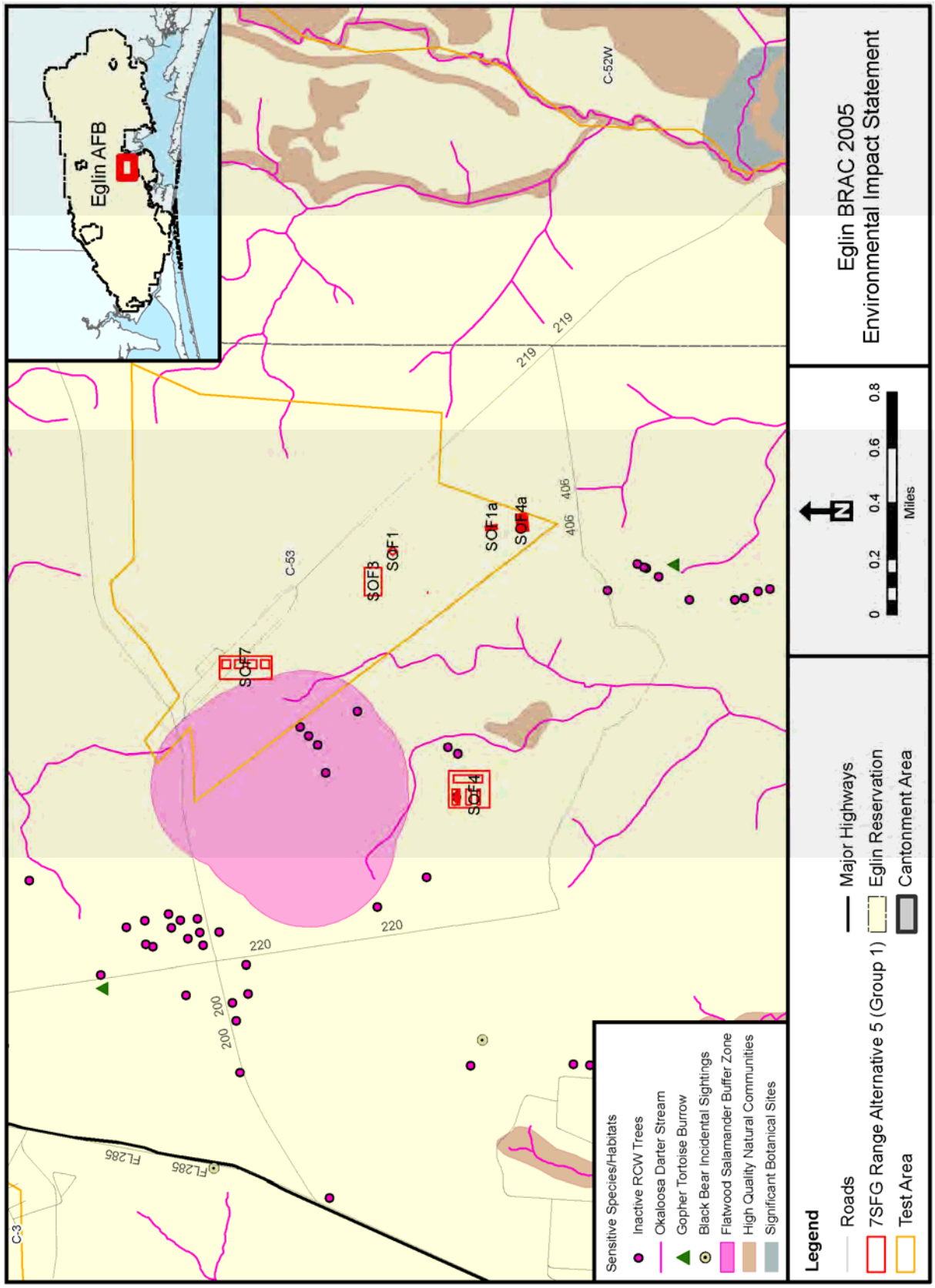

Figure 5-47. 7SFG(A) Range Alternative 5 – Group 1 SOFs Sensitive Habitats and Sensitive Species

5.11.5.2 Environmental Consequences (Biological Resources – 7SFG(A) Range Alternative 5)

This section discusses potential impacts to biological resources from the 7SFG(A) Range Alternative 5 Group 1 SOF ranges. For the species listed in Table 5-42, the types of potential impacts from 7SFG(A) Range Alternative 5 land clearing/construction and munitions/pyrotechnics activities (i.e., sedimentation, chemical impacts) would be the same as those detailed above for 7SFG(A) Range Alternative 1, but would occur in the TA C-53 area. 7SFG(A) Range Alternative 5 Group 1 range activities would result in additional impacts to the federally listed Okaloosa darter and flatwoods salamander in the TA C-53 area, as described below. Table 5-43 details potential mitigations for 7SFG(A) Range Alternative 5.

Table 5-42. Sensitive Species that May Occur on or Near TA C-53

Common Name	Scientific Name	State Status	Federal Status
Sensitive Animals			
Eastern indigo snake	*Drymarchon corais couperi*	ST	FT
Flatwoods salamander	*Ambystoma cingulatum*	SSC	FT
Florida black bear	*Ursus americanus floridanus*	ST	--
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC	--
Okaloosa darter	*Etheostoma okaloosae*	SE	FE
Red-cockaded woodpecker*	*Picoides borealis*	ST	FE
Southeastern American kestrel	*Falco sparverius paulus*	ST	--
Sensitive Plants			
Arkansas Oak	*Quercus arkansana*	ST	--
Baltzell's Sedge	*Carex baltzellii*	ST	--
Hairy Wild Indigo	*Baptisia calycosa* var. *villosa*	ST	--
Orange Azalea	*Rhododendron austrinum*	SE	--
Panhandle Lily	*Lilium iridollae*	SE	--
Sandhill Sedge	*Carex tenax*	--	--

Sources: Eglin GIS, 2007a; Eglin GIS, 2007b; Eglin GIS, 2007c; U.S. Air Force, 2005f; U.S. Air Force, 2006l
FE = federally endangered; FT = federally threatened; SE = state-endangered; SSC = state species of special concern; ST = state-threatened
*Inactive RCW cavity trees

Under 7SFG(A) Range Alternative 5, all of the Group 1 Ranges would be located close to darter streams, thus there would be a greater potential for impacts from land clearing/construction and munitions/pyrotechnics use than for 7SFG(A) Range Alternative 1 Group 1 Ranges (Figure 5-47). Note that the range layouts are conceptual and in those locations where construction appears to impact streams, the final surveys and design layouts would be implemented so that riparian areas would not be impacted. Thus, land clearing/construction and munitions/pyrotechnics use for 7SFG(A) Range Alternative 5 Group 1 Ranges are not likely to adversely affect the Okaloosa darter, and impacts would not be significant.

Potential flatwoods salamander habitat exists southwest of TA C-53 (Figure 5-47). Eglin Natural Resources Section biologists indicate that none of the range areas associated with the proposed action on the eastern side of Eglin are considered good potential habitat for the flatwoods salamander, and that the areas potentially impacted have a

very low likelihood of actually supporting flatwoods salamander populations (Hagedorn, 2006). Erosion control measures used during land clearing/construction would minimize the potential for runoff and munitions cleanup procedures would reduce the likelihood of chemical impacts. As discussed in Section 4.12.2.2, increased frequency of wildfires would increase the potential for ground-disturbing fire suppression activities, which may result in alterations in hydrology and excess sedimentation. Restrictions on prescribed fire near the ranges due to smoke management concerns and closures would allow hardwoods to encroach on the ponds, resulting in a degradation of the ponds as salamander breeding habitat. However, as stated previously, these ponds are not likely to support flatwoods salamanders; thus 7SFG(A) Range Alternative 5 Group 1 activities are not likely to adversely affect the flatwoods salamander, and impacts would not be significant.

Although some adverse impacts to sensitive habitats and species are possible, overall impacts to biological resources from 7SFG(A) Range Alternative 5 activities (including Group 2 SOFs, SRI, etc.) would not be of a magnitude to be considered significant.

5.11.6 No Action Alternative

The No Action Alternative would involve activities on Eglin Main Base, D-51, and Duke Field. The majority of Eglin Main Base and Duke Field is Landscaped/Urban, with smaller areas of Sandhills. Almost all of D-51 is degraded Sandhills that have been invaded by sand pine. On Eglin Main Base, inactive RCW trees and one Okaloosa darter stream are present. The only sensitive species documented at Duke Field is the gopher tortoise. No sensitive species have been documented at D-51, but the headwaters of one Okaloosa darter stream begins to the north of the site.

Under the No Action Alternative, impacts to biological resources from clearing, construction, DZ/LZs, water operations, air operations, ground maneuvering, munitions and pyrotechnics use would not occur. The predictable actions that are to occur at Eglin through the year 2015 are all to be located either on Eglin Main Base or at established test areas, where wildlife habitat quality is poor. Activities by the FLARNG at D-51 would occur in an area degraded by sand pine, and construction on Eglin Main Base would occur primarily in areas that are already developed. The realignment of the Air Force Reserve's 919 SOW located at Duke Field would reduce noise and activity levels in the Duke Field area, reducing disturbance to wildlife and potentially allowing an increase in prescribed burning in the area. Impacts to biological resources from the No Action Alternative would not be significant.

5.11.7 Potential Mitigations

As stated in Chapter 2 (Section 2.4.2.1), there are certain operating constraints based on current agreements with the USFWS for T&E species protection. Additionally, all terms and conditions resulting from the BRAC Section 7 consultation with the USFWS would be implemented. Below are potential additional mitigations to reduce or remove impacts to biological resources from 7SFG Range Alternative activities.

Table 5-43. 7SFG(A) Range Alternatives – Potential Mitigations for Biological Resources

Biological Resource	Potential Mitigation	Group 2 Ranges and DZs/LZs	SRI	Boat Landing Sites*	Interstitial Areas	Group 1 Ranges for Alternative:				
						1	2	3	4	5
High Quality Natural Community	Employ erosion control measures such as silt fences near High Quality Natural Communities associated with wetland/riparian areas.	√				√				
	Minimize clearing and avoid construction in wet High Quality Natural Communities. Maintain at least a 100-foot vegetative buffer around these wetlands/streams.	√				√				
	Continue prescribed burning as much as possible in High Quality Natural Communities.	√			√				√	
	During ground maneuvers, avoid land disturbing activities within wet High Quality Natural Communities (i.e., off-road vehicle use, bivouac, fighting positions). Mark these areas on maps.	√			√	√				
Outstanding Natural Area	Employ erosion control measures such as silt fences near Outstanding Natural Areas associated with wetland/riparian areas.	√								
	Minimize clearing and avoid construction in wet Outstanding Natural Areas. Maintain at least a 100-foot vegetative buffer around these wetlands/streams.	√								
	Continue prescribed burning as much as possible in Outstanding Natural Areas.	√			√		√			
	During ground maneuvers, avoid land disturbing activities within wet Outstanding Natural Areas (i.e., off-road vehicle use, bivouac, fighting positions). Mark these areas on maps.	√			√					
Significant Botanical Site	Employ erosion control measures such as silt fences near Significant Botanical Sites associated with wetland/riparian areas.	√								

Table 5-43. 7SFG(A) Range Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	Group 2 Ranges and DZs/LZs	SRI	Boat Landing Sites*	Interstitial Areas	Group 1 Ranges for Alternative:				
						1	2	3	4	5
Significant Botanical Site, Cont'd	Minimize clearing and avoid construction in wet Significant Botanical Sites. Maintain at least a 100-foot vegetative buffer around these wetlands/streams.	√								
	Continue prescribed burning as much as possible in Significant Botanical Sites.	√			√		√			
	During ground maneuvers, avoid land disturbing activities within wet Significant Botanical Sites (i.e., off-road vehicle use, bivouac, fighting positions). Mark these areas on maps.	√			√					
Red-cockaded Woodpecker	Continue monitoring of RCWs in the area by the Eglin Natural Resources Section.	√			√			√		
	Do not allow longleaf pine trees larger than 5 feet in height to be cut or destroyed within active RCW clusters, unless written permission has been granted by the Natural Resources Section.	√			√			√		
	Continue prescribed burning as much as possible in RCW foraging habitat.	√			√			√		
	Modify range layout to protect RCW foraging and nesting habitat.	√			√			√		
Flatwoods Salamander	During construction, employ erosion control measures such as silt fences near potential flatwoods salamander habitat.	√			√					√

Table 5-43. 7SFG(A) Range Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	Group 2 Ranges and DZs/LZs	SRI	Boat Landing Sites*	Interstitial Areas	Group 1 Ranges for Alternative:				
						1	2	3	4	5
Flatwoods Salamander, Cont'd	Observe the following restrictions from the Final Rule for federal listing of the flatwoods salamander: Timber harvesting in pine flatwoods habitat is allowed within a 164-meter (538-foot) radius buffer zone surrounding known flatwoods salamander breeding ponds by using selective harvest only during dry periods; within an outer secondary zone extending from 164 meters (538 feet) to 450 meters (1,476 feet) out from the edge of the breeding pond, a mixture of clear-cutting and selective harvesting is allowed. The rule allows clear-cutting of up to 25 percent of this secondary zone at any give time, as long as 75 percent of the secondary zone remains in pine flatwoods habitat at a basal area of 4.2 to 4.7 square meters per hectare.	√			√					√
	Avoid pyrotechnics and munitions use in water bodies.	√			√					√
	Avoid ground-disturbing fire suppression activities (bulldozers) in flatwoods salamander habitat.	√			√					√
	Continue prescribed burning as much as possible in confirmed and potential flatwoods salamander habitat.	√			√					√
	Locate munitions impact areas away from flatwoods salamander ponds, preferably at least 0.25 mile away.	√								√
	Manage lead-based projectiles near flatwoods salamander ponds.	√								√
Okaloosa Darter	During land clearing and construction, utilize erosion control measures such as silt fencing near Okaloosa darter steams.	√					√			√
	Maintain at least a 100-foot vegetated buffer along Okaloosa darter streams.	√					√			√

Table 5-43. 7SFG(A) Range Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	Group 2 Ranges and DZs/LZs	SRI	Boat Landing Sites*	Interstitial Areas	Group 1 Ranges for Alternative:				
						1	2	3	4	5
Okaloosa Darter, Cont'd	For trees that must be removed within the Okaloosa darter vegetative buffer, hand-cut them and remove them without heavy machinery.	√					√			√
	Near Okaloosa darter streams, conduct land clearing and construction activities during dry periods to limit the potential for rutting and erosion into darter streams as much as possible.	√					√			√
	Mark Okaloosa darter streams on field maps.	√			√		√			√
	Prohibit equipment, vehicle, and troop movements on stream slopes near Okaloosa darter streams and in newly restored areas adjacent to Okaloosa darter streams.	√			√		√			√
	Minimize soil and vegetation disturbance near Okaloosa darter streams.	√			√		√			√
	Avoid pyrotechnics and munitions use in water bodies.	√			√		√			√
	Locate munitions impact areas away from Okaloosa darter streams, preferably at least 0.25 mile away.	√					√			√
	Manage lead-based projectiles near Okaloosa darter streams.	√					√			√
Sea Turtles	If surveys indicate a sea turtle nest is within 200 feet of the insertion point, use another insertion point for that mission.		√							
	Avoid vehicular and foot traffic in areas with dunes over five feet high.		√							
	Restrict driving on the beach during sea turtle season.		√							
	Properly shield any light from view of the beach during sea turtle nesting and hatching season.		√							

Table 5-43. 7SFG(A) Range Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	Group 2 Ranges and DZs/LZs	SRI	Boat Landing Sites*	Interstitial Areas	Group 1 Ranges for Alternative:				
						1	2	3	4	5
Eastern Indigo Snake	Cease vehicular activity if an indigo snake is sighted, and wait until the animal is out of harm's way before resuming activity. The Natural Resources Section should be notified.	√			√	√	√	√	√	√
	Direct personnel not to injure, harm, or kill the indigo snake.	√			√	√	√	√	√	√
	Follow the *Standard Protection Measures for the Eastern Indigo Snake* (U.S. Air Force, 2004f).	√			√	√	√	√	√	√
	For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., indigo snake). Use video cameras to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.	√			√	√	√	√	√	√
Perforate Lichen	Continue perforate lichen population monitoring as scheduled.		√							
	In the event that monitoring showed an expansion of lichen cover, expand the fenced area accordingly.		√							
Florida Black Bear	Cease vehicular activity if a black bear is sighted, and wait until the animal is out of harm's way before resuming activity. The Natural Resources Section should be notified.	√			√	√	√	√	√	√
Gopher Tortoise	Cease vehicular activity if a gopher tortoise is sighted, and wait until the animal is out of harm's way before resuming activity. The Natural Resources Section should be notified.	√			√	√	√	√	√	√
	Avoid active, inactive, and abandoned gopher tortoise burrows by a minimum of 25 feet.	√			√	√	√	√	√	√

Table 5-43. 7SFG(A) Range Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	Group 2 Ranges and DZs/LZs	SRI	Boat Landing Sites*	Interstitial Areas	Group 1 Ranges for Alternative:				
						1	2	3	4	5
Gopher Tortoise, Cont'd	Should a gopher tortoise burrow be identified within the proposed path of construction, cease work near the burrow until Natural Resources Section personnel have investigated the burrow and relocated any gopher tortoise or commensals to a suitable location in accordance with the *Gopher Tortoise Permitting Guidelines* (FWC, 2008).	√				√	√	√	√	√
Gopher Frog	Employ erosion control measures such as silt fences near gopher frog ponds.	√								
	Restrict digging in gopher frog ponds by troops.	√			√					
	Restrict troops and vehicle movements in gopher frog ponds.	√			√					
	Avoid pyrotechnics and munitions use in water bodies.	√			√					
	Avoid use of heavy equipment in gopher frog ponds.	√								
	Avoid ground-disturbing fire suppression activities (bulldozers) in gopher frog ponds.	√			√					
	Locate munitions impact areas away from gopher frog ponds, preferably at least 0.25 miles away.	√								
	Manage lead-based projectiles near gopher frog ponds.	√								
	For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., gopher frog). Use video cameras to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.	√			√					

Table 5-43. 7SFG(A) Range Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	Group 2 Ranges and DZs/LZs	SRI	Boat Landing Sites*	Interstitial Areas	Group 1 Ranges for Alternative:				
						1	2	3	4	5
Florida Pine Snake	For any gopher tortoise burrows that would require relocation, Eglin would obtain a relocation permit from the FWC and follow the *Gopher Tortoise Permitting Guidelines* (FWC, 2008) for gopher tortoises and commensals (i.e., pine snake). Use video cameras to look for commensals immediately prior to land-disturbing and construction activities, so that they could also be relocated.	√			√	√	√	√	√	√
Southeastern American Kestrel	Survey inactive RCW cavity trees prior to removal to check for occupation by the Southeastern American kestrel, and relocate the kestrel.	√				√	√	√	√	√
Shorebirds	Avoid 7SFG(A) activities in marked shorebird nesting areas on Eglin SRI.		√							
	Coordinate all ground movement operations on SRI through Eglin's Natural Resources Section.		√							
Invasive Nonnative Species	To reduce potential seed sources, treat areas with known invasive nonnative species problems.	√	√	√	√	√	√	√	√	√
	Use native plants in all landscaping and plantings.	√		√		√	√	√	√	√
	To avoid spreading invasive nonnative plant species, do not drive vehicles or boats in areas with known invasive nonnative plant species problems; these areas are designated by signs. If a vehicle is driven in such an infested area, clean the vehicle before it is driven to a non-infested area.	√	√	√	√	√	√	√	√	√
Gulf Sturgeon	At boat landing sites, minimize erosion through restoration/stabilization, rotational use, and avoidance of contact with emergent vegetation along banks and shorelines.			√						
	Use only designated boat landing sites.			√						

Table 5-43. 7SFG(A) Range Alternatives – Potential Mitigations for Biological Resources, Cont'd

Biological Resource	Potential Mitigation	Group 2 Ranges and DZs/LZs	SRI	Boat Landing Sites*	Interstitial Areas	Group 1 Ranges for Alternative:				
						1	2	3	4	5
Freshwater Mussels	At boat landing sites, minimize erosion through restoration/stabilization, rotational use, and avoidance of contact with emergent vegetation along banks and shorelines.			√						
	Use only designated boat landing sites.			√						
Wildfires	Per the Eglin Wildfire Specific Action Guide, establish post-mission fire watch of 20 to 30 minutes to search for smoke/fire from training activities, unless otherwise directed by Eglin's Natural Resources Section.	√			√	√	√	√	√	√
	Immediately notify Eglin Fire Department Dispatch of any wildfire started as a result of pyrotechnics or munitions use.	√			√	√	√	√	√	√
	Provide additional wildland fire resources at Eglin.	√			√	√	√	√	√	√
	Avoid ground-disturbing fire suppression activities (bulldozers) in wetland habitats.	√			√	√	√	√	√	√
All Biological Resources	Provide conditions and restrictions regarding biological resources to all participants in verbal or written form. Provide maps when necessary.	√	√	√	√	√	√	√	√	√
	Contain bullets within collection berms and periodically cleanup and dispose of munitions on the firing ranges.	√				√	√	√	√	√

RCW = red-cockaded woodpecker; SRI = Santa Rosa Island
*Includes Yellow River, East Bay River, Santa Rosa Sound, Choctawhatchee Bay, and the near-shore waters of the Gulf of Mexico.

5.12 CULTURAL RESOURCES

5.12.1 7SFG(A) Range Alternative 1: East Side and North of Eglin Main Training

5.12.1.1 Existing Conditions (Cultural Resources – 7SFG(A) Range Alternative 1)

The Area of Potential Effects (APE) for cultural resources under this alternative is depicted in Chapter 2 by Figure 2-13 (Location of 7SFG(A) Group 2 Ranges, Alternatives 1–5) and Figure 2-16 (Location of 7SFG(A) Range Alternative 1 Group 1 Ranges). To identify potential historic resources within all of the 7SFG(A) Range Alternative areas, 40 new survey units have been identified by Eglin's Cultural Resources Branch, in consultation with multiple State Historic Preservation Offices/Tribal Historic Preservation Offices (SHPOs/THPOs). These units are part of 6,689 total acres of survey area planned in support of BRAC (Avery, 2007a). These survey units are in addition to surveys that Eglin previously completed as part of their ongoing responsibilities under Section 106 and Section 110 of the National Historic Preservation Act (NHPA). Due to the large amount of survey and identification required to support cultural resource studies under the BRAC EIS, not all survey, identification, and consultation has been completed as of the release of this document. As per 36 CFR 800.4(b)(2), regarding phased identification of large geographic areas (see Chapter 3 for discussion of this item), these surveys will be presented in full detail prior to the Final EIS, once surveys are completed and as results are available. Appendix F, *Cultural Resources,* provides a description of survey areas, identified sites, and consultation description and documentation. The project-specific programmatic agreement located in Appendix F also documents in detail all cultural resource studies to be completed as part of the agreement.

Project areas common to all five 7SFG(A) Range alternatives are the Group 2 Ranges, DZs, and Closed Training Areas. Existing conditions for these areas are discussed under 7SFG(A) Range Alternative 1, Existing Conditions. Environmental consequences are discussed individually under each alternative. Only 7SFG(A) Range Alternative 3, the Preferred Alternative, was subject to consultation, survey and evaluation of resources for Group 1 ranges. Group 1 ranges are discussed under that alternative.

Within all 7SFG(A) Range alternatives, Group 2 Ranges encompass new survey areas listed in Table 5-44, totaling 1,508 acres. Analysis focused on identified and potentially present cultural resources within the APE that would be affected by the proposed activities. Any analysis required following the project's Record of Decision (ROD) is provided for by the project-specific programmatic agreement (Appendix F).

Within 7SFG(A) Range Alternative 1, Group 1 Ranges, one survey tract was previously completed. Designated as X-675, that survey tract did not identify any historic properties (Mallory and Campbell, 2002a).

The survey areas for the Closed Training Areas (Table 5-45) encompass a total of 4,110 acres in all 7SFG(A) Range alternatives. Analysis focused on identified and potentially present cultural resources within the APE that would be affected by the proposed activities. Any analysis required following the project's ROD is provided for by the project-specific programmatic agreement (Appendix F).

Table 5-44. New Archaeological Survey Units and Results Within 7SFG(A) Range, Group 2 Ranges Footprints (Common to Alternatives 1, 2, 3, 4, 5)

Survey Unit	Acreage of Survey Unit	NRHP-Eligible Sites Identified	Reference
X-912	377	8WL2231, 8WL2232 and 8WL2233	Mallory and Campbell, 2007a
X-913	428	8WL2258	Avery, 2007a
X-914	265	8WL2246, 8WL2248, 8WL2250, and 8WL2251	Mallory and Campbell, 2007b
X-915	153	8WL2229	Mallory and Campbell, 2007c
X-917	149	No eligible sites	Avery, 2007a
X-918	136	8WL2226 and 8WL2227	Mallory and Campbell, 2007d

NRHP = National Register of Historic Places

Table 5-45. New Archaeological Survey Units and Results Within 7SFG(A) Range, Closed Training Area Footprints (Common to Alternatives 1, 2, 3, 4, 5)

Survey Unit	Acreage of Survey Unit	NRHP-Eligible Sites Identified	Reference
X-916	622	8WL305	Mallory and Campbell, 2007e
X-919	99	No eligible sites	Mallory and Campbell, 2007f
X-922	59	No eligible sites	Avery, 2007b
X-923	52	No eligible sites	Avery, 2007b
X-926	321	No eligible sites	Avery, 2007b
X-929	105	No eligible sites	Avery, 2007b
X-930	382	8OK256	Avery, 2007b
X-931	392	No eligible sites	Mallory and Campbell, 2007g
X-932	264	No eligible sites	Mallory and Campbell, 2007h
X-933	145	No eligible sites	Mallory and Campbell, 2007i
X-934	312	No eligible sites	Avery, 2007b
X-935	162	No eligible sites	Mallory and Campbell, 2007j
X-936	223	No eligible sites	Mallory and Campbell, 2007k
X-937	115	No eligible sites	Mallory and Campbell, 2007l
X-938	161	No eligible sites	Mallory and Campbell, 2007m
X-939	102	No eligible sites	Avery, 2007b
X-940	62	No eligible sites	Avery, 2007b
X-941	68	No eligible sites	Mallory and Campbell, 2007n
X-942	85	8OK255	Avery, 2007b
X-943	57	No eligible sites	Avery, 2007b
X-944	76	No eligible sites	Mallory and Campbell, 2007k
X-950	108	No eligible sites	Mallory and Campbell, 2007o
X-951	138	8WL2253	Avery, B., 2007b

NRHP = National Register of Historic Places

To complete identification of potential historic resources within the DZ areas, Eglin's Cultural Resources Branch, in consultation with the SHPO/THPO, identified four additional survey tracts that require additional survey under this alternative (Table 5-46). Analysis focused on identified and potentially present cultural resources within the APE that would be affected by the proposed activities. Any analysis required following the project's ROD is provided for by the project-specific programmatic agreement (Appendix F).

Table 5-46. New Archaeological Survey Units and Results Within 7SFG(A) Range, Drop Zone Footprints (Common to Alternatives 1, 2, 3, 4, 5)

Survey Unit	Acreage of Survey Unit	NRHP-Eligible Sites Identified	Reference
X-924	68	No eligible sites identified	Avery, 2007b
X-925	119	No eligible sites identified	Avery, 2007b
X-948	148	No eligible sites identified	Mallory and Campbell, 2007p
X-949	103	No eligible sites identified	Mallory and Campbell, 2007q

NRHP = National Register of Historic Places

Eleven archaeological sites within project footprints under the Group 2 Ranges are considered eligible for nomination to the NRHP (Table 5-45). Within the Closed Training Areas, 31 archaeological sites are considered eligible for the NRHP (Table 5-47).

Table 5-47. NRHP-Eligible Archaeological Sites Within 7SFG(A) Range Alternative 1, Group 2 Ranges (Common to Alternatives 1, 2, 3, 4, 5)

Site Number	Description of Site	NRHP Evaluation	Reference
8WL54	Multicomponent Historic/Prehistoric	Eligible	Eglin AFB, 2008
8WL2178	Weeden Island Prehistoric	Eligible	Eglin AFB, 2008
8WL2231	New site, description to be added	Potentially Eligible	Mallory and Campbell, 2007a
8WL2232	New site, description to be added	Potentially Eligible	Mallory and Campbell, 2007a
8WL2233	New site, description to be added	Potentially Eligible	Mallory and Campbell, 2007a
8WL2226	New site, description to be added	Potentially Eligible	Mallory and Campbell, 2007d
8WL2227	New site, description to be added	Potentially Eligible	Mallory and Campbell, 2007d
8WL2229	American 20th Century John W. Gladwell Homestead	Potentially Eligible	Mallory and Campbell, 2007c
8WL2246	Gulf Formational, Santa Rosa, Swift Creek, Elliots Point, Weeden Island	Potentially Eligible	Mallory and Campbell, 2007b
8WL2248	Santa Rosa, Swift Creek	Potentially Eligible	Mallory and Campbell, 2007b
8WL2250	New site, description to be added	Potentially Eligible	Mallory and Campbell, 2007b
8WL2251	New site, description to be added	Potentially Eligible	Mallory and Campbell, 2007b
8WL2258	New site, description to be added	Potentially Eligible	Mallory and Campbell, 2007d

NRHP = National Register of Historic Places

In addition to the eligible archaeological sites shown in Table 5-46, Table 5-47, and Table 5-48, there are five existing World War II (1941-1945) and Cold War era

(1946-1989) historic complexes that are considered eligible for nomination to the NRHP. The Vietnam tunnels (8WL1523) are an historic military replica of Viet Cong fortifications and tunnels located within the SOF 10 7SFG(A) Range Alternative 2 project area. This site was used to train military personnel on the best ways to handle access to the baited-trap tunnels of the Viet Cong (Weitze, 2005).

Table 5-48. NRHP-Eligible Sites Within 7SFG(A) Range Closed Training Areas

Site Number	Description of Site	NRHP Evaluation	Reference
8WL305	see footnote in table	Potentially Eligible	Mallory and Campbell, 2007e
8OK255	Prehistoric Artifact Scatter	Potentially Eligible	Avery, 2007b
8OK256	Prehistoric Artifact Scatter	Potentially Eligible	Avery, 2007b
8OK2591	see footnote in table	Potentially Eligible	Avery, 2007b
8OK434	see footnote in table	Potentially Eligible	Avery, 2007b
8OK433	see footnote in table	Potentially Eligible	Avery, 2007b
8OK435	see footnote in table	Potentially Eligible	Avery, 2007b
8OK2621	see footnote in table	Potentially Eligible	Avery, 2007b
8OK2622	see footnote in table	Potentially Eligible	Avery, 2007b
8OK2624	see footnote in table	Potentially Eligible	Avery, 2007b
8OK163	see footnote in table	Eligible	Avery, 2007b
8OK149	see footnote in table	Potentially Eligible	Avery, 2007b
8WL1611	see footnote in table	Potentially Eligible	Avery, 2007b
8OK2127	see footnote in table	Potentially Eligible	Avery, 2007b
8OK2133	see footnote in table	Potentially Eligible	Avery, 2007b
8OK2483	see footnote in table	Potentially Eligible	Avery, 2007b
8OK1395	see footnote in table	Potentially Eligible	Hemphill et al., 2000
8OK900	see footnote in table	Potentially Eligible	Avery, 2007b
8OK1698	see footnote in table	Potentially Eligible	Avery, 2007b
8WL300	see footnote in table	Potentially Eligible	Thomas and Campbell, 1992
8OK198	see footnote in table	Potentially Eligible	Avery, 2007a
8OK2016	see footnote in table	Potentially Eligible	Avery, 2007b
8OK2011	see footnote in table	Potentially Eligible	Avery, 2007b
8WL242	see footnote in table	Potentially Eligible	Thomas and Campbell, 1992
8WL329	see footnote in table	Potentially Eligible	Avery, 2007b
8WL1516	see footnote in table	Potentially Eligible	Avery, 2007b
8WL1486	see footnote in table	Potentially Eligible	Avery, 2007b
8WL157	see footnote in table	Potentially Eligible	Thomas and Campbell, 1992
8WL156	see footnote in table	Potentially Eligible	Avery, 2007b
8WL1681	see footnote in table	Potentially Eligible	Avery, 2007b
8WL2253	Prehistoric artifact scatter	Potentially Eligible	Avery, 2007b

NRHP = National Register of Historic Places

Note: Historic site with intact above-ground or surface resources. May be susceptible to damage from ground training activities.

Four other historic properties are within Group 2 Range areas and are all considered eligible for the NRHP. These include the Operation Crossbow site, the German Factory Target, the Japanese Dugouts, and the Sled Track. The Crossbow historic site has two targets within Group 2 range areas. Operation Crossbow is a World War II era test site within TA C-52B designed to simulate German V-1 Rocket sites for practice bombing missions. The German Factory and Japanese Dugout targets are both located within SOF 6 and are also World War II era targets designed to practice bombing runs over Axis power factory and village sites. The Sled Track is a Cold War era facility located in TA C-72, which tested missiles on a launch sled to simulate airborne launched ordnance from aircraft (Weitze, 2005).

5.12.1.2 Environmental Consequences (Cultural Resources – 7SFG(A) Range Alternative 1)

Potential impacts to cultural resources may include disturbance of the physical remains, objects, or other elements of an archaeological site, including sites and/or objects of religious or cultural importance to Native Americans. Eglin AFB's Cultural Resources Branch determined, in consultation with the SHPO/THPO, that numerous areas within the 7SFG(A) Range Alternative 1 boundaries require archaeological surveys. (Appendix F, *Cultural Resources*, has a full listing of these survey areas.) As provided for by the project-specific programmatic agreement (Appendix F), this effort, including subsequent evaluation of findings for their NRHP eligibility, assessment of effects, and mitigation for adverse effects, will be accomplished following the project's ROD. Regarding potential impacts to Historic Cold War or World War II era structures identified within Group 2 Range areas, those historic structures also would require treatment under the project-specific programmatic agreement.

Known eligible cultural resources will be clearly marked as off-limits or would be otherwise protected within areas where troop movement, training activity, the use of wheeled vehicles, and the use of munitions and pyrotechnics would occur. Troop movement has the potential to affect archaeological sites where artifacts are located on the surface of the ground, where the soil is exceptionally soft or devoid of vegetation, or where foot traffic occurs on steep slopes such as along riverbanks, shoreline bluffs, or interior gullies. All wheeled vehicles will be confined to existing roads on Eglin. Munitions will be used only in areas known to be devoid of cultural resources, in areas with a low probability for cultural resources, or in areas frequently used for that purpose. A similar situation exists in ground training areas along the Yellow River in the northwest portion of the reservation and in the ground training area west of Hwy 87. Current procedures regarding treatment of unintentional discoveries would be followed in the event of discovery of undocumented cultural resources. These procedures are discussed in Section 6 of the Eglin AFB ICRMP (Appendix F, *Cultural Resources*).

5.12.2 7SFG(A) Range Alternative 2: East Side and North-South Corridor Training

5.12.2.1 Existing Conditions (Cultural Resources – 7SFG(A) Range Alternative 2)

The APE for cultural resources for this alternative is depicted in Chapter 2 by Figure 2-13 (Location of 7SFG(A) Group 2 Ranges, Alternatives 1–5) and Figure 2-17 (Location of 7SFG(A) Range Alternative 2 Group 1 Ranges). The previously surveyed areas, sites identified, and new survey units for Group 2 Ranges, DZs and Closed Training Areas under this alternative are identical to 7SFG(A) Range Alternative 1 and are described in Section 5.12.1.1.

Within Group 1 Ranges, one survey tract was previously completed that did not identify any NRHP-eligible historic properties (Mallory, 2005b).

5.12.2.2 Environmental Consequences (Cultural Resources – 7SFG(A) Range Alternative 2)

Environmental Consequences under Alternative 2 would be identical to those presented for 7SFG(A) Range Alternative 1 in Section 5.12.1.2.

5.12.3 7SFG(A) Range Alternative 3: East and West Side Training (Preferred Alternative)

5.12.3.1 Existing Conditions (Cultural Resources – 7SFG(A) Range Alternative 3)

The APE for cultural resources is depicted in Chapter 2 by Figure 2-13 (Location of 7SFG(A) Group 2 Ranges, Alternatives 1–5) and Figure 2-18 (Location of 7SFG(A) Range Alternative 3 Group 1 Ranges). The previously surveyed areas, sites identified, and new survey units for Group 2 Ranges, DZs and Closed Training Areas under this alternative are identical to 7SFG(A) Range Alternative 1 and are described in Section 5.12.1.1. Within Group 1 Ranges, one survey tract was previously completed. It did not identify any eligible historic properties (Brown et al., 1997). To complete identification of potential historic resources within the Group 1 Ranges, Eglin's Cultural Resources Branch, in consultation with the SHPO/THPO, identified 4 additional survey tracts that required additional survey (Table 5-49; Mallory and Campbell, 2007r; 2007s; 2007t).

Table 5-49. New Archaeological Survey Units and Results Within 7SFG(A) Range Alternative 3, Group 1 Facility Footprints

Survey Unit	Acreage of Survey Unit	NRHP-Eligible Sites Identified	Reference
X-945	172	No eligible sites	Avery, 2007b
X-946	142	No eligible sites	Avery, 2007b
X-947	145	No eligible sites	Avery, 2007b
X-963	163	8OK2639, 8OK2637, 8OK2635	Avery, 2007b

These Group 1 Range surveys identified three new archaeological sites. Sites 8OK2635, 8OK2637, and 8OK2639 are considered potentially eligible for nomination to the NRHP. The sites identified on the Group 2 Ranges and Closed Training Areas within project footprints under this alternative are identical to 7SFG(A) Range Alternative 1 and are described in Section 5.12.1.1 of this document.

5.12.3.2 Environmental Consequences (Cultural Resources – 7SFG(A) Range Alternative 3)

Except for the addition of the Group 1 Range resources for 7SFG(A) Range Alternative 3, environmental consequences under 7SFG(A) Range Alternative 2 would be identical to those presented for 7SFG(A) Range Alternative 1 in Section 5.12.1.2. Under 7SFG(A) Range Alternative 3, the three archaeological sites (8OK2635, 8OK2637, and 8OK2639) will require additional evaluation or protection implemented under provisions of the project-specific programmatic agreement (Appendix F, *Cultural Resources*).

5.12.4 7SFG(A) Range Alternative 4: East and Northeast Side Training

5.12.4.1 Existing Conditions (Cultural Resources – 7SFG(A) Range Alternative 4)

The APE for cultural resources under this 7SFG(A) Alternative is depicted in Chapter 2 by Figure 2-13 (Location of 7SFG(A) Group 2 Ranges, Alternatives 1–5) and Figure 2-19 (Location of 7SFG(A) Range Alternative 4 Group 1 Ranges). The previously surveyed areas, sites identified, and new survey units for Group 2 Ranges, DZs, and Closed Training Areas under this alternative are identical to 7SFG(A) Range Alternative 1 and are described in Section 5.12.1.2. Within Group 1 Ranges, 6 survey tracts were previously completed and did not identify any eligible historic properties (Brown, 1996; Hemphill, 2001; Mallory and Campbell, 2001a, 2002a, 2002b; Thomas and Campbell, 1992).

The Group 2 Range sites identified within project footprints under this alternative are identical to 7SFG (A) Range Alternative 1 and are described in Section 5.12.1.1 of this document.

5.12.4.2 Environmental Consequences (Cultural Resources – 7SFG(A) Range Alternative 4)

Environmental consequences under 7SFG(A) Range Alternative 4 would be identical to those presented for 7SFG(A) Range Alternative 1 in Section 5.12.1.2.

5.12.5 7SFG(A) Range Alternative 5: East Side Training

5.12.5.1 Existing Conditions (Cultural Resources – 7SFG(A) Range Alternative 5)

The APE for cultural resources under 7SFG(A) Range Alternative 5 is depicted in Chapter 2 by Figure 2-13 (Location of 7SFG(A) Group 2 Ranges, Alternatives 1–5) and Figure 2-20 (Location of 7SFG(A) Range Alternative 5 Group 1 Ranges). The previously surveyed areas, eligible sites identified, and new survey units for Group 2 Ranges and Closed Training Areas under this alternative are identical to 7SFG(A) Range Alternative 1 and are described in Section 5.12.1.2. Within Group 1 Ranges, one survey tract was previously completed, and it did not identify any eligible historic properties (Brown et al., 1997; Mathews et al., 1994).

The Group 2 Range sites identified within project footprints under this alternative are identical to 7SFG(A) Range Alternative 1 and are described in Section 5.12.1.2 of this document.

5.12.5.2 Environmental Consequences (Cultural Resources – 7SFG(A) Range Alternative 5)

Environmental consequences under 7SFG(A) Range Alternative 5 would be identical to those presented for 7SFG(A) Range Alternative 1 in Section 5.12.1.2.

5.12.6 No Action Alternative

Under this No Action Alternative, the actions described in Chapter 2 (Section 2.4, Operational Requirements for 7SFG(A) Range Training) would not occur. If BRAC-related activities were not to occur at Eglin, the 33 FW were to depart, and the predicted projects listed in Section 2.7 and Section 9.1.3 were to occur, no adverse effects to cultural resources would be expected under the No Action Alternative.

6. JSF IJTS CANTONMENT – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

6.1 INTRODUCTION

This chapter describes the affected environment and the environmental consequences associated with each alternative cantonment location for the Joint Strike Fighter (JSF) Initial Joint Training Site (IJTS) at Eglin Air Force Base (AFB). Table 6-1 provides an overview of the resources potentially affected by this action and respective analysis conducted. Some resource areas were not evaluated; the rationale for elimination is also identified in Table 6-1.

Table 6-1. Resource Areas Analyzed for Environmental Consequences Associated With the JSF IJTS Cantonment Alternatives

Resource Area	Section	Brief Description of Scope of Analysis
Airspace	N/A	Airspace was not analyzed because there are no airspace issues associated with the JSF cantonment.
Noise	6.2	Noise was analyzed with respect to construction activities and potential impacts to surrounding areas.
Land Use	6.3	Analysis determined whether the alternatives would change the existing land use in the affected area or have any direct or indirect impacts on any surrounding land use.
Parks and Recreation	6.3	Parks and recreation were not analyzed under these alternatives because there are no parks and recreation issues associated with the JSF cantonment.
Socioeconomics	6.4	Analysis focused on identifying the effects of the JSF IJTS and related personnel to the population, employment, school districts, and provision of public services in the affected communities.
Transportation	6.5	Analysis focused on the JSF IJTS traffic generated from the proposed alternatives and the identification of new regional roadway deficiencies that are due to the impacts of the construction alternatives. The transportation analysis included the regional roadway network that provides access to and from the proposed cantonment areas.
Utilities	6.6	Analysis focused on the existing infrastructure, current use, and any predefined capacity or limitations as set forth in permits or regulations for potable water, wastewater, electrical, and natural gas.
Air Quality	6.7	Analysis focused on construction and additional personnel emissions.

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Table 6-1. Resource Areas Analyzed for Environmental Consequences Associated With the JSF IJTS Cantonment Alternatives, Cont'd

Resource Area	Section	Brief Description of Scope of Analysis
Safety	6.8	Analyses focused on issues with the potential to affect safety. These issues were evaluated to assess how the activity would increase or decrease safety risks to military personnel, the public, and property.
Solid Waste	6.9	Analysis focused on identifying the types and quantities of solid wastes generated from government actions and requiring disposal. The calculated mass of waste was then used to evaluate the potential increase in wastes being disposed at local landfills, taking into account current landfill life cycle and existing capacity. The potential impact to landfill life cycle and existing capacity could be minimized through the recycle/reuse of the material.
Hazardous Materials	6.10	Analysis focused on identifying the type of materials and wastes that would be associated with proposed activities. These data were evaluated against the base's capability for managing these materials/wastes. The analysis also evaluated impact of proposed activities on ERP sites.
Physical Resources	6.11	Analysis focused on impacts to soils, marine sediments, surface waters, and wetlands from construction activities. Groundwater was not analyzed because the construction activities would not impact groundwater quality. Additionally, floodplains were not analyzed because none are within or adjacent to the proposed sites.
Biological Resources	6.12	Analysis focused on impacts to flora, fauna, sensitive habitats, and species and the potential for introduction and spread of invasive species as a result of construction and daily cantonment operations.
Cultural Resources	6.13	Analysis focused on identified and potentially present cultural resources within the Area of Potential Effects for the proposed activities. Any analysis required following the project's Record of Decisions will be provided for by a project-specific programmatic agreement (Appendix F, *Cultural Resources*).

ERP = Environmental Restoration Program; N/A = not applicable

6.2 NOISE

6.2.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.2.1.1 Existing Conditions (Noise – JSF IJTS Alternative 1)

To meet operational requirements, the IJTS must be located proximate to the Eglin AFB runway, an area exposed to high levels of aircraft noise. Under JSF IJTS Alternative 1, the IJTS would be located near the western end of the east-west runway. Average aircraft-generated noise levels in this area range from 65 decibels (dB) day-night level (DNL) to slightly greater than 85 dB DNL. Average aircraft-generated noise levels at

proposed facilities within the Munitions Storage Area (MSA) currently range from less than 65 dB DNL to 75 dB DNL. Section 3.2, Noise (in Chapter 3), and Appendix E, *Noise*, describe the DNL noise metric and methods used to produce time-averaged noise contours.

Noise generated by construction and maintenance equipment, as well as general vehicle traffic, is also common in the base environment. Continuous military construction projects are under way at Eglin AFB, to upgrade facility and infrastructure. On a typical day, trucks and other heavy equipment operate at Eglin AFB in support of these projects.

6.2.1.2 Environmental Consequences (Noise – JSF IJTS Alternative 1)

Types of vehicles used in construction of the IJTS would be similar to those used for the 7SFG(A) facilities. As a result, construction noise levels would be similar to those generated during 7SFG(A) construction (see Chapter 4, Table 4-2, 7SFG(A) Cantonment Alternative 1 – Noise Level Expected From Each Construction Site). No known noise-sensitive receptors are located within 600 feet of the proposed construction activities, so none would be exposed to noise levels higher than 65 dB DNL due to construction. Noise would be temporary and would occur only during normal working hours (i.e., between 7:00 AM and 5:00 PM). Personnel directly involved in construction would wear hearing protection, as required, in accordance with Occupational Safety and Health Administration (OSHA) regulations. People working at administrative and operations facilities near the construction and demolition sites may become annoyed by the construction noise. Overall, however, construction noise impacts would be minimal.

Day-to-day operations of the IJTS would generate low-intensity noise due to increased vehicular traffic. Increases in day-to-day noise would be minimal.

6.2.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.2.2.1 Existing Conditions (Noise – JSF IJTS Alternative 2)

Existing noise conditions at the proposed locations for the IJTS under JSF IJTS Alternative 2 are similar to those at the JSF IJTS Alternative 1 location, in that both are located adjacent to an active runway. The proposed location for the IJTS under JSF IJTS Alternative 2 is currently exposed to aircraft noise levels ranging from less than 65 dB DNL to slightly greater than 85 dB DNL. Under JSF IJTS Alternative 2, the location of MSA projects would be the same as under JSF IJTS Alternative 1, and as a result, current noise levels would be the same under both alternatives.

6.2.2.2 Environmental Consequences (Noise – JSF IJTS Alternative 2)

Construction equipment used under JSF IJTS Alternative 2 would be similar to that used under JSF IJTS Alternative 1. Thus, similar noise levels would be produced. Several unaccompanied housing units are located across east Daytona Road from the area proposed for the IJTS. The closest residential units to the construction site are approximately 200 feet away; residents in these units could experience noise at 74 dB DNL during construction. Residents may become annoyed by the construction noise. Under current conditions, these residential units are regularly exposed to aircraft noise, and DNL in this area varies between less than 65 and 70 dB DNL.

People directly involved in construction would wear hearing protection, as required, in accordance with OSHA regulations. People not directly involved in construction would not be exposed to noise at an intensity and duration that would damage hearing.

Implementation of Alternative 2 would require current 46 TW operations to relocate to the current 33rd Fighter Wing (33 FW) area. Additional facilities would require renovation to accept displaced functions. Renovation activities are typically relatively quiet but may annoy people working nearby.

Day-to-day operations of the IJTS would be expected to generate low-intensity noise due to increased vehicular traffic. Increases in day-to-day noise would be minimal.

6.2.3 No Action Alternative

Several of the actions listed under the No Action Alternative (see Chapter 2, Section 2.7, No Action Alternative) involve facility construction and would result in temporary noise increases in immediately surrounding areas during construction. The drawdown of the 33 FW would result in a decrease in noise levels on and near Eglin AFB, including those areas being considered as sites for the IJTS.

6.3 LAND USE

The proposed sites under both JSF IJTS Alternatives 1 and 2 are associated with Eglin Main Base and are contiguous to the Eglin Main airfield. Functional land use classes within Eglin Main were described previously in Chapter 4 (Section 4.3.1.1, Existing Conditions) and shown on Figure 4-1 (7SFG(A) Alternative 1 – Existing Land Use Associated With Eglin Main Base).

The MSA would be the same for either of the two JSF IJTS cantonment alternatives, which is the use of the existing MSA for the 46 TW. This area is centrally located and can be accessed from either of the Eglin Main Base runways (Figure 2-24, JSF IJTS Complex Alternative 1 and Alternative 2 Proposed Locations).

6.3.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.3.1.1 Existing Conditions (Land Use – JSF IJTS Alternative 1)

The existing land use classes in the area proposed for JSF IJTS Alternative 1 are mainly associated with the 33 FW area and include airfield (primary surface/clear zones), airfield (runway/taxiway/apron), aircraft operations and maintenance, industrial, and open space. Adjacent land uses include administrative (University of Florida's Research and Engineering Education Facility [REEF]); community or service (including the Air Force Armament Museum, Okaloosa Regional Airport, and Cherokee Elementary School, youth center, child care center, playground, etc., immediately south of Eglin Boulevard); medical (Eglin Hospital and Veterans Affairs Clinic); and accompanied housing (Eglin Housing Area). Located further west are the range areas of the Eglin Reservation.

6.3.1.2 Environmental Consequences (Land Use – JSF IJTS Alternative 1)

Implementation of the JSF IJTS Alternative 1 would require construction of new facilities and modification of existing facilities in and around the existing 33 FW area within Eglin Main Base. These activities would be limited primarily to predeveloped areas, and none of the affected land use classes would change. However, a portion of the open space located east of the existing 33 FW area and south of the airfield would change because of the proposed expansion of the airfield apron area and a new taxiway. A portion of the existing open space area south of Nomad Way would also change to accommodate additional JSF IJTS facilities. This minor change to the current land use would still be compatible with the existing land use patterns in the general area. There would be no impact to the existing land use in the MSA, since the changes to support the JSF IJTS requirements would not change the existing land use classification (industrial).

Land use in the immediate vicinity of the affected area would not be impacted. JSF IJTS Alternative 1 would not directly or indirectly impact surrounding community land use, since the JSF IJTS cantonment would only occur within the immediate Eglin Main Base area. A sufficient buffer is present between the proposed location and the closest

off-base development, which is located over two miles away in the residential areas closest to the installation boundary in Shalimar and along Garniers Bayou.

6.3.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.3.2.1 Existing Conditions (Land Use – JSF IJTS Alternative 2)

The existing land use classes in the area proposed for JSF IJTS Alternative 2 are mainly associated with the 46th Test Wing (46 TW) area and include airfield (primary surface/clear zones), airfield (runway/taxiway/apron), aircraft operations and maintenance, industrial, and open space. Current land uses in the immediate vicinity include administrative, community (service), community (commercial), housing (accompanied), housing (unaccompanied), and medical.

6.3.2.2 Environmental Consequences (Land Use – JSF IJTS Alternative 2)

Implementation of the JSF IJTS Alternative 2 would require construction of new facilities and modification of existing facilities similar to JSF IJTS Alternative 1, except the affected area would be located on the east side of the runway within the existing 46 TW area at Eglin Main Base. Current 46 TW operations would relocate to the current 33 FW area. This would require additional renovation activities on the 33 FW side of the airfield. These activities would be limited to predeveloped areas, and no changes to existing land use classes are expected. As a displaced action, the Aero Club currently located in the 46 TW area would be relocated to either Building 1398 or Building 1399 located at the end of the taxiway near the west end of Runway 12. The existing building would need to be renovated for use by the Aero Club, but the action would not result in any change to the existing land use classification. Also, like JSF IJTS Alternative 1, there would be no change to the existing land use for the MSA, the proposed activities would be compatible with the existing land use patterns in the surrounding area, and no off-base land use impacts would occur. The closest off-base development to the existing 46 TW area is located over a mile away near the East Gate and Eglin Boulevard.

6.3.3 No Action Alternative

None of the listed actions under the No Action Alternative (see Chapter 2, Section 2.7) would directly or indirectly impact land use within the Eglin Main Base area. The listed actions, if implemented, would occur where the existing land use is already compatible with the actions. No additional land use impacts would occur beyond those associated with other ongoing activities and approved actions.

6.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

6.4.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.4.1.1 Existing Conditions (Socioeconomics and Environmental Justice – JSF IJTS Alternative 1)

The existing conditions for the JSF IJTS are described in Section 3.4.2 (Socioeconomics) and Section 3.4.6 (Environmental Justice) in Chapter 3. The effects of the JSF IJTS in combination with the 33 FW drawdown and the drawdown from President's 2007 Budget included in the No Action Alternative are discussed to determine the net change in the economy as the result of the actions. The total effects of the BRAC-related actions, including the incoming JSF and 7SFG(A) personnel with the drawdown of the 33 FW and the President's 2007 Budget, are described in Section 9.1.4, Cumulative Effects Analysis.

6.4.1.2 Environmental Consequences (Socioeconomics and Environmental Justice – JSF IJTS Alternative 1)

The establishment of the JSF IJTS would involve the addition of 2,326 personnel to Eglin AFB, including pilot instructors, maintainer instructors, civil service personnel, government contractors, and students. Students would rotate through the JSF IJTS regularly on temporary duty. However, it is assumed that the JSF IJTS program would maintain the maximum number of students included in the 2,326 total to estimate the full potential for socioeconomic impacts. The construction of the JSF IJTS is estimated to occur from 2009 to 2011. The first aircraft is scheduled to arrive in 2010 with the JSF IJTS reaching full capacity in 2016. The region of influence (ROI) for this action includes Okaloosa, Santa Rosa, and Walton Counties.

The impacts analysis focused on the permanent effects of locating the JSF IJTS personnel to Eglin AFB. Temporary effects due to the construction spending related to the JSF IJTS are considered later in this subsection under the "Construction" subheading.

The additional personnel would result in an increase in jobs in the ROI, as well as increase the revenue and expenditure requirements of the county governments and the school districts. However, the effects from the JSF IJTS would be partially offset by the decrease in personnel and resulting economic effects of the 33 FW drawdown and related actions (Table 6-2).

Table 6-2. Socioeconomic Effects of the JSF IJTS Realignment

Category	JSF IJTS Alternatives 1 & 2	No Action Alternative	Net Annual Change	
	Totals	Totals	Totals	Percent Change
Population				
Existing conditions, 2005[a]	388,466	388,466	388,466	
Direct	4,885	-4,561	324	0.08%
Induced	2,587	-2,443	144	0.04%
Total	7,472	-7,004	468	0.12%
Employment				
Existing conditions, 2004[b]	189,469	189,469	189,469	
Direct	2,326	-2,172	154	0.08%
Induced	1,322	-1,251	72	0.04%
Total	3,648	-3,423	226	0.12%
Housing				
Existing conditions, 2000[c]	156,795	156,795	156,795	
Direct	2,326	-2,172	154	0.10%
Induced	1,322	-1,251	72	0.05%
Total	3,648	-3,423	226	0.14%
Students				
Existing Conditions, 2005[d]	61,955	61,955	61,955	
Direct	879	-821	58	0.09%
Induced	710	-422	288	0.46%
Total	1,589	-1,243	346	0.56%
School Revenue				
Existing Conditions, 2005[e]	$413,847,831	$413,847,831	$413,847,831	
Direct	$5,862,554	-$8,689,533	-$2,826,979	-0.68%
Induced	$4,732,454	-$4,468,349	$264,105	0.06%
Total	$10,595,008	-$13,157,882	-$2,562,874	-0.62%
Law Enforcement				
Existing Conditions, 2005[f]	670	670	670	
Total	31	N/A	N/A	N/A
Fire Protection				
Existing Conditions, 2006[g]	657	657	657	
Total	11	N/A	N/A	N/A
Medical				
Existing Conditions, 2006[h]	11,446	11,446	11,446	
Total	217	N/A	N/A	N/A

a. Office of Economic and Demographic Research, The Florida Legislature, 2005
b. U.S. Bureau of Economic Analysis, 2006
c. U.S. Census Bureau, 2000a, 2000b, 2000c
d. Florida Department of Education, 2005a
e. Florida Department of Education, 2005b
f. Florida Department of Law Enforcement, 2005
g. Department of Homeland Security, U.S. Fire Administration, 2006
h. Orcutt, 2006

Although the full buildup of personnel will not occur until 2016, comparisons were made with current ROI conditions to determine only the effects of the increase in military personnel and the induced effects from that change. Potential impacts were analyzed by comparing the net change in the specific socioeconomic resources with existing conditions and historical growth patterns.

The growth in the counties and the ROI overall would not exceed the growth typically experienced by the area. Also, personnel associated with the JSF IJTS would migrate to the area over a period of more than six years. This gradual buildup of personnel would allow time for the local communities and local economies to adjust to the increased demand for services. The additional population would contribute to the revenues collected by the various levels of government, including school districts, and provide increased funding for the required public services. The effect of the JSF on each of these socioeconomic indicators would also be reduced by the decrease in personnel related to the 33 FW and other related actions. Table 6-2 summarizes the estimated effects of the JSF IJTS, the No Action Alternative (see Chapter 4, Section 4.4.6, No Action Alternative), and the net change at the ROI level for each socioeconomic resource of concern for all of the associated alternatives.

Population

Of the 2,326 personnel moving into the area as a result of the JSF IJTS realignment, it is assumed that 50 percent are married and 30 percent have no more than two children (Table 6-2). Under these assumptions, the total number of people entering the area as a result of the JSF IJTS would be 4,885. The secondary population was estimated based on the number of secondary, or induced, jobs created by the JSF IJTS as determined by the Impact Analysis for Planning (IMPLAN) Economic Impact Model. While many of these jobs could be filled by local workers or by spouses of the incoming military personnel, it was assumed that workers would migrate to the ROI to fill the secondary jobs to estimate the maximum effects of the JSF IJTS. The family demographics of the secondary population were estimated using data for each individual county from the 2000 Census. Therefore, a total of 7,472 people would enter the ROI as a result of the JSF IJTS.

By the end of the realignment in 2016, a total 6,879 (92 percent) of the additional population would reside in Okaloosa County, 467 (6 percent) in Santa Rosa County, and 125 (2 percent) in Walton County.

However, the drawdown of the 33 FW and the drawdown from President's 2007 Budget would result in a decrease of 7,004 personnel in the ROI. Therefore, the total net change

in population in the ROI from actions related to the JSF and the 33 FW would be an increase of only 468 personnel, an increase of approximately 0.12 percent.

Housing

The Air Force is conducting several studies to determine the housing requirements of the incoming personnel and their families as a result of Base Realignment and Closure (BRAC) actions. A Housing Requirements and Market Analysis report has been completed based on current BRAC manpower authorizations and military family housing inventory. A separate environmental impact analysis (per the National Environmental Policy Act) is also being conducted to determine the potential impacts from housing needs of the personnel stationed at Eglin AFB. At this time, it is assumed that military family housing on Eglin AFB will be fully occupied at the time of the JSF IJTS realignment, and the incoming personnel would require private sector housing in the surrounding communities.

Assuming that each additional job created by the JSF IJTS represents a single household and that a single household would require one housing unit, the additional population associated with the JSF IJTS would require 3,648 housing units. If the additional population relied only on new construction, the number of housing units would increase 2.3 percent, compared with the total number of housing units in the ROI. The incoming population would not have to rely completely on new construction, as there is vacant housing available in the area. In 2000, the number of vacant housing units in the ROI was over 30,000, or 19 percent of the total number of housing units. The number of vacant units, however, is most likely overestimated because the U.S. Census Bureau includes seasonal and second homes in determining the number of vacant units. Even if the vacancies are overestimated, however, there would still be housing available in the ROI for the incoming personnel. Also, the decrease in personnel in the ROI due to the 33 FW drawdown and related actions would leave more housing units vacant that could be available for the incoming JSF personnel, providing even more opportunities for adequate housing in the local communities.

Affordability of housing is a concern to many of the local residents. Until recently, housing prices in the ROI were increasing at faster rates, driven by low interest rates and new mortgage opportunities that allowed more households to purchase homes. Homeowners insurance, in particular, has become more costly. However, as noted previously, the housing market in the region has begun to slow as compared to the recent high level of activity. A potential surplus inventory exists in the housing market, indicated by slowing price growth and a decrease in housing sales. Typically, excess inventory in the housing market would allow military members greater choice in housing units. Also, some homeowners who are unable to sell their houses could

choose to rent them out instead, increasing the inventory in the rental market. The excess inventory would also potentially apply downward pressure on housing prices, making housing more affordable for military members.

In the ROI, however, the magnitude of the increased demand from the personnel entering the region as a result of BRAC may also stimulate the housing market to the extent that housing prices would stabilize. The military members regularly receive allowances as a part of their income to compensate for these factors. In particular, the basic housing allowance for military members living off-base is based on cost-of-living factors. According to DoD policy, these allowances are updated annually and are determined to be sufficient for military members to gain adequate housing. Also per DoD policy, the military gives priority for on-base housing to military members whose incomes including allowances are below 50 percent of the local median incomes.

Schools

Number of Students

The JSF IJTS personnel are estimated to have a total of 1,396 children, of which 63 percent are assumed to be school-aged children. Their effect on specific schools would depend on the location of their residences. The new students would be distributed among the school districts based on the distribution of the residence location of the current military personnel.

In Okaloosa County School District, the number of students entering the county as a result of the JSF would be 1,462 students. In Santa Rosa County School District 102 students would enter the district, and Walton County School District would have 25 additional students as a result of the JSF (Table 6-2). However, the 33 FW drawdown would decrease the number of students by 1,243. The net change in the student population would then be an addition of 346 students in the ROI, an increase of 0.56 percent (Table 6-2). By applying the state-mandated maximum average class sizes and using the 2000 Census for each county to estimate the age distribution of the incoming students, it is estimated that the additional students could form a total of 13 classes in kindergarten through twelfth grade.

The additional students could increase the size of classes that are currently below the maximum average size, and new classes may be formed. However, the drawdown of the 33 FW and the drawdown from President's 2007 Budget would offset the addition of students entering the ROI due to the JSF IJTS, yielding only a small net effect. The transition period of the incoming population would give the school districts time to adjust to the new students.

School District Finances

The increase in the number of students would increase the level of school revenues and expenditures. The increase in revenues and expenditures for each school district in the ROI is estimated based on per-student revenues and expenditures from the 2003 school year, the latest data available.

In the ROI, the revenues collected from the individual school districts would total over $10.5 million as a result of the JSF IJTS (Table 6-2). Okaloosa County School District would experience the largest gain in revenues with an increase of $9.7 million. Revenues in the Santa Rosa School District would increase by approximately $651,000, and Walton County School District revenues would increase by $200,000. However, as with the student population, the decrease in personnel from the No Action Alternative would offset the additional revenues earned from the JSF personnel, yielding a net decrease in revenue of approximately $2.5 million. The net change in expenditures for each school district also corresponds with the net change in revenues.

Economic Activity

The measures of military-related economic activity include total spending, income, and the number of jobs supported. These effects were estimated using the IMPLAN Economic Impact Model based on the number of personnel associated with the JSF IJTS. No indirect economic effects are expected from the buildup of the JSF IJTS, assuming its operations procurements would use the same Air Force-wide suppliers for items used for JSF IJTS operations, such as practice ordnance, aircraft maintenance tools and parts, and jet fuel, rather than purchasing these items in the local communities. Thus, any economic effects from JSF IJTS operations and personnel would stem from household spending, not business-to-business interactions.

The JSF IJTS realignment would inject approximately $286 million in annual permanent spending into the ROI, as well as generate approximately $212.4 million in income. A total of 3,648 permanent jobs would be created, including the incoming military personnel and civilian personnel, as well as other full-time, part-time, and seasonal employment. By combining the net effect of the 33 FW drawdown and the drawdown from President's 2007 Budget, the net increase in permanent annual spending would be $15.9 million and the creation of 226 permanent jobs.

Public Services

With additional people entering the ROI, the need for public services as well as county expenditures is expected to increase. The main effect would be in Okaloosa County where it is estimated that most of the incoming personnel and the secondary population

would live. However, the additional demand for public services would not adversely impact the affected communities, as the incoming population would also increase in the amount of revenues collected. Also, the increased demand for services would be partially offset by the decrease in the population related to the 33 FW and related actions. Therefore, it is not expected that the demand for services would vary widely from the current level of service being provided.

Law Enforcement

The need for additional police officers and sheriff's deputies was estimated assuming current number of law enforcement personnel per 1,000 people would be maintained as the population increases under the JSF IJTS realignment.

The increased population would require an additional 31 law enforcement officers in the ROI to maintain the current level of service in each county (Table 6-2). Twenty-seven of these officers would be required in Okaloosa County, as most of the incoming population is expected to reside there. Santa Rosa County would need the other four law enforcement officers. Walton County would not require any additional officers to maintain the current level of service. These additional law enforcement officers may not be required given the corresponding decrease in personnel from the 33 FW. Therefore, it is feasible that the local police departments could maintain their current level of employment and provide the same level of service to the communities, including the population related to the JSF IJTS.

Fire Protection

The need for additional fire protection resources was estimated assuming that the current number of firefighters per 1,000 population will be maintained as the population increases. With the additional population entering the ROI as a result of the JSF IJTS, and to maintain the current level of service, an additional 11 firefighters would be needed (Table 6-2). All the additional firefighters would be required in Okaloosa County, since that county is expected to be the center of population growth. As with law enforcement, the decrease in population from the 33 FW drawdown would allow the fire departments and firefighters to provide their current level of service and still sufficiently meet the demand from the local communities, including the additional JSF population.

Medical Services

The need for additional licensed health care professionals was estimated assuming the current ratio to the population will be maintained as population increases. In the ROI, an additional 217 licensed health care professionals would be required to maintain the

current level of service. As with fire protection and law enforcement, most of these health care professionals would be located in Okaloosa County. Santa Rosa County and Walton County would require only 16 and 3 health care professionals, respectively.

A number of hospitals are dispersed throughout the main cities in the three counties, including a hospital on Eglin AFB. The military personnel associated with the JSF IJTS would be more likely to use on-base medical services, including the hospital. Eglin Hospital is currently being renovated to increase capacity.

The additional population would be dispersed throughout the ROI, with a number of hospitals available in the larger cities, such as Crestview, DeFuniak Springs, Navarre, and Destin. Therefore, because the additional people entering the area would not concentrate in one city in the ROI, additional hospital capacity would not be required as a result of the JSF IJTS realignment.

Construction

Locating the JSF IJTS at Eglin AFB would require the construction of facilities such as classrooms, virtual trainers, and munitions storage. Estimated spending for these construction projects is $284.5 million, to be spent between Calendar Year (CY) 2008 and CY 2015. The number of jobs created and the amount of additional spending in the economy as a result of the JSF IJTS would not be affected by the drawdown of the 33 FW and the drawdown from President's 2007 Budget as these two actions do not have any associated construction projects that would be concurrent with the JSF-related construction. Therefore, only the effects of the JSF-related construction were evaluated.

The injection of the construction spending into the economy would increase the number of jobs available in the construction sector. These effects were estimated using the IMPLAN Economic Impact Model based on the estimated construction expenditures provided by the U.S. Air Force. In 2004, there were approximately 15,400 construction jobs in the three-county ROI. The direct effects of the construction involved in establishing the JSF IJTS at Eglin AFB would support approximately 551 jobs per year over the term of the construction for a total of 3,859 jobs (Table 6-3).

Table 6-3. Estimated Temporary Effects of JSF IJTS Construction

Category	Direct Effects	Indirect Effects	Induced Effects	Total Effects
Total spending (output)	$284,500,000	$72,475,639	$97,044,585	$454,020,240
Incomes generated	$129,473,296	$30,902,474	$31,030,736	$191,406,505
Jobs supported	3,859	855	1,203	5,917

Source: Haas Center for Business Research and Economic Development, 2006

The effects estimated from the construction for the JSF IJTS would be temporary, lasting only for the term of the construction projects. A large portion of the jobs supported by the construction actions would be filled by local construction workers; only construction workers with highly specialized skills would migrate to the area. Any construction workers that would migrate from outside of the region would likely stay for only the term of the construction before migrating to another region where their skill sets are in demand. In addition, one construction worker would be able to work multiple jobs over the course of the construction, moving to a subsequent job after completing the previous job.

Effects on school districts, county revenues, and expenditures, as well as demand for public services would be minimal as a result of the construction. The majority of the construction workers would be local; construction workers migrating to the region would not likely be accompanied by family members, given the short time frame involved.

The construction projects would also involve business-to-business interactions, resulting in over $72.4 million in indirect spending effects and 122 jobs per year, or 855 total jobs supported. The induced effects of the construction would be over $97 million in total spending and 172 jobs per year, or 1,203 total jobs supported. The indirect and induced effects would be felt throughout the economy, while the direct effects would impact only the construction sector. In total, the construction resulting from the JSF IJTS realignment would provide $454 million in total spending and support 845 jobs per year, or 5,917 temporary jobs over the term of the construction for all industries.

Environmental Justice and Special Risks to Children

Evaluation of the environmental effects related to the JSF IJTS realignment included their potential impact to low-income or minority ("environmental justice") populations and the potential for special risks to children. Analysis determined there would be no disproportionately high and/or adverse effects to minority or low-income communities or adverse safety or health risks to children associated with noise, air pollutant transport, and other conditions in the existing and proposed project areas. Analysis focused on the exposure of these communities to anticipated environmental effects, identifying potential areas of concern by demographics of known population distributions.

Environmental Justice

Construction activities as well as the personnel realignment associated with the actions involving the location of the JSF IJTS would not disproportionately impact minority or

low-income communities of concern. Environmental justice concerns associated with JSF IJTS Alternatives 1 and 2 are related to noise, safety, air pollutants, and hazardous materials.

Analysis for JSF IJTS Alternatives 1 and 2, discussed in Sections 6.2.1.2 and 6.2.2.2 (Noise), 6.8.1.2 and 6.8.2.2 (Safety), and 6.10.1.2 and 6.10.2.2 (Hazardous Materials), found that no adverse impacts related to these environmental issues would occur under any of the alternatives. As a result, no disproportionate or adverse safety or hazardous materials impacts to minority or low-income populations in the ROI are anticipated from the JSF IJTS realignment.

Special Risks to Children

Given that children have physiologic and behavioral characteristics that make them more vulnerable than adults to environmental effects, evaluation of potential environmental exposures associated with the alternatives requires special consideration. Safety concerns with regard to children associated with demolition and construction activities include potential asbestos/LBP exposure and potential accidents at construction sites. Analyses for JSF IJTS Alternatives 1 and 2, discussed respectively in Sections 6.8.1.2 and 6.8.2.2 (Safety) and 6.10.1.2 and 6.10.2.2 (Hazardous Materials), considered potential exposure to these materials during demolition and construction.

Construction activities and the personnel realignment associated with the JSF IJTS would not pose any special health or safety risks to children. Safety precautions to protect children in areas surrounding the work sites would include adequate measures to restrict access, minimization of hazards associated with the construction sites/activities, and proper handling and disposal of hazardous materials. Such mitigation measures would offset the potential for construction-related impacts to any age group, including children.

Demolition and construction activities related to the JSF IJTS would affect noise levels. Children, being more sensitive to noise than adults and, therefore, more likely to develop potentially damaging hearing loss, are of particular concern with regard to noise impacts. As presented in Section 6.2 (Noise), construction-related noise is unlikely to generate negative effects; therefore, no special risk to children would occur. Sound levels associated with demolition and construction would be intermittent and short in duration, not contributing any appreciable effect to the existing acoustic environment.

6.4.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.4.2.1 Existing Conditions (Socioeconomics and Environmental Justice – JSF IJTS Alternative 2)

The existing conditions for the JSF IJTS are the same as the existing conditions described in Section 3.4.2, Region of Influence and Existing Conditions – Socioeconomics.

6.4.2.2 Environmental Consequences (Socioeconomics and Environmental Justice – JSF IJTS Alternative 2)

No adverse socioeconomic impacts would result from locating the cantonment area of the JSF IJTS on the east side of the Eglin Main runways. The socioeconomic effects associated with JSF IJTS Alternative 2 would be the same as those under JSF IJTS Alternative 1. The location of the cantonment area likely would not influence the residence location of the personnel. The effects of the additional population in each county is the same as those described in Section 6.4.1.2 for JSF IJTS Alternative 1 and summarized in Table 6-2. Construction expenditures required for establishing the JSF IJTS cantonment area are not available, however, it is estimated that the overall costs of establishing the cantonment area on the east side of the Eglin Main runways would be higher than the expenditures estimated for JSF IJTS Alternative 1. The construction projects involved in JSF IJTS Alternative 2 focus on renovation of current buildings rather than new construction; the costs of maintaining the older buildings are expected to be higher than the maintenance costs of newly constructed buildings. The effects of the increased construction spending would be an increase in employment, particularly in the construction and related industries. However, as under JSF IJTS Alternative 1, the effects of the construction spending are temporary, given the short-term nature of the construction projects. Also, a single construction worker would be able to work on multiple projects moving to the next projects after the previous projects are complete. It is likely that the construction workers would be hired from the local area, thus not affecting population, schools, or public services.

As discussed in Alternative 1, the construction related to Alternative 2, including the renovation of current buildings, would result in construction noise. However, this noise would be intermittent and would not contribute to the overall acoustic environment. Also, no adverse impacts related to noise, safety, or hazardous materials have been determined and would have no disproportionate or adverse impacts to minorities or low-income populations.

6.4.3 No Action Alternative

Existing conditions and environmental consequences for the No Action Alternative are the same as those discussed in Chapter 4 (Section 4.4.6, No Action Alternative).

6.5 TRANSPORTATION

6.5.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.5.1.1 Existing Conditions (Transportation – JSF IJTS Alternative 1)

Under JSF IJTS Alternative 1, the JSF IJTS is proposed to be located on the west side of Eglin Main Base near the 33 FW, with access on Nomad Way. The existing conditions for transportation resources are the same as those described in the discussion for the Eglin Main Base region in Chapter 3 (Section 3.5.2, Region of Influence and Existing Conditions).

6.5.1.2 Environmental Consequences (Transportation – JSF IJTS Alternative 1)

A general description of the transportation demand modeling process, trip generation, and inputs utilized for transportation impact analysis is provided in Chapter 3 (Section 3.5.3, Analysis Methodology). More detailed discussion of and documentation on the development of the model are included in Appendix B, *Transportation*.

The analysis included generating the 2016 peak-hour, peak-direction traffic volumes under JSF IJTS Alternative 1. These future volumes were compared with the peak-hour, peak-direction roadway capacities based on number of lanes, facility type, and area type to determine which roadways are projected to operate worse than the adopted level of service (LOS) under JSF IJTS Alternative 1. Table 6-4 lists the results, including the current peak-hour, peak-direction LOS for each study area roadway and the projected LOS under JSF IJTS Alternative 1. Appendix B, *Transportation*, shows the daily and peak-hour, peak-direction LOS for all the alternatives.

Figure 6-1 shows the 2016 peak-hour, peak-direction LOS for study area roadways under JSF IJTS Alternative 1.

Table 6-4. 2016 Level of Service Analysis for JSF IJTS Alternative 1

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1 JSF IJTS - 33rd Fighter Wing						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
3rd Street															
Between Van Matre Ave & SR 397 (Eglin Blvd/John Sims Pkwy)	2 (one way)	0.27	E	2,064	250	C	0.12	No	300	C	0.15	No	No	0%	No
4TH Street															
Between Van Matre Ave & Magnolia St	1 (one way)	0.29	E	972	200	C	0.21	No	250	C	0.26	No	No	0%	No
5TH Street															
Between Van Matre Ave & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.30	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
7TH Street															
Between Daytona Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.38	E	712	250	C	0.35	No	250	C	0.35	No	No	1%	No
8th Street															
Between Daytona Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.37	E	712	300	C	0.42	No	350	C	0.49	No	No	0%	No
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Biscayne Rd	2	0.41	E	810	100	C	0.12	No	100	C	0.12	No	No	0%	No
Barrancas Avenue															
Between Choctawhatchee Rd & F Ave++	2	0.44	E	972	100	C	0.10	No	150	C	0.15	No	No	0%	No

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Table 6-4. 2016 Level of Service Analysis for JSF IJTS Alternative 1, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1 JSF IJTS - 33rd Fighter Wing						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between F Ave & 2nd St/Eglin Blvd	2 (one way)	0.13	E	972	250	C	0.26	No	300	C	0.31	No	No	0%	No
Boatner Road															
Between Hatchee Rd & Hospital	2	0.23	E	648	500	D*	0.77	No	500	D*	0.77	No	No	0%	No
Between Hospital & Ash Dr	2	0.20	E	648	350	C	0.54	No	350	C	0.54	No	No	0%	No
Chinquapin Drive															
Between Minor Dr & Memorial Tr+	2	0.26	E	770	650	C	0.84	No	650	D*	0.84	No	No	2%	No
Between Memorial Tr & Wakulla Rd	2	0.33	E	770	100	C	0.13	No	150	C	0.19	No	No	0%	No
Choctawhatchee Road															
Between 7th St & Barrancas Ave	2	0.36	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
Cypress Road															
Between Lido Rd & Kissimmee Rd	2	0.18	E	810	100	C	0.12	No	100	C	0.12	No	No	1%	No
Daytona Road[2]															
Between 10th St & 8th St	2	0.27	E	810	90	C	0.11	No	100	C	0.12	No	No	0%	No
Between 8th St & 7th St	2/4	0.25	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
General Robert M Bond Boulevard															
Between SR 85 & SR 189 (Lewis Turner Blvd)	2 (one way)	1.20	D	1,140	850	D*	0.75	No	1,100	D*	0.96	No	No	0%	No
Hatchee Road															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Choctaw Rd	2	0.81	E	770	100	C	0.13	No	150	C	0.19	No	No	0%	No

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Table 6-4. 2016 Level of Service Analysis for JSF IJTS Alternative 1, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1 JSF IJTS - 33rd Fighter Wing						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Choctaw Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.82	E	770	70	C	0.09	No	70	C	0.09	No	No	0%	No
Inverness Road															
Between Cypress Rd & De Leon Rd	2	0.10	E	810	150	C	0.19	No	150	C	0.19	No	No	0%	No
Kissimmee Road															
Between Biscayne Rd & Cypress Rd	2	0.11	E	810	150	C	0.19	No	150	C	0.19	No	No	0%	No
Magnolia Street															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & F Ave	2	0.13	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
May Road															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & F Ave	2	0.13	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
Memorial Trail															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Commissary/ Exchange	2	1.58	E	688	300	C	0.44	No	300	C	0.44	No	No	0%	No
Between Commissary/ Exchange & Chinquapin Dr	2	0.41	E	770	350	C	0.45	No	400	D*	0.52	No	No	1%	No
Museum Drive															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Minor Dr	2	0.09	E	616	450	D*	0.73	No	550	E*	0.89	No	No	2%	No

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Table 6-4. 2016 Level of Service Analysis for JSF IJTS Alternative 1, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1 JSF IJTS - 33rd Fighter Wing						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Nomad Way															
Between SR 85 & Pumphouse	2	1.23	E	688	250	C	0.36	No	850	F	1.24	Yes	No	1%	No
Between Pumphouse and SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.85	E	688	250	C	0.36	No	500	C	0.73	No	No	1%	No
North Gate Road															
Between SR 85 & Perimeter Rd	2	0.71	E	770	40	C	0.05	No	40	C	0.05	No	No	0%	No
Perimeter Road															
Between Daytona Rd & Taxiway S	2	0.38	E	770	200	C	0.26	No	200	C	0.26	No	No	0%	No
Between Taxiway S & North Gate Rd	2	0.61	E	770	70	C	0.09	No	80	C	0.10	No	No	0%	No
Between North Gate Rd & ACC Munitions (west end)	2	0.93	E	770	50	C	0.06	No	50	C	0.06	No	No	0%	No
Between ACC Munitions (west end) & ACC Munitions (south end)	2	0.37	E	770	40	C	0.05	No	50	C	0.06	No	No	0%	No
Between ACC Munitions (south end) & Taxiway C	2	1.64	E	770	80	C	0.10	No	80	C	0.10	No	No	1%	No
Between Taxiway C & Nomad Way	2	0.42	E	770	60	C	0.08	No	70	C	0.09	No	No	2%	No
State Road 20															
Between SR 85 & SR 285 (N Partin Dr)	6	0.78	D	2,790	2,700	C	0.97	No	3,000	F	1.08	Yes	No	4%	No
Between SR 285 (N Partin Dr) & Rocky Bayou Bridge	4	2.60	D	1,860	1,700	C	0.91	No	1,900	F	1.02	Yes	No	3%	No

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Table 6-4. 2016 Level of Service Analysis for JSF IJTS Alternative 1, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1 JSF IJTS - 33rd Fighter Wing						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Rocky Bayou Bridge & SR 293 (White Point Rd)	4	2.10	D	1,860	1,800	C	0.97	No	2,100	F	1.13	Yes	No	1%	No
State Road 30 (US 98)															
Between SR 85 & SR 393 (Mary Esther Boulevard)	4	3.02	D	1,860	1,800	D*	0.97	No	2,100	F	1.13	Yes	No	0%	No
Between SR 393 (Mary Esther Boulevard) & Hurlburt Field Gate	4	2.70	D	1,860	2,100	F	1.13	Yes	2,500	F	1.34	Yes	No	2%	No
State Road 85															
Between Duke Field & CR 190 (College Blvd)	4	8.72	C	2,500	2,000	C	0.80	No	2,300	C	0.92	No	No	3%	No
Between CR 190 (College Blvd) & SR 20	4	0.89	D	1,860	1,000	B	0.54	No	1,200	B	0.65	No	No	0%	No
Between SR 20 & SR 397 (John Sims Pkwy)	6	0.68	D	2,710	2,900	F	1.07	Yes	3,400	F	1.25	Yes	No	5%	No
Between SR 397 (John Sims Pkwy) & North Gate	4	1.26	D	1,810	1,000	B	0.55	No	1,300	B	0.72	No	No	2%	No
Between North Gate Rd & SR 123	4	2.66	D	2,980	1,400	B	0.47	No	1,700	C	0.57	No	No	1%	No
Between SR 123 & ACC Gate at Nomad Way	4	1.05	D	1,860	2,400	F	1.29	Yes	2,700	F	1.45	Yes	Yes	11%	Yes
Between ACC Gate at Nomad Way & SR 189 (Lewis Turner Blvd)	4	0.94	D	1,810	2,100	F	1.16	Yes	2,700	F	1.49	Yes	Yes	7%	Yes

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Table 6-4. 2016 Level of Service Analysis for JSF IJTS Alternative 1, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1 JSF IJTS - 33rd Fighter Wing						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between SR 189 (Lewis Turner Blvd) & SR 189/SR 397 (Eglin Blvd)	4	0.50	D	1,860	900	B	0.48	No	1,100	B	0.59	No	No	0%	No
Between SR 189/SR 397 (Eglin Blvd) & 12th Ave	4	1.36	***	1,810	2,000	F	1.10	Yes	2,300	F	1.27	Yes	Yes	7%	Yes
Between 12th Ave & SR 188 (Racetrack Rd)	6	1.58	***	2,710	2,000	C	0.74	No	2,300	D	0.85	No	No	3%	No
Between SR 188 (Racetrack Rd) & SR 30 (US 98)	6	2.96	***	2,790	2,200	D	0.79	No	3,100	F	1.11	Yes	No	3%	No
State Road 123															
Between SR 85 & SR 85/SR 20	2	5.00	D	870	1,000	E	1.15	Yes	1,200	F	1.38	Yes	Yes	13%	Yes
State Road 188 (Racetrack Road)															
Between SR 189 (Beal Pkwy) & SR 85	4	2.60	D	1,860	1,700	C	0.91	No	1,900	F	1.02	Yes	No	1%	No
State Road 189															
Between SR 197 (Eglin Blvd/John Sims Pkwy) & SR 85	4	0.51	E	1,810	700	B	0.39	No	850	B	0.47	No	Yes	20%	No
Between SR 85 & General Bond Blvd	4	1.26	E	1,810	1,300	B	0.72	No	1,400	B	0.77	No	Yes	12%	No
Between General Bond Blvd & Mooney Rd	4	2.31	E	1,860	2,800	F	1.51	Yes	3,300	F	1.77	Yes	Yes	12%	Yes
Between Mooney Rd & SR 188 (Racetrack Rd)	4	2.10	D	1,710	1,500	D*	0.88	No	2,000	F	1.17	Yes	Yes	8%	Yes

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Table 6-4. 2016 Level of Service Analysis for JSF IJTS Alternative 1, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1 JSF IJTS - 33rd Fighter Wing						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between SR 188 (Racetrack Rd) & SR 393 (Mary Esther Blvd)	4	1.50	D	1,796	2,100	F	1.17	Yes	2,400	F	1.34	Yes	No	4%	No
Between SR 393 (Mary Esther Blvd) & Yacht Club Dr	4	1.50	D	1,953	1,100	B	0.56	No	1,400	B	0.72	No	No	0%	No
State Road 285															
Between Swift Creek & SR 20	4	1.00	E	1,800	400	C	0.22	No	500	C	0.28	No	No	1%	No
State Road 393 (Mary Esther Boulevard)															
Between SR 189 (Beak Pkwy) & SR 30 (US 98)	4	1.84	D	1,586	1,800	F	1.14	Yes	2,400	F	1.51	Yes	No	4%	No
State Road 397 (Eglin Boulevard/John Sims Parkway)															
Between SR 85 & SR 190	4	0.90	D	1,860	1,500	B	0.81	No	1,700	C	0.91	No	No	4%	No
Between SR 190 & East Gate	4	1.37	D	1,860	650	B	0.35	No	1,200	B	0.65	No	No	5%	No
Between East Gate & 8th St	4	0.43	D	1,710	1,100	C	0.64	No	1,300	C	0.76	No	Yes	8%	No
Between 8th St & 7th St	4	0.27	D	1,710	1,000	C	0.58	No	1,200	C	0.70	No	Yes	9%	No
Between 7th St & 5th St	4	0.39	D	1,860	700	B	0.38	No	850	B	0.46	No	Yes	7%	No
Between 5th St & Memorial Tr (northbound/ eastbound)	3 (one way)	0.70	D	3,348	1,100	B	0.33	No	1,200	B	0.36	No	Yes	11%	No
Between 5th St & Memorial Tr (southbound/ westbound)**	3 (one way)	0.71	D	3,348	1,100	B	0.33	No	1,200	B	0.36	No	Yes	5%	No

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Table 6-4. 2016 Level of Service Analysis for JSF IJTS Alternative 1, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 1 JSF IJTS - 33rd Fighter Wing						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Memorial Tr & Eglin Blvd South End Split (eastbound)	2 (one way)	0.47	D	2,172	700	B	0.32	No	850	B	0.39	No	Yes	6%	No
Between Memorial Tr & Eglin Blvd South End Split (westbound)	2 (one way)	0.54	D	2,172	1,100	B	0.51	No	1,400	B	0.64	No	Yes	9%	No
Between Eglin Blvd South End Split & Museum Dr/Nomad Way	4	1.42	D	1,810	1,300	B	0.72	No	1,500	C	0.83	No	Yes	11%	No
Between Museum Dr/Nomad Way & SR 189 (Lewis Turner Blvd)/West Gate	4	1.10	D	1,810	700	B	0.39	No	1,500	C	0.83	No	Yes	22%	No
Between SR 189 (Lewis Turner Blvd)/West Gate & SR 85	4	0.47	D	1,860	850	B	0.46	No	950	B	0.51	No	Yes	10%	No

* Level of service does not exceed the standard.
** This section of Eglin Boulevard runs as F Avenue and 2nd Street.
*** Constrained: Not able to be widened.
\+ AADT has been generated from turning movement counts.
++ Count data estimated based on 1996 Eglin Transportation Plan
1. v/c ratio was calculated from peak hour peak direction adopted level of service standard
2. Roadway analyzed as a two lane facility.
3. Significance is based on project trips for the alternative/action divided by the peak hour peak direction capacity of the adopted level of service standard.

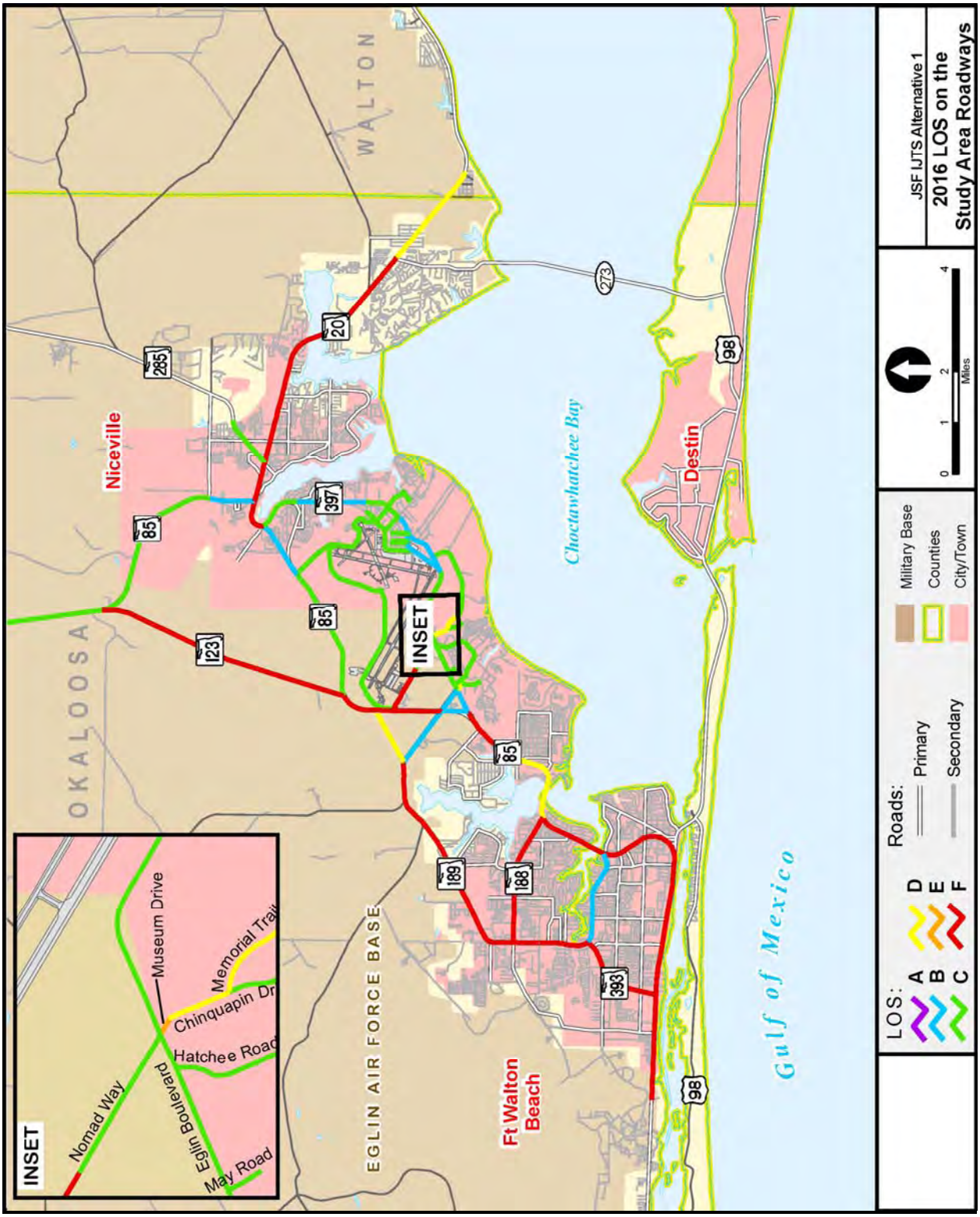

Figure 6-1. JSF IJTS Alternative 1 – 2016 LOS on the Study Area Roadways

This analysis identified any roadway segment that operates deficiently, or worse than the adopted local government LOS standard. Table 6-4 includes a volume-to-capacity (v/c) ratio; this number indicates how well the roadway operates relative to the adopted standard.

Analysis results indicate that, under JSF IJTS Alternative 1, 17 roadways are projected to operate deficiently with respect to the adopted LOS standard. The analysis also identified which of the area roadways are projected to be "significantly impacted" by project-related trips (i.e., where project trips are projected to exceed 5 percent of the capacity of the roadway at the adopted LOS standard) and which of the significantly impacted roadways are projected to also be "adversely impacted" (i.e., where the peak-hour capacity at the adopted LOS standard is projected to be exceeded). The analysis for JSF IJTS Alternative 1 identified 17 significantly impacted roadways. Six of the 17 significantly impacted roadways are projected to also be adversely impacted. The roadway segments found to be significant and adverse include:

- SR 85 between SR 123 and the ACC Gate at Nomad Way.
- SR 85 between the ACC Gate at Nomad Way and SR 189 (Lewis Turner Boulevard).
- SR 85 between SR 189/SR 397 (Eglin Boulevard) and 12th Avenue.
- SR 123 between SR 85 and the SR 85/SR 20 intersection.
- SR 189 between General Bond Boulevard and Mooney Road.
- SR 189 between Mooney Road and SR 188 (Racetrack Road).

Improvements needed to address the LOS deficiencies are addressed in Section 6.5.4, Summary of Improvements.

Summary

Under JSF IJTS Alternative 1, 17 segments could be deficient with respect to the adopted LOS standard, including portions of Nomad Way, SR 20, SR 30 (US 98), SR 83 (US 331), SR 85, SR 123, SR 188 (Racetrack Road), SR 189, and SR 393 (Mary Esther Boulevard). Of these, nine are currently deficient today. Seventeen of the deficient segments could be significantly impacted by project-related trips under this alternative. Nine roadway segments on-base could be significantly impacted but are not projected to require improvement. On-base impacts of JSF IJTS Alternative 1 could require some improvement to Nomad Way and Memorial Trail to allow access.

6.5.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.5.2.1 Existing Conditions (Transportation – JSF IJTS Alternative 2)

Under JSF IJTS Alternative 2, the JSF IJTS is proposed to be located on the east side of the runway at Eglin Main Base, with access generally off Daytona Road and Barrancas

Avenue. The existing conditions for transportation resources are the same as those described in the discussion for the Eglin Main Base region in Chapter 3 (Section 3.5.2, Region of Influence and Existing Conditions).

6.5.2.2 Environmental Consequences (Transportation – JSF IJTS Alternative 2)

A general description of the transportation demand modeling process, trip generation, and inputs utilized for transportation impact analysis is provided in the Analysis Methodology discussion in Chapter 3 (Section 3.5.3). More detailed discussion of and documentation on the development of the model are included in Appendix B, *Transportation*.

The transportation analysis for this alternative involved generating the 2016 peak-hour, peak-direction traffic volumes. These future volumes were compared to the peak-hour, peak-direction roadway capacities based on number of lanes, facility type, and area type to determine which roadways are projected to operate worse than the adopted LOS.

Table 6-5 summarizes results of the roadway analysis for JSF IJTS Alternative 2. The table lists the current peak-hour, peak-direction LOS for each study area roadway and the projected LOS under JSF IJTS Alternative 2. Appendix B, *Transportation*, shows the daily and peak-hour, peak-direction LOS for all of the alternatives.

This analysis identified any roadway segment that operates deficiently or worse than the adopted local government LOS standard. Table 6-5 includes a v/c ratio, which indicates how well the roadway operates relative to the adopted standard. The 2016 roadway LOS is shown in Figure 6-2 for JSF IJTS Alternative 2.

Analysis results indicate that, under JSF IJTS Alternative 2, 17 roadway segments are projected to operate deficiently with respect to the adopted LOS standard. The analysis also identified which roadways are projected to be significantly impacted by project-related trips (i.e., where project trips are projected to exceed 5 percent of the capacity of a roadway at the adopted LOS standard) and which significantly impacted roadways are projected to also be adversely impacted (i.e., where the peak-hour capacity at the adopted LOS standard is projected to be exceeded). The analysis identified 24 roadways that are projected to be significantly impacted. Eight of the 24 significantly impacted roadways are projected to also be adversely impacted.

Improvements needed to address the LOS deficiencies are addressed in Section 6.5.4, Summary of Improvements.

Table 6-5. 2016 Level of Service Analysis for JSF IJTS Alternative 2

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 JSF IJTS – East Side						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
3rd Street															
Between Van Matre Ave & SR 397 (Eglin Blvd/John Sims Pkwy)	2 (one way)	0.27	E	2,064	250	C	0.12	No	300	C	0.15	No	No	0%	No
4th Street															
Between Van Matre Ave & Magnolia St	1 (one way)	0.29	E	972	200	C	0.21	No	250	C	0.26	No	No	0%	No
5th Street															
Between Van Matre Ave & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.30	E	810	200	C	0.25	No	200	C	0.25	No	No	0%	No
7th Street															
Between Daytona Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.38	E	712	250	C	0.35	No	250	C	0.35	No	No	4%	No
8th Street															
Between Daytona Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.37	E	712	300	C	0.42	No	350	C	0.49	No	No	0%	No
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Biscayne Rd	2	0.41	E	810	100	C	0.12	No	100	C	0.12	No	No	0%	No
Barrancas Avenue															
Between Choctawhatchee Rd & F Ave[++]	2	0.44	E	972	100	C	0.10	No	400	C	0.41	No	No	0%	No
Between F Ave & 2nd St/Eglin Blvd	2 (one way)	0.13	E	972	250	C	0.26	No	1,200	F	1.23	Yes	Yes	88%	Yes

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Table 6-5. 2016 Level of Service Analysis for JSF IJTS Alternative 2, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 JSF IJTS – East Side						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Boatner Road															
Between Hatchee Rd & Hospital	2	0.23	E	648	500	D*	0.77	No	500	D*	0.77	No	No	0%	No
Between Hospital & Ash Dr	2	0.20	E	648	350	C	0.54	No	350	C	0.54	No	No	0%	No
Chinquapin Drive															
Between Minor Dr & Memorial Tr+	2	0.26	E	770	650	C	0.84	No	650	D*	0.84	No	No	0%	No
Between Memorial Tr & Wakulla Rd	2	0.33	E	770	100	C	0.13	No	100	C	0.13	No	No	0%	No
Choctawhatchee Road															
Between 7th St & Barrancas Ave	2	0.36	E	810	200	C	0.25	No	800	F	0.99	Yes	Yes	31%	Yes
Cypress Road															
Between Lido Rd & Kissimmee Rd	2	0.18	E	810	100	C	0.12	No	100	C	0.12	No	No	2%	No
Daytona Road[2]															
Between 10th St & 8th St	2	0.27	E	810	90	C	0.11	No	350	C	0.43	No	Yes	48%	No
Between 8th St & 7th St	2/4	0.25	E	810	200	C	0.25	No	750	E*	0.93	No	Yes	42%	No
General Robert M Bond Boulevard															
Between SR 85 & SR 189 (Lewis Turner Blvd)	2 (one way)	1.20	D	1,140	850	D*	0.75	No	1,000	D*	0.88	No	No	0%	No
Hatchee Road															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Choctaw Rd	2	0.81	E	770	100	C	0.13	No	150	C	0.19	No	No	0%	No
Between Choctaw Rd & SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.82	E	770	70	C	0.09	No	70	C	0.09	No	No	0%	No

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Table 6-5. 2016 Level of Service Analysis for JSF IJTS Alternative 2, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 JSF IJTS – East Side						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Inverness Road															
Between Cypress Rd & De Leon Rd	2	0.10	E	810	150	C	0.19	No	150	C	0.19	No	No	0%	No
Kissimmee Road															
Between Biscayne Rd & Cypress Rd	2	0.11	E	810	150	C	0.19	No	150	C	0.19	No	No	0%	No
Magnolia Street															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & F Ave	2	0.13	E	810	200	C	0.25	No	250	C	0.31	No	Yes	25%	No
May Road															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Gaffney Rd	2	0.15	E	770	20	C	0.03	No	20	C	0.03	No	No	0%	No
Memorial Trail															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Commissary/ Exchange	2	1.58	E	688	300	C	0.44	No	300	C	0.44	No	No	2%	No
Between Commissary/ Exchange & Chinquapin Dr	2	0.41	E	770	350	C	0.45	No	350	C	0.45	No	No	0%	No
Museum Drive															
Between SR 397 (Eglin Blvd/John Sims Pkwy) & Minor Dr	2	0.09	E	616	450	D*	0.73	No	500	E*	0.81	No	No	0%	No
Nomad Way															
Between SR 85 & Pumphouse	2	1.23	E	688	250	C	0.36	No	250	C	0.36	No	No	0%	No

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Table 6-5. 2016 Level of Service Analysis for JSF IJTS Alternative 2, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 JSF IJTS – East Side						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Pumphouse and SR 397 (Eglin Blvd/John Sims Pkwy)	2	0.85	E	688	250	C	0.36	No	300	C	0.44	No	No	2%	No
North Gate Road															
Between SR 85 & Perimeter Rd	2	0.71	E	770	40	C	0.05	No	50	C	0.06	No	No	1%	No
Perimeter Road															
Between Daytona Rd & Taxiway S	2	0.38	E	770	200	C	0.26	No	250	C	0.32	No	No	2%	No
Between Taxiway S & North Gate Rd	2	0.61	E	770	70	C	0.09	No	80	C	0.10	No	No	0%	No
Between North Gate Rd & ACC Munitions (west end)	2	0.93	E	770	50	C	0.06	No	50	C	0.06	No	No	0%	No
Between ACC Munitions (west end) & ACC Munitions (south end)	2	0.37	E	770	40	C	0.05	No	50	C	0.06	No	No	0%	No
Between ACC Munitions (south end) & Taxiway C	2	1.64	E	770	80	C	0.10	No	80	C	0.10	No	No	0%	No
Between Taxiway C & Nomad Way	2	0.42	E	770	60	C	0.08	No	60	C	0.08	No	No	0%	No
State Road 20															
Between SR 85 & SR 285 (N Partin Dr)	6	0.78	D	2,790	2,700	C	0.97	No	3,100	F	1.11	Yes	Yes	7%	Yes
Between SR 285 (N Partin Dr) & Rocky Bayou Bridge	4	2.60	D	1,860	1,700	C	0.91	No	2,000	F	1.08	Yes	Yes	6%	Yes

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Table 6-5. 2016 Level of Service Analysis for JSF IJTS Alternative 2, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 JSF IJTS – East Side						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Rocky Bayou Bridge & SR 293 (White Point Rd)	4	2.10	D	1,860	1,800	C	0.97	No	2,100	F	1.13	Yes	No	3%	No
Between SR 293 (White Point Rd) & Walton County Line	2	1.62	D	950	600	C	0.63	No	750	D*	0.79	No	No	0%	No
State Road 30 (US 98)															
Between SR 85 & SR 393 (Mary Esther Boulevard)	4	3.02	D	1,860	1,800	D*	0.97	No	2,100	F	1.13	Yes	No	0%	No
Between SR 393 (Mary Esther Boulevard) & Hurlburt Field Gate	4	2.70	D	1,860	2,100	F	1.13	Yes	2,500	F	1.34	Yes	No	1%	No
State Road 85															
Between Duke Field & CR 190 (College Blvd)	4	8.72	C	2,500	2,000	C	0.80	No	2,300	C	0.92	No	No	2%	No
Between CR 190 (College Blvd) & SR 20	4	0.89	D	1,860	1,000	B	0.54	No	1,300	B	0.70	No	Yes	5%	No
Between SR 20 & SR 397 (John Sims Pkwy)	6	0.68	D	2,710	2,900	F	1.07	Yes	3,500	F	1.29	Yes	Yes	12%	Yes
Between SR 397 (John Sims Pkwy) & North Gate	4	1.26	D	1,810	1,000	B	0.55	No	1,200	B	0.66	No	No	0%	No
Between North Gate Rd & SR 123	4	2.66	D	2,980	1,400	B	0.47	No	1,700	C	0.57	No	No	0%	No
Between SR 123 & ACC Gate at Nomad Way	4	1.05	D	1,860	2,400	F	1.29	Yes	2,600	F	1.40	Yes	No	0%	No

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Table 6-5. 2016 Level of Service Analysis for JSF IJTS Alternative 2, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 JSF IJTS – East Side						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between ACC Gate at Nomad Way & SR 189 (Lewis Turner Blvd)	4	0.94	D	1,810	2,100	F	1.16	Yes	2,400	F	1.33	Yes	No	0%	No
Between SR 189 (Lewis Turner Blvd) & SR 189/SR 397 (Eglin Blvd)	4	0.50	D	1,860	900	B	0.48	No	1,100	B	0.59	No	No	0%	No
Between SR 189/SR 397 (Eglin Blvd) & 12th Ave	4	1.36	***	1,810	2,000	F	1.10	Yes	2,300	F	1.27	Yes	Yes	6%	Yes
Between 12th Ave & SR 188 (Racetrack Rd)	6	1.58	***	2,710	2,000	C	0.74	No	2,300	D	0.85	No	No	3%	No
Between SR 188 (Racetrack Rd) & SR 30 (US 98)	6	2.96	***	2,790	2,200	D	0.79	No	3,000	F	1.08	Yes	No	3%	No
State Road 123															
Between SR 85 & SR 85N	2	5.00	D	870	1,000	E	1.15	Yes	1,100	E	1.26	Yes	No	0%	No
State Road 188 (Racetrack Road)															
Between SR 189 (Beal Pkwy) & SR 85	4	2.60	D	1,860	1,700	C	0.91	No	1,800	D*	0.97	No	No	0%	No
State Road 189															
Between SR 197 (Eglin Blvd/John Sims Pkwy) & SR 85	4	0.51	E	1,810	700	B	0.39	No	1,000	B	0.55	No	Yes	9%	No
Between SR 85 & General Bond Blvd	4	1.26	E	1,810	1,300	B	0.72	No	1,400	B	0.77	No	Yes	8%	No
Between General Bond Blvd & Mooney Rd	4	2.31	E	1,860	2,800	F	1.51	Yes	3,200	F	1.72	Yes	Yes	9%	Yes

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Table 6-5. 2016 Level of Service Analysis for JSF IJTS Alternative 2, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 JSF IJTS – East Side						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Mooney Rd & SR 188 (Racetrack Rd)	4	2.10	D	1,710	1,500	D*	0.88	No	2,000	F	1.17	Yes	Yes	6%	Yes
Between SR 188 (Racetrack Rd) & SR 393 (Mary Esther Blvd)	4	1.50	D	1,796	2,100	F	1.17	Yes	2,300	F	1.28	Yes	No	3%	No
Between SR 393 (Mary Esther Blvd) & Yacht Club Dr	4	1.50	D	1,953	1,100	B	0.56	No	1,400	B	0.72	No	No	0%	No
State Road 285															
Between Swift Creek & SR 20	4	1.00	E	1,800	400	C	0.22	No	500	C	0.28	No	No	3%	No
State Road 393 (Mary Esther Boulevard)															
Between SR 189 (Beak Pkwy) & SR 30 (US 98)	4	1.84	D	1,586	1,800	F	1.14	Yes	2,400	F	1.51	Yes	No	3%	No
State Road 397 (Eglin Boulevard/John Sims Parkway)															
Between SR 85 & SR 190	4	0.90	D	1,860	1,500	B	0.81	No	1,700	C	0.91	No	Yes	17%	No
Between SR 190 & East Gate	4	1.37	D	1,860	650	B	0.35	No	1,200	B	0.65	No	Yes	17%	No
Between East Gate & 8th St	4	0.43	D	1,710	1,100	C	0.64	No	1,300	C	0.76	No	Yes	7%	No
Between 8th St & 7th St	4	0.27	D	1,710	1,000	C	0.58	No	1,200	C	0.70	No	No	1%	No
Between 7th St & 5th St	4	0.39	D	1,860	700	B	0.38	No	850	B	0.46	No	No	0%	No
Between 5th St & Memorial Tr (northbound/ eastbound)	3 (one way)	0.70	D	3,348	1,100	B	0.33	No	1,400	B	0.42	No	Yes	8%	No
Between 5th St & Memorial Tr (southbound/ westbound)**	3 (one way)	0.71	D	3,348	1,100	B	0.33	No	1,400	B	0.42	No	Yes	10%	No

Continued on the next page…

Table 6-5. 2016 Level of Service Analysis for JSF IJTS Alternative 2, Cont'd

Primary Roadway Segment	Number of Lanes 2016	Length (miles)	Adopted LOS	Capacity at LOS Standard	2006				2016 Alt 2 JSF IJTS – East Side						
					Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Pk Hr Pk Dir Vol	Pk Hr Pk Dir LOS	v/c Ratio[1]	Deficient?	Significant[3]	% Significant	Significant & Adverse
Between Memorial Tr & Eglin Blvd South End Split (eastbound)	2 (one way)	0.47	D	2,172	700	B	0.32	No	1,000	B	0.46	No	Yes	11%	No
Between Memorial Tr & Eglin Blvd South End Split (westbound)	2 (one way)	0.54	D	2,172	1,100	B	0.51	No	1,600	B	0.74	No	Yes	17%	No
Between Eglin Blvd South End Split & Museum Dr/Nomad Way	4	1.42	D	1,810	1,300	B	0.72	No	1,700	C	0.94	No	Yes	21%	No
Between Museum Dr/Nomad Way & SR 189 (Lewis Turner Blvd)/West Gate	4	1.10	D	1,810	700	B	0.39	No	1,900	F	1.05	Yes	Yes	20%	Yes
Between SR 189 (Lewis Turner Blvd)/West Gate & SR 85	4	0.47	D	1,860	850	B	0.46	No	1,200	B	0.65	No	Yes	9%	No

* Level of service does not exceed the standard.
** This section of Eglin Boulevard runs as F Avenue and 2nd Street.
*** Constrained: Not able to be widened.
\+ AADT has been generated from turning movement counts.
++ Count data estimated based on 1996 Eglin Transportation Plan
1. v/c ratio was calculated from peak hour peak direction adopted level of service standard
2. Roadway analyzed as a two lane facility.
3. Significance is based on project trips for the alternative/action divided by the peak hour peak direction capacity of the adopted level of service standard.

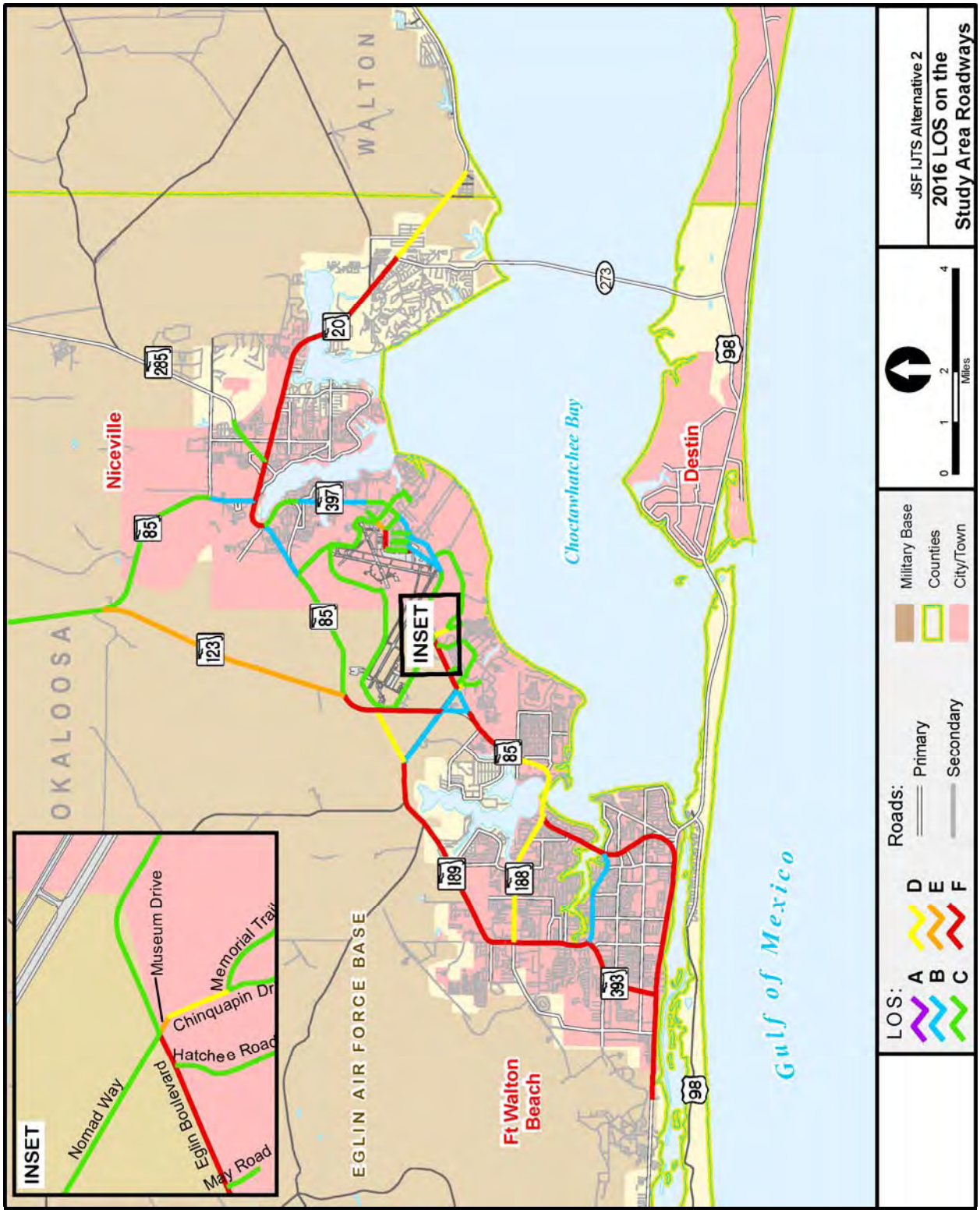

Figure 6-2. JSF IJTS Alternative 2 – 2016 LOS on the Study Area Roadways

6.5.2.3 Qualitative Impacts of Closure of Perimeter Road

Without approval of an explosives safety waiver, JSF IJTS Alternative 2 could require closing Perimeter Road, North Gate Road, and the North Gate during line munitions-loading activities, for safety reasons. These activities are assumed to occur at scheduled times lasting less than a day, such as four- to six-hour periods. The remainder of the time, these facilities could be open and operating normally.

During the munitions-loading activities, no one could enter Eglin Main Base at the North Gate, except for personnel associated with munitions loading. All other traffic is assumed to be rerouted to the East Gate via SR 85 and SR 397 or to the Air Combat Command (ACC) and West Gate via SR 85. Traffic associated with the munitions-loading activities is assumed to be negligible when compared to the typical traffic flow on the closed roadways. Trips using Perimeter Road are assumed to be rerouted to other on-base roadways, namely Eglin Parkway as the major parallel facility, based on the trip origin/destination within Eglin Main Base. Access to offices/employment is assumed to be maintained even during munitions loading, except that trips entering Eglin Main on the east are assumed to not be allowed to access offices/locations on the western side of the base via Perimeter Road and vice versa; these trips are assumed to be routed onto Eglin Parkway.

A qualitative assessment of the impacts of closing the facilities as described above was conducted for the alternative that includes the location of the JSF IJTS on the east side (46th Test Wing). During munitions loading, Perimeter Road is assumed to be closed to all traffic from approximately Taxiway C to North Gate Road, except for traffic associated with munitions loading. North Gate Road from the North Gate to Perimeter Road and the North Gate (aka Commercial Gate) are also assumed to be closed to all traffic, except that associated with munitions loading.

In the peak hour, the traffic on Perimeter Road is greatest between Taxiway S and Daytona Road at about 300 trips. Approximately half of this traffic is traveling to and from destinations in this area. Between Taxiway S and Nomad Way, the peak hour trips using Perimeter Road range from 70 to 110 trips. Approximately 50 to 60 peak-hour trips are estimated to be using North Gate Road. If the munitions loading time were to occur during the peak period, these trips are assumed to be unable to utilize Perimeter Road or the North Gate and are assumed to divert to other facilities. The model indicates that this diverted traffic would instead use either the East Gate (54 percent) or the West Gate (46 percent) to access Eglin Parkway. The origin/destination survey indicated that, of the traffic entering Eglin Main Base at the North Gate, approximately 35 percent originated from the east and 35 percent originated from the west; the remaining 30 percent indicated origination from the north. If the percentage of trips originating to the north is divided between the East and West Gates, then based on both the transportation model and the survey results, approximately half the traffic diverted from the road closures is assumed to instead go to either the East Gate or the West Gate. As Eglin Parkway is the only parallel facility to

Perimeter Road in this area, all the diverted traffic is assumed to utilize this facility on Eglin Main Base.

Although the amount of traffic utilizing Perimeter Road as a throughway to cross Eglin Main Base is relatively small (approximately 70 peak-hour trips), and the trips using North Gate Road and the North Gate are also projected to be small (approximately 60 peak-hour trips), the impact on Eglin Parkway and the East and West Gates could cause additional congestion and delay. As indicated in Table 6-5, the segment of Eglin Parkway near West Gate is projected to operate at LOS F. Portions of this facility near the East Gate are projected to operate at approximately 90 percent capacity.

In conclusion, the closure of Perimeter Road, North Gate Road, and the North Gate during the peak hours could cause additional congestion and delay at the East and West Gates and on Eglin Parkway adjacent to the gates. If the closure of Perimeter Road were to become permanent, the gates and Eglin Parkway could require additional improvement to operate at an acceptable LOS. If the munitions-loading activities and associated closure of Perimeter Road, North Gate Road and the North Gate were to occur during the off-peak hours, the impacts on the alternate facilities could be less and would not be likely to cause additional roadway failures, as both the amount of diverted traffic, and the traffic already using these facilities, are projected to be less.

Summary

The results of the analysis show that, under this alternative, 18 segments could be deficient with respect to the adopted LOS standard, including portions of Barrancas Avenue, Choctawhatchee Road, SR 20, SR 30 (US 98), SR 85, SR 123, SR 189, SR 393 (Mary Esther Boulevard), and SR 397. On-base impacts resulting from JSF IJTS Alternative 2 (located east of the Eglin Main Base Runway) could require some improvement to Barrancas Avenue, Choctawhatchee Road, and Daytona Road if the JSF IJTS has access from these facilities as conceptualized.

6.5.3 No Action Alternative

The description of the No Action Alternative was developed by reviewing the predictable actions described in Chapter 2 (Section 2.7, No Action Alternative) and was previously discussed in Chapter 4 (Section 4.5.6, No Action Alternative).

A general description of the transportation demand modeling process, trip generation, and inputs utilized for transportation impact analysis is provided in Chapter 3 (Section 3.5.3, Analysis Methodology). More detailed discussion and documentation on the development of the model are included in the Appendix B, *Transportation*.

As discussed in Chapter 4 (Section 4.5.6, No Action Alternative), the results of the analysis show that 23 segments are projected to be deficient, including portions of SR 10, SR 20, SR 30 (US 98), SR 83 (US 331), SR 85, SR 123, SR 188 (Racetrack Road), SR 189, SR 285, and SR 393 (Mary Esther Boulevard). Of these 23, 14 are deficient today.

6.5.4 Summary of Improvements

The results of the analyses associated with the JSF IJTS cantonment areas alternatives identified a number of the regional roadways as deficient in regards to their adopted LOS. Many of the deficiencies are common to all of the alternatives, including the No Action Alternative. Results of the analysis associated with the No Action Alternative were used to identify those roadways that are projected to be deficient regardless of the alternative actions (refer to Chapter 4, Table 4-11, No Action Alternative – Needed Road Improvements, in Section 4.5.7). In addition, several of these deficient roadways are also identified as deficient today. The alternatives were grouped based on similar study areas for identification of common needed improvements. Improvements associated with both Alternatives 1 (33rd Fighter Wing) and 2 (East Side) are shown in Table 6-6. The following table also indicates if the improvement is needed today. Where the v/c ratio is generally between 1.0 and 1.07, the suggested improvements are congestion management system (CMS) and transportation system management (TSM) projects, which are typically smaller intersection and operational improvements that could allow the corridor to operate acceptably within the planning horizon.

Three segments of SR 85, between Eglin Boulevard and US 98 are identified as constrained. This designation indicates that for either environmental or policy reasons, the local government has determined that it is not feasible to widen this facility. Capacities for these constrained roadways are based on the Florida Department of Transportation 2002 Q/LOS Handbook Generalized Tables. A more in depth discussion about these tables is provided in Chapter 3 (Section 3.5.3, Analysis Methodology). Where mitigation is identified as needed for this facility it should include the consideration of CMS/TSM improvements to this corridor, as well as exploration of widening of alternate corridors or new facilities. As this corridor traverses a largely built out and environmentally constrained area, the identification of new or alternate corridors is unlikely.

Table 6-6 summarizes the deficient roadway segments for both JSF IJTS Cantonment area alternatives that need improvement to operate acceptably. As indicated in the table, the demand on several roadways equates to the need for a more-than-six-lane facility. However, an improvement beyond six lanes may not be feasible for many reasons, including right-of-way availability, safety concerns, cost, etc. Other improvements that should be considered include CMS and TSM projects, a corridor management plan that looks at access along the corridor, and transit improvements. These types of improvements are potential options to preserve capacity in the corridor. In addition, the study of potential alternate corridors or improvements to parallel corridors is recommended.

Table 6-6. JSF IJTS Alternatives 1 and 2 – Needed Improvements

Roadway	From	To	Alternative	Improvement	Deficient in 2006?	Deficient in No Action?	Significant and Adverse in the 2016 Alternative?
Barrancas Avenue	*F Avenue*	*2nd Street/Eglin Boulevard*	*2*	*Widen to 3 lanes (one way)*	*No*	*No*	***Yes***
Nomad Way	*SR 85*	*Pumphouse*	*1*	*Widen to 4 lanes*	*No*	*No*	*No*
SR 20	SR 85	SR 285 (Partin Drive)	1,2	Needs Capacity*	No	Yes	**Yes[2]**
SR 20	SR 285 (Partin Drive)	Rocky Bayou Bridge	1	CMS/TSM	No	Yes	No
SR 20	SR 285 (Partin Drive)	Rocky Bayou Bridge	2	Widen to 6 lanes	No	Yes	No
SR 20	Rocky Bayou Bridge	SR 293 (White Point Road)	1,2	Widen to 6 lanes	No	Yes	No
SR 30 (US 98)	SR 85	SR 393 (Mary Esther Blvd)	1,2	Widen to 6 lanes	No	Yes	No
SR 30 (US 98)	SR 393 (Mary Esther Blvd)	Hurlburt Field Gate	1,2	Widen to 6 lanes	Yes	Yes	No
SR 85	SR 20	SR 397 (John Sims Parkway)	1,2	Needs Capacity*	Yes	Yes	**Yes[2]**
SR 85	SR 123	ACC Gate at Nomad Way	1,2	Widen to 6 lanes	Yes	Yes	**Yes[1]**
SR 85	ACC Gate at Nomad Way	SR 189 (Lewis Turner Blvd)	1,2	Widen to 6 lanes	Yes	Yes	**Yes[1]**
SR 85	SR 189/SR 397 (Eglin Blvd)	12th Avenue	1,2	Constrained*	Yes	Yes	**Yes**
SR 85	SR 188 (Racetrack Road)	SR 30 (US 98)	1,2	Constrained*	No	Yes	No
SR 123	SR 85N	SR 85	1,2	Widen to 4 lanes	Yes	Yes	**Yes[1]**
SR 188 (Racetrack Rd)	SR 189 (Beak Parkway)	SR 85	1	CMS/TSM	No	Yes	No
SR 189	Gen. Bond Boulevard	Mooney Road	1,2	Widen to 6 lanes	Yes	Yes	**Yes**
SR 189	Mooney Road	SR 188 (Racetrack Road)	1,2	Widen to 6 lanes	No	Yes	**Yes**
SR 189	SR 188 (Racetrack Road)	SR 393 (Mary Esther Blvd)	1,2	Widen to 6 lanes	Yes	Yes	No
SR 393 (Mary Esther Blvd)	SR 189 (Beal Parkway)	SR 30 (US 98)	1,2	Widen to 6 lanes	Yes	Yes	No
SR 397	*Museum Drive/Nomad Way*	*SR 189/West Gate*	*2*	*CMS/TSM*	*No*	*No*	***Yes***

CMS/TSM projects are suggested where the volume to capacity ratio is between 1.00 and 1.07.
Italics identify on-base roadways.
1 True for Alternative 1 only.
2 True for Alternative 2 only.
* Needs additional lanes/parallel corridor improvement or CMS/TSM to satisfy demand but cannot be widened further.

Ten of the needed improvements are significantly impacted by the Alternatives. Needed improvements on significantly impacted roadway segments include Barrancas Avenue from F Avenue to 2nd Street/Eglin Boulevard in Alternative 2, SR 20 from SR 285 to Rocky Bayou Bridge, portions of SR 85 from SR 20 to 12th Avenue, SR 123 from SR 85 to SR 85, portions of SR 189 from General Bond Boulevard to SR 188 and SR 397 from SR 189/West Gate to SR 85. Of these significantly impacted segments, SR 397 and Barrancas Avenue are located on base. The portions of SR 85 and SR 397 are operating better than the adopted LOS standard today and also in the No Action Alternative.

The JSF IJTS alternatives revealed three needed improvements located on base. Barrancas Avenue from F Avenue to 2nd Street/Eglin Boulevard has a need to be widened to three lanes one-way in Alternative 2, Nomad Way from SR 85 to the pump house needs to be widened to four lanes in Alternative 1, and SR 397 from Museum Drive/Nomad Way to SR 189/West Gate needs minor capacity improvements in Alternative 2. As shown in Table 6-6, these roadway segments are both significantly and adversely impacted by the project trips with the exception of Nomad Way. Several needed improvements off base are shown in Table 6-6 as well.

6.6 UTILITIES

6.6.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

Under this alternative, the JSF IJTS would be located on Eglin Main Base in an area already developed for industrial type uses. This section describes the existing utilities on Eglin Main Base and identifies potential impacts to utilities under this alternative.

6.6.1.1 Existing Conditions (Utilities – JSF IJTS Alternative 1)

Potable Water

Under this alternative, the Housing Area water system would be used to support the JSF IJTS (Figure 6-3). The amount of potable water currently drawn from the Floridan Aquifer is below the levels permitted by the consumptive use permit (CUP) authorization (Table 6-7). As demand increases with the influx of additional people and military missions to Eglin AFB, future considerations for the potable water supply may require additional water systems and CUPs, making changes to reduce water consumption, and identifying areas of dependence on the aquifer (Brown, 2006a).

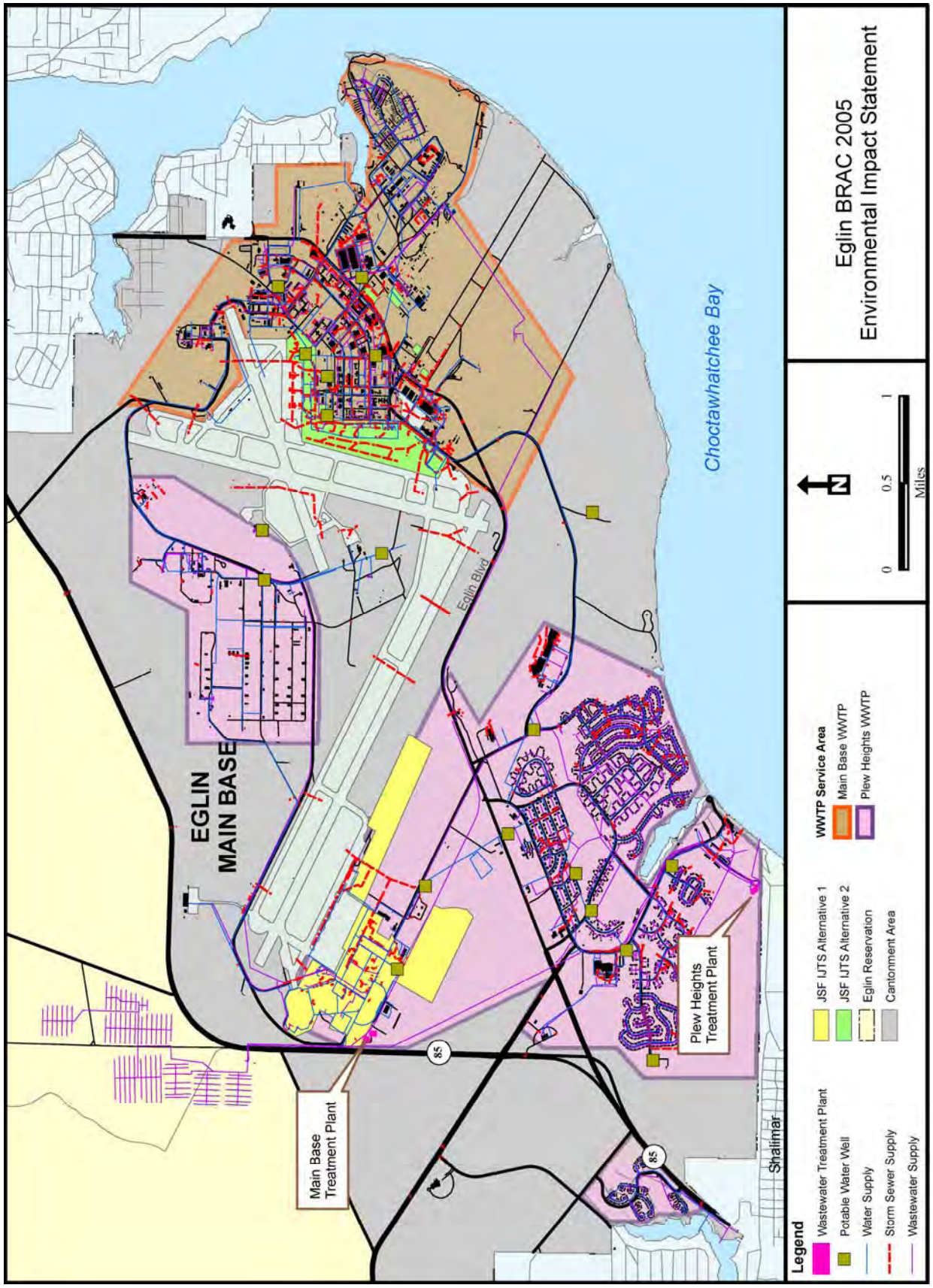

Figure 6-3. JSF IJTS – Potable Water and Wastewater Utilities on Main Base

Table 6-7. JSF IJTS Alternative 1 – Permitted and Actual Potable Water Use by the Housing Area Water System

Water Supply System	Permitted Average Daily Limit (gal/day)	Permitted Maximum Daily Limit (gal/day)	Permitted Maximum Monthly Limit (gal/month)	2005 Average Daily Rate (gal/day)	2005 Average Monthly Rate (gal/month)
Housing Area	3.39 million	6.08 million	120 million	1.1 million	33.4 million

Source: 96 CEG/CEVC, 2006
gal = gallons

Wastewater

Plew Wastewater Treatment Plant (WWTP) serves the Main Base housing areas, the 33 Fighter Wing (33 FW) area, and the MSAs (Table 6-8 and Figure 6-3). It is expected that this facility would service the proposed JSF IJTS Alternative 1 site (south of Nomad Way). Sprayfields are co-located with each of the WWTPs so that effluent can be reused. Sludge produced from the WWTPs is spread within a designated area at Field 4. Since the proposed location for the JSF IJTS Alternative 1 is well-established and utilized, the supporting wastewater infrastructure is already in place.

Table 6-8. JSF IJTS Alternative 1 – Plew Heights Wastewater Treatment Facility

WWTP Location	Capacity in mgd	Annual Average (Including July 2006)	Percentage of Capacity Used	Areas Served by WWTP
Plew Heights Treatment Facility	1.5	0.549	36.6	Main Base housing, 33 FW area, Munitions Storage Area

Source: Brown, 2006b and U.S. Air Force, 2006o
mgd = million gallons per day

Electricity

Electricity use on Eglin AFB has been steady from FY 2000 through FY 2007 (Table 6-9). The electrical infrastructure on Main Base is extensive (Figure 6-4). Gulf Power supplies transmission voltage electricity to Eglin Main Base via a primary meter. Two substations on Eglin track usage, regulate flow, and distribute electricity to Main Base, Duke Field, and portions of the Eglin Range (Fleming, 2006 and McBay, 2007).

Table 6-9. Electricity Consumption for Eglin AFB[a], 2000-2007

Fiscal Year	Total Electric Consumption[a] (kWh)
2000	265,650,513
2001	252,823,920
2002	271,832,920
2003	263,271,716
2004	261,955,624
2005	278,051,532
2006	269,711,844
2007[b]	185,661,203

Sources: Fleming, 2006 and McBay, 2007
kWh = kilowatt hours
a. Electricity consumption data include Main Base, Duke Field and the Eglin Range.
b. FY 2007 data does not include July-Sept

Natural Gas

Natural gas consumption by Eglin Main Base has generally been steady over the last seven years with a slow decline in usage between 2004 and 2006 (Table 6-10). The theoretical capacity of the gas pipeline into Eglin is a maximum throughput in excess of 68,000 million cubic feet (MCF) per day. The total base demand for natural gas in 2006 was approximately 234,734 MCF, or 643 MCF per day. Infrastructure currently exists on Eglin Main Base (Figure 6-4), Duke Field cantonment, and at the Navy Explosive Ordnance Disposal (EOD) School at D-51 on the Eglin Range. Two main metering points for natural gas regulate the flow of natural gas on Main Base and out to Duke Field and the Navy EOD School at D-51 (Fleming, 2006).

Table 6-10. Natural Gas Consumption for Eglin AFB[a], 2000–2007

Year	Total Eastside (MCF)	Total Westside (MCF)	Grand Total Consumption (MCF)
2000	215,840	110,416	326,256
2001	227,901	138,987	366,888
2002	206,764	127,288	334,052
2003	215,710	131,881	347,591
2004	219,560	130,730	350,290
2005	173,242	119,598	292,840
2006	115,783	118,951	234,734
2007[b]	180,795	112,259	293,054

Sources: Fleming, 2006 and McBay, 2007
a. Natural gas consumption data include Eglin Main Base, Duke Field and D-51 (Navy EOD School).
b. Data for 2007 is through the month of June.

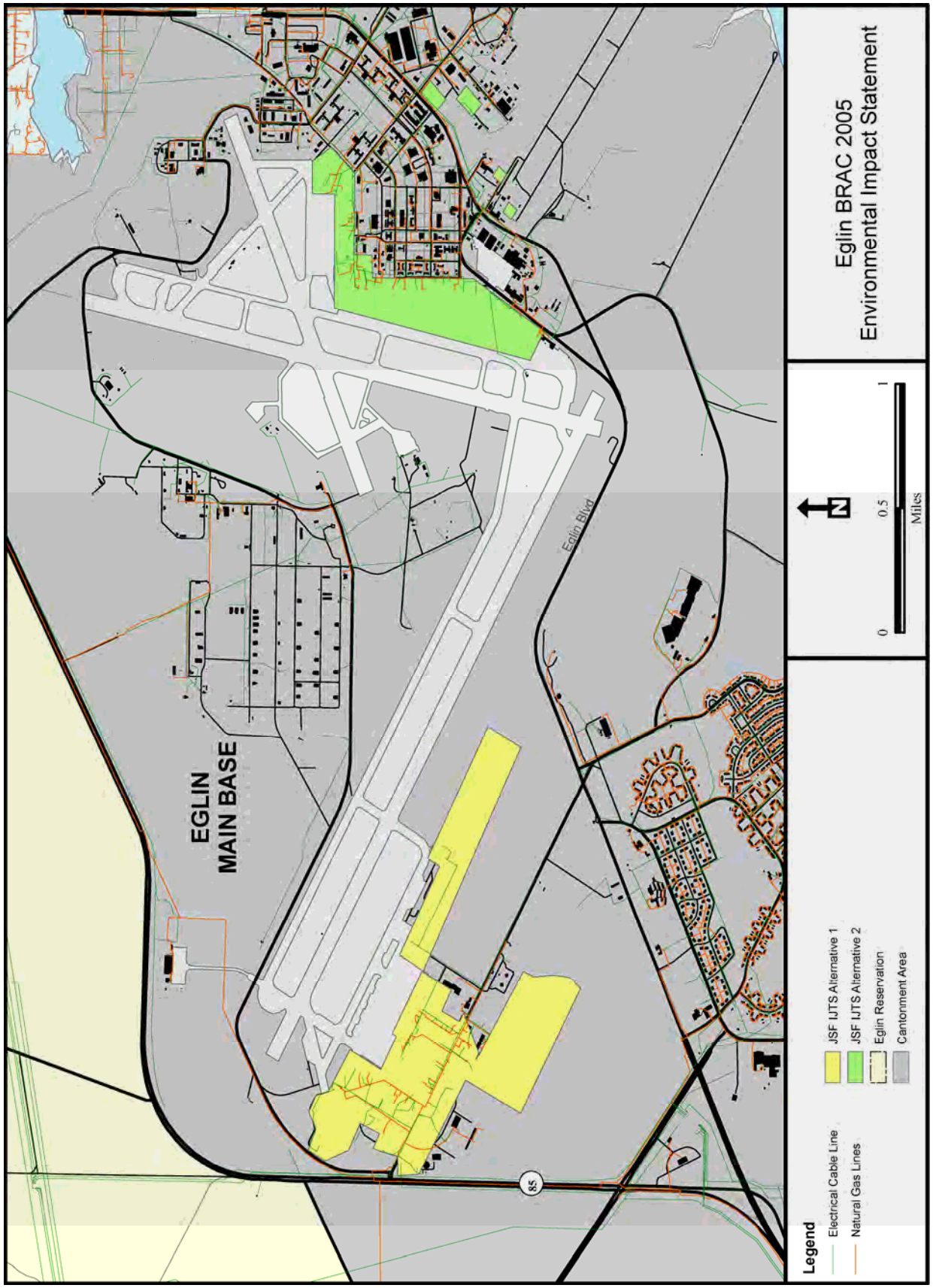

Figure 6-4. JSF IJTS – Electrical and Natural Gas Utilities on Main Base

6.6.1.2 Environmental Consequences (Utilities – JSF IJTS Alternative 1)

The proposed changes to the MSA at Main Base in support of the JSF IJTS would not result in an increase or decrease in personnel. For this reason, the amount of utilities used would not change. However, the utilities infrastructure would be modified to accommodate the changes in buildings.

Potable Water

The JSF IJTS will potentially use approximately 537,000 gallons of water per day, or 196 million gallons per year. An explanation of potable water estimates can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Potable Water). The permitted average daily limit of the Housing Area potable water system is 3.39 million gallons per day (mgd) with a maximum daily limit of 6.08 mgd (Table 6-11). The consumption of potable water from the Housing Area water system in 2005 was 1.1 mgd on average. JSF IJTS Alternative 1 would replace the 33 FW with the JSF IJTS, which currently utilizes this water system. The 33 FW currently uses 0.378 mgd, based on a total of 1,638 personnel. With the addition of 0.537 mgd from the JSF IJTS, the Housing Area water system would reach approximately 1.6 mgd, which is still within permit limits. The drawdown of the 33 FW would decrease the total average daily rate to 1.26 mgd. Since the Housing Area water system would remain within permitted limits, there would be no adverse impact on potable water from JSF IJTS Alternative 1.

Table 6-11. Water Use by the Housing Area Water System and JSF IJTS

Water Supply System	2005 Average Daily Rate (mgd)	JSF IJTS Estimated Average Daily Rate (mgd)	Total Average Daily Rate (mgd)	Permitted Average Daily Limit (mgd)	Permitted Maximum Daily Limit (mgd)
Housing Area	1.1	.537	1.64	3.39	6.08

mgd = million gallons per day

Potable water estimates and impacts are based on numbers of personnel. However, the proposed freshwater aircraft rinses and aircraft wash rack would also draw water from the Floridan Aquifer. This type of water use is classified as industrial water use. To quantify industrial water use on Eglin Main Base and to identify ways to reduce it, Eglin completed the *Main Base Industrial Water Use Survey* in December 2007. The survey determined that industrial water use accounts for only 1.73 percent of the five-year annual average for total water use on Eglin Main Base (Eglin AFB, 2007b). The primary water uses drawing from the Floridan Aquifer on Eglin AFB are public water supply and cooling towers, accounting for 71 percent and 27 percent, respectively, of total water use.

Of the total *industrial* water uses on Eglin Main Base, equipment washing/rinsing (vehicles and aircraft) accounts for 19 percent of the total, and equipment processes

(metal finishing operations, x-ray machines, and the cooling tower at McKinley Climatic Lab) account for the remaining 81 percent of the total. The 33 FW, which operates F-15 jet aircraft, utilized approximately 236,400 gallons per year for aircraft washing and rinsing.

Approximately seven times as many F-35 aircraft would be washed on an annual basis, which would increase the amount of water used per year for aircraft washing and rinsing to 1.65 million gallons. With the scheduled drawdown of the 33 FW, the amount of water used for aircraft washing and rinsing would be reduced to 1.4 million gallons per year. With the sevenfold increase in water use for F-35 aircraft washing and rinsing, industrial water use would account for 2.14 percent of the five-year annual average of total water use on Eglin Main Base, up from 1.73 percent.

The *Main Base Industrial Water Use Survey* identified several opportunities for reducing industrial water usage. Of all the opportunities evaluated to reduce industrial water use, the utilization of the Sand and Gravel Aquifer for aircraft washing and rinsing would have the most impact on the JSF IJTS. However, it was determined that use of the Sand and Gravel Aquifer would not be feasible due to water quality limits established by Air Force Technical Order 1-1-691, Section 3.1.1-f for washing and rinsing aircraft. These limits would require water from the Sand and Gravel Aquifer to be treated and monitored before use on aircraft. Due to the level of effort this would require, it was excluded as a method for reducing Floridan Aquifer water use for aircraft washing and rinsing (Eglin AFB, 2007b).

Even though the proposed JSF aircraft wash rack and rinses would continue to utilize the Floridan Aquifer, there would be no significant impact on potable water since this type of industrial water use accounts for such a small percentage of the overall potable water use of the Floridan Aquifer by Eglin Main Base.

Wastewater

The JSF IJTS is estimated to produce 108,335 gallons of wastewater per day or 39.5 million gallons per year (Table 6-12). An explanation of wastewater estimates can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Wastewater).

The rinse water resulting from the two freshwater aircraft rinses would be allowed to be absorbed directly into the ground without first being processed by a wastewater treatment facility (Brown, 2006b). An estimate for the rinses is still included in Table 6-13 to account for the potential of some water ending up in the wastewater stream. However, the wastewater calculation assumes all the rinsewater enters the wastewater stream, thereby providing a conservative estimate (Brown, 2006b).

Table 6-12. JSF IJTS Alternative 1: Estimated Wastewater Flow

Generalized Activity	Number of People	Wastewater Produced per Person (gal/day)	Total Wastewater Produced (gal/day)
Working (office & industrial)	2,326	13	30,238
Living (dormitory)	545	40	21,800
Eating 3 meals/day (dining hall)	545	21	11,445
Eating 1 meal/day (dining hall)	1,781	7	12,467
		Total (gal/day)	**75,950**
Structure	**Square Feet (sq ft)**	**Wastewater Produced per sq ft (gal/day)**	**Total Wastewater Produced (gal/day)**
Aircraft Wash Rack	11,050	1.7	18,785
Freshwater Rinse Area North	4,000	1.7	6,800
Freshwater Rinse Area South	4,000	1.7	6,800
		Total (gal/day)	**32,385**
		Grand Total (gal/day)	**108,335**

gal/day = gallons per day; sq ft = square feet

The current wastewater input to the Plew Heights WWTP consumes less than 50 percent of the total permitted capacity. JSF IJTS Alternative 1 would replace the 33 FW with the JSF IJTS, which currently uses the Plew Heights WWTP. With the additional wastewater from the JSF IJTS (108,335 gallons per day), the Plew Heights WWTP annual average would increase to 0.657 mgd. This would result in 44 percent of the total permitted capacity being utilized (Table 6-13). The Plew Heights WWTP would have no difficulty accommodating the additional flow from the JSF IJTS and would not result in adverse impacts as a result of JSF IJTS Alternative 1.

Table 6-13. JSF IJTS Alternative 1: Plew Heights WWTP Capacity

WWTP Location	Annual Average Including JSF IJTS (mgd)	Capacity (mgd)	Percentage of Capacity Used
Plew Heights	0.657	1.5	44

mgd = million gallons per day

Electricity and Natural Gas

Based on the amount of new square footage to be constructed for the JSF IJTS, it is estimated that the electrical requirement would be approximately 12,609,261 kilowatt hours (kWh) per year or 34,545 kWh per day, and the natural gas requirement would be approximately 20 MCF per year or 0.05 MCF per day. An explanation of electrical and natural gas estimates can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Electricity and Natural Gas). Based on FY 2006 electricity usage, the estimated requirement to support the new JSF IJTS facilities would be 4.7 percent of the total usage in 2006. According to the military liaison at Gulf Power, they can serve the new electrical power load requirement for Eglin AFB (Erickson, 2007).

Based on the 2006 natural gas usage, the estimate requirement to support the new JSF IJTS facilities would be less than 0.5 percent of the total usage in 2006 and well within the current theoretical capacity of the gas pipeline serving Eglin Main Base. Okaloosa Natural Gas would be able to accommodate this increase in natural gas consumption (Shue, 2007). This alternative would not cause an adverse impact to the electrical or natural gas supply in Northwest Florida.

Overall, the existing electrical and natural gas infrastructure on Eglin Main Base would support JSF IJTS Alternative 1. Additional infrastructure may need to be added or existing infrastructure slightly modified to accommodate certain aspects of the JSF IJTS. Providing 270 volts direct current at each of the aircraft parking spots was potentially an unusual electrical requirement for the JSF IJTS hangars. However, it has been decided that the electrical hydraulic mule and all other JSF electrical needs in the hangars will use 440 volts alternate current, 60 hertz, 100 amperes. To accommodate the 270 volts direct current requirement, a power converter would be used (Bohlman, 2006).

Additional details are currently unavailable to determine the specific impact of this alternative on existing electrical infrastructure. It is yet to be determined whether Gulf Power would continue to provide a primary feed of transmission voltage to Eglin AFB and whether Eglin would continue to operate and maintain substations and distribution lines to serve the proposed JSF IJTS. An alternate arrangement would be for Gulf Power to construct substations and distribution lines and either operate and maintain the infrastructure or pass it to Eglin for maintenance and continued operation.

Natural gas infrastructure already exists on Eglin Main Base in the proposed JSF IJTS site. New infrastructure may be needed to supply new construction. However, based on the existing capacity of the main lines serving Eglin Main Base, installing additional pipes is not expected to adversely affect the natural gas supply system.

6.6.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.6.2.1 Existing Conditions (Utilities – JSF IJTS Alternative 2)

Potable Water

The Main Base/Ammunition Area water system would be used to support JSF IJTS Alternative 2 (Figure 6-3). The amount of potable water currently drawn from the Floridan Aquifer is under the levels permitted by the CUP authorization (Table 6-14). As demand increases with the influx of additional people and military missions to Eglin AFB, future considerations for the potable water supply may require additional water

systems and CUPs, making changes to reduce water consumption, and identifying areas of dependence on the aquifer (Brown, 2006a).

Table 6-14. JSF IJTS Alternative 2 - Permitted and Actual Potable Water Use by Main Base Water System

Water Supply System	Permitted Average Daily Limit (gal/day)	Permitted Maximum Daily Limit (gal/day)	Permitted Maximum Monthly Limit (gal/month)	2005 Average Daily Rate (gal/day)	2005 Average Monthly Rate (gal/month)
Main Base/Ammo	1.9 million	4.0 million	121.6 million	0.847 million	25.7 million

Source: 96 CEG/CEVC, 2006
gal = gallons

Wastewater

The Main Base Treatment Facility Plant serves all of Main Base east of the runway (U.S. Air Force, 2006o). It is expected that this facility would service the proposed JSF IJTS Alternative 2 site (Table 6-15 and Figure 6-3). However, this could change depending on the final selection and configuration of this site. Since this location for the JSF IJTS is well-established and already in use, the supporting wastewater infrastructure is already in place.

Table 6-15. JSF IJTS Alternative 2 – Main Base Wastewater Treatment Facility

WWTP Location	Capacity (mgd)	Annual Average (Including July 2006)	Percentage of Capacity Used	Areas Served by WWTP
Main Base Treatment Facility	1.0	0.469	46.9	Main Base east of the runway

Source: Brown, 2006b and U.S. Air Force, 2006o
mgd = million gallons per day

Electricity and Natural Gas

The existing condition of electrical and natural gas consumption and infrastructure on Eglin Main Base is the same as described for JSF IJTS Alternative 1 (Section 6.6.1) and shown previously in Figure 6-4.

6.6.2.2 Environmental Consequences (Utilities – JSF IJTS Alternative 2)

The potential impact from JSF IJTS Alternative 2 to utilities resulting from the proposed changes to the MSA in support of the JSF IJTS would be the same as described for JSF IJTS Alternative 1 (Section 6.6.1), since the proposal is the same for both alternatives.

Two displaced actions would take place if this alternative is selected. The first would involve the 46 TW being relocated to the 33 FW area of Main Base to accommodate the JSF IJTS. This would not result in a change in overall numbers of personnel. For this reason, the amount of utilities used would not change based on this displaced action. However, utilities infrastructure would potentially be modified to accommodate the changes to buildings.

The second displaced action involves relocation of the Aero Club from its current location to either of two existing buildings (1398 or 1399) located off the end of the runway near the 33 FW area. These are existing buildings and would require renovation that would involve possible changes to the utilities infrastructure. However, the overall number of personnel would not change as a result of this move. For this reason, the amount of utilities used would not change based on this displaced action.

Potable Water

The JSF IJTS will potentially use approximately 537,000 gallons of water per day or 196 million gallons per year. An explanation of potable water estimates can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Potable Water). The permitted average daily limit of the Main Base water system is 1.9 mgd with a maximum daily limit of 4.0 mgd. The consumption of potable water from the Main Base water system in 2005 was on average 0.847 mgd. With the addition of 0.537 mgd, the Main Base water system would reach approximately 1.4 mgd, which is within permit limits (Table 6-16). Since the Main Base Water System would remain within permitted limits, there would be no adverse impact on potable water as a result of implementing JSF IJTS Alternative 2.

Table 6-16. Water Use by the Eglin Main Base Water System and the JSF IJTS

Water Supply System	2005 Average Daily Rate (mgd)	JSF IJTS Average Daily Rate (mgd estimate)	Total Average Daily Rate (mgd)	Permitted Average Daily Limit (mgd)	Permitted Maximum Daily Limit (mgd)
Main Base/Ammo	0.847	0.537	1.38	1.9	4.0

mgd = million gallons per day

The environmental consequences from the freshwater aircraft rinses and wash rack would be the same as those described for JSF IJTS Alternative 1.

Wastewater

Since the number of personnel associated with the JSF IJTS is the same for both JSF IJTS Alternatives 1 and 2, the wastewater estimate for the JSF IJTS is the same as shown in

Alternative 1 (Table 6-12). To summarize, the JSF IJTS is estimated to produce 108,335 gallons of wastewater per day or 39.5 million gallons per year.

The current wastewater input to Main Base WWTP consumes less than 50 percent of the total permitted capacity. The location for JSF IJTS Alternative 2 would use the Main Base WWTP. With the additional wastewater from the JSF IJTS, the Main Base WWTP annual average would increase to 0.577 mgd. This would result in 58 percent of the total permitted capacity being utilized (Table 6-17). The Main Base WWTP would have no difficulty accommodating the additional flow from the JSF IJTS and would not result in adverse impacts to wastewater capacity.

Table 6-17. JSF IJTS Alternative 2 – Main Base WWTP Capacity

WWTP Location	Annual Average Including JSF IJTS (mgd)	Capacity (mgd)	Percentage of Capacity Used
Main Base	0.577	1.0	58

mgd = million gallons per day

Electricity and Natural Gas

Based on the amount of new square footage to be constructed for the JSF IJTS under this alternative, it is estimated that the electrical requirement would be approximately 14,571,893 kWh per year or 39,923 kWh per day, and the natural gas requirement would be approximately 23.2 MCF per year or 0.06 MCF per day. An explanation of electrical and natural gas estimates can be found in Chapter 3 (Section 3.6.3, Analysis Methodology, Electricity and Natural Gas). Based on FY 2006 electricity usage, the estimated requirement to support the new JSF IJTS facilities would be 5.4 percent of the total usage in 2006. According to the military liaison at Gulf Power, they can serve the new electrical power load requirement for Eglin AFB (Erickson, 2007).

Based on the 2006 natural gas usage, the estimated requirement to support the new JSF IJTS facilities would be less than half of one percent of the total usage in 2006 and well within the current theoretical capacity of the gas pipeline serving Eglin Main Base. Okaloosa Natural Gas would be able to accommodate this increase in natural gas consumption (Shue, 2007). This alternative would not cause an adverse impact to the electrical or natural gas supply in Northwest Florida.

6.6.3 No Action Alternative

In the No Action Alternative the JSF IJTS would not be located at Eglin AFB and would therefore not require the use of utilities on Eglin Main Base. Sections 6.6.1.1 and 6.6.2.1 describe utilities as they currently are on Eglin Main Base. However, several actions unrelated to BRAC are predicted to occur that would impact the current baseline status

of utilities on Eglin. Some of the actions represent minor fluctuations in personnel (described in Chapter 2, Section 2.7, No Action Alternative). Generally, the minor changes in levels of use are easily absorbed by the existing utility systems because none of the utilities are currently nearing their maximum permitted levels or capabilities. These types of fluctuations would not impact utilities on Eglin Main Base.

Two of the actions predicted to occur would result in major changes to numbers of personnel on Eglin Main Base. The drawdown of the 33 FW and the reduction in overall numbers of DoD personnel as specified in the President's Fiscal Year (FY) 2007 Budget would result in 2,207 fewer people on Eglin Main Base by 2018. The reduction in personnel would reduce the amounts of potable water consumed and wastewater produced by roughly 509,817 gallons per day based the average per capita use coefficient for Eglin AFB (see Section 3.6.3, Analysis Methodology, for more details), assuming that all water consumed becomes wastewater. The reduction in water consumption and wastewater production would have an overall positive impact on utilities. Fewer people on Eglin Main Base would also reduce the overall consumption of electricity and natural gas.

6.7 AIR QUALITY

Identifying the affected area for an air quality assessment requires knowledge of sources of air emissions, pollutant types, emission rates and release parameters, proximity to other emissions sources and local conditions. Refer to Appendix D, *Air Quality*, for a review of air quality and the associated methodologies used for emissions calculations.

6.7.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.7.1.1 Existing Conditions (Air Quality – JSF IJTS Alternative 1)

The existing conditions associated with air quality for Okaloosa, Santa Rosa, and Walton Counties are discussed in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

6.7.1.2 Environmental Consequences (Air Quality – JSF IJTS Alternative 1)

Construction and Personnel Emissions

For the completion of this analysis, the data provided in Table 2-14 (*Proposed Facilities Associated With JSF IJTS Alternative 1*), was utilized for the analysis of construction emissions. The exact footprint is not currently known for the construction of the JSF

IJTS at each of the sites described for JSF IJTS Alternatives 1 and 2 in Chapter 2 (Section 2.5.2, Alternatives Carried Forward for JSF IJTS).

JSF IJTS Alternative 1 involves the construction of 23 new facilities/buildings and open area facilities, or approximately 3,387,327 square feet (ft^2) of new space. Additionally, Alternative 1 would include the demolition of approximately 191,579 ft^2 and renovation of 390,091 ft^2. Renovation activities are not considered as part of this analysis as this usually occurs inside buildings, thus emissions affecting the regional air quality are not generated. Table 6-18 summarizes the estimated construction emissions over the life of the project.

Table 6-18. Estimated Construction Air Emissions by JSF IJTS Activity

Source Category		Emissions (tons/year)				
		CO	NO_x	PM_{10}	SO_2	VOCs
Maximum Annual Construction Project Emissions	Acres Paved	0.000	0.000	0.000	0.000	0.001
	Demolition	0.000	0.000	0.627	0.000	0.000
	Grading Equipment	0.000	0.000	1.163	0.000	0.000
	Grading Operations	0.000	0.000	415.416	0.000	0.000
	Mobile Equipment	7.118	16.973	0.000	2.099	1.551
	Nonresidential Architectural Coatings	0.000	0.000	0.000	0.000	0.194
	Stationary Equipment	48.271	1.250	0.000	0.064	1.807
	Workers Trips	61.185	3.503	0.000	0.000	3.736
	Total	**116.574**	**21.726**	**417.206**	**2.163**	**7.290**

CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxides; VOC = volatile organic compound

In association with building the JSF IJTS, Eglin will also gain an estimated 2,326 personnel and approximately 2,559 spouses and children. With the influx of people, vehicular emissions will also increase. Emissions from base personnel commuting as well as increased use of government vehicles are assessed as mobile sources in Table 6-19.

Table 6-19. Percentage of Construction and Additional Personnel Emissions Associated With JSF IJTS Alternative 1 Compared to the ROI

Emission Activities	Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOCs
Construction Emissions	116.57	21.73	417.21	2.16	7.29
Point Source	11.37	13.93	1.00	0.09	0.71
Mobile Source	65.00	8.71	0.27	0.19	4.79
Total	**192.94**	**44.37**	**418.47**	**2.44**	**12.79**
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percentage of ROI Emissions	*0.13%*	*0.19%*	*1.36%*	*0.06%*	*0.05%*

CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxides; VOC = volatile organic compound

As indicated in Table 6-19, the individual pollutant emissions from the project would not exceed 10 percent of the total ROI emissions for each corresponding pollutant. The highest pollutant percentage is for PM_{10}, which is approximately 1.36 percent of ROI's total emissions based on the USEPA 2002 NEI. This slight increase in local air quality would be temporary. In calculating emissions, certain assumptions were made regarding various variables associated with construction activities. Specific details regarding the assumptions and calculations associated with the emissions estimates are located in Appendix D, *Air Quality*. There are no air quality issues anticipated with the construction of the JSF IJTS at the 33 FW area on Eglin (Alternative 1).

6.7.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.7.2.1 Existing Conditions (Air Quality – JSF IJTS Alternative 2)

The existing conditions associated with air quality for this alternative are discussed in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions). The ROI selected for this air quality analysis are the three counties in which Eglin AFB is located: Okaloosa, Santa Rosa, and Walton Counties.

6.7.2.2 Environmental Consequences (Air Quality – JSF IJTS Alternative 2)

JSF IJTS Alternative 2 would require the construction of 28 new facilities/buildings and additional open area facilities amounting to approximately 3,447,562 ft^2 as well as the demolition of nine structures (approximately 66,873 ft^2). Renovation activities are not included in the air analysis since emissions are contained within the renovated building thus not affecting regional air quality. Construction emissions generated for JSF IJTS Alternative 2 are estimated in Table 6-20.

Table 6-20. JSF IJTS Alternative 2 – Construction Emissions by Activity

Source Category		Emissions (tons/year)				
		CO	NO_x	PM_{10}	SO_2	VOC
Maximum Annual Emissions CY 2008-2015	Acres Paved	0.000	0.000	0.000	0.000	0.009
	Demolition	0.000	0.000	0.211	0.000	0.000
	Grading Equipment	0.000	0.000	0.245	0.000	0.000
	Grading Operations	0.000	0.000	87.514	0.000	0.000
	Mobile Equipment	7.118	16.973	0.000	2.099	1.551
	Nonresidential Architectural Coatings	0.000	0.000	0.000	0.000	0.168
	Stationary Equipment	48.271	1.250	0.000	0.064	1.807
	Workers Trips	52.750	3.020	0.000	0.000	3.221
	Total	**108.139**	**21.243**	**87.971**	**2.163**	**6.756**

CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxides; VOC = volatile organic compounds

The additional personnel associated with the JSF IJTS Alternative 2 are the same as JSF IJTS Alternative 1. Vehicular emissions from the additional people are expressed as mobile sources in Table 6-20. The renovation of the Aero Club and use of the 46 TW are connected actions that are considered under this alternative. As described in Chapter 2 (Section 2.5.2.3, JSF IJTS Alternative 2: The 46 TW Area), the siting of the JSF IJTS in the 46 TW area would require the relocation of 46 TW personnel and functions to the vacated 33 FW area in 2010. Construction of six new facilities, demolition of six facilities, and renovation of six facilities would be required to accommodate the 46 TW. Emissions expected from the construction and demolition activities are summarized in Table 6-21. The renovation of the Aero Club would not impact regional air quality since the work would be completed to the interior of the building thus emissions would not be released to the atmosphere.

Table 6-21. Emissions for 46 TW Connected Action to JSF IJTS Alternative 2

Source Category		Emissions (tons/year)				
		CO	NO_x	PM_{10}	SO_2	VOC
Maximum Annual Emissions CY 2008-2015	Acres Paved	0.000	0.000	0.000	0.000	0.002
	Demolition	0.000	0.000	0.048	0.000	0.000
	Grading Equipment	0.046	0.171	0.014	0.017	0.018
	Grading Operations	0.000	0.000	5.027	0.000	0.000
	Mobile Equipment	3.569	8.510	0.686	1.052	0.778
	Nonresidential Architectural Coatings	0.000	0.000	0.000	0.000	0.257
	Stationary Equipment	24.202	0.627	0.018	0.032	0.906
	Workers Trips	3.027	0.150	0.025	0.000	0.139
	Total	**30.842**	**9.458**	**5.818**	**1.102**	**2.099**

CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_2 = sulfur dioxides; VOC = volatile organic compounds

As indicated in Table 6-22, the individual pollutant emissions from the project would not exceed 10 percent of the total ROI emissions for each corresponding pollutant for both the proposed action and the connected action. The highest pollutant percentage is for PM_{10}, which is approximately 0.31 percent of ROI's total emissions based on the USEPA 2002 NEI. This slight increase in local air quality would be temporary. In calculating emissions, certain assumptions were made regarding various variables associated with construction activities. Specific details regarding the assumptions and calculations associated with the emissions estimates are located in Appendix D, *Air Quality*. There are no air quality issues anticipated with the construction of the JSF IJTS at the 46 TW area on Eglin (JSF IJTS Alternative 2).

Table 6-22. Percentage of Construction and Additional Personnel Emissions Associated With JSF IJTS Alternative 2 Compared to the ROI

Emission Activities	Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOC
Alternative 2					
Construction Emissions	108.14	21.24	87.97	2.16	6.76
Point Source	9.80	12.01	0.86	0.07	0.61
Mobile Source	65.00	8.71	0.27	0.19	4.79
Connected Actions					
Construction Emissions	30.84	9.46	5.82	1.10	2.10
Point Source	1.12	1.37	0.10	0.01	0.07
Mobile Source	0	0	0	0	0
Total Emissions	214.91	52.79	95.02	3.54	14.33
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percentage of ROI Emissions	0.14%	0.23%	0.31%	0.09%	0.06%

CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = particulate matter with a diameter less than or equal to 10 microns; SO_x = sulfur oxides; VOC = volatile organic compounds

6.7.3 No Action Alternative

Environmental impacts to air quality from the No Action Alternative were presented in Chapter 4 (Section 4.7.6, No Action Alternative). No adverse impacts are expected from the implementation of the predicted actions to regional air quality.

6.8 SAFETY

6.8.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.8.1.1 Existing Conditions (Safety – JSF IJTS Alternative 1)

Explosives Safety

Explosive safety quantity-distances (ESQDs) are established under Air Force Manual 91-201, *Explosives Safety Standards*. The ESQDs are separation distances between explosive storage areas such as storage igloos, handling areas such as weapon loading areas, and other areas such as "hot" cargo pads. ESQDs are based on the maximum storage capacity of each facility to prevent explosive propagation from one storage facility to another. Additionally, ESQDs are established to provide a safety zone between the explosive storage areas and the surrounding areas.

The largest ESQD area on Eglin Main is located on the north side of the runways away from the developed area. This area surrounds the facilities of the MSA. A second ESQD zone surrounds the flightline operations of the 33 FW. This zone is defined as 800 feet from the arm/disarm pads, hot refueling and aircraft parking apron, and 700 feet from the former alert apron. ESQD zones also surround the hot gun line in the main complex and the munitions loading area at Range 22 (U.S. Air Force, 2001c).

Ground Safety

Day-to-day operations, maintenance, and construction activities conducted at Eglin AFB are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements. Specific safety requirements and responses to events that may occur on the range are detailed in published range operating procedures.

6.8.1.2 Environmental Consequences (Safety – JSF IJTS Alternative 1)

Explosive Safety

The JSF IJTS Alternative 1 would include construction and/or renovation of facilities where munitions may be stored. Additionally, other ordnance storage areas may be constructed to support the JSF mission (Table 6-23).

Table 6-23. JSF IJTS – Munitions Storage/Maintenance Facilities

Buildings	Acres
De-arming Facilities	0.12
Munitions Arming Area	2.30
Hot Gun/De-arming Area	4.59
Live Ordnance Loading Area	27.55
Modular Storage Magazine	0.10
Modular Storage Magazine	0.10
Modular Storage Magazine (small)	0.04
Munitions Maintenance Facility	0.23
Munitions Training Facility	0.54

The proposed JSF IJTS munitions storage and maintenance facilities would be located in the northwest portion of Eglin Main Base, at the existing MSA. The MSA is currently divided in two sections, one for the tenant unit 33 FW and the other for the current host wing, the 46 TW. ESQDs would also be associated with the Live Ordnance Load Area (LOLA) and other storage facilities located adjacent to the runway at the 33 FW. All selected locations for the JSF IJTS munitions storage and maintenance facilities would

meet mission and ESQD requirements; no inhabited buildings or public roadways would be located within the ESQD.

As part of the construction of new munitions storage facilities, Explosive Site Plan (ESP) packages would be submitted in accordance with Air Force Manual 91-201, *Explosives Safety Standards*. These ESPs would illustrate the relationships and requirements between surrounding exposures and the facilities being sited. No adverse impacts to explosive safety from implementation of JSF IJTS Alternative 1 are anticipated.

Ground Safety

Ground operations and maintenance activities on Eglin AFB would continue to be conducted using the same processes and procedures as under current operations. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable Air Force safety requirements, approved technical data, and AFOSH standards.

Several facilities would be constructed to support the JSF IJTS implementation, while other facilities would be altered or have additional space developed. Additionally, some facilities may be demolished to accommodate new construction. No unique construction practices or materials are required to construct these facilities. During construction, standard industrial safety standards and best management practices (BMPs) would be followed. No unusual ground safety risks would be expected from these activities.

6.8.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.8.2.1 Existing Conditions (Safety – JSF IJTS Alternative 2)

The existing conditions of environmental factors associated with explosive safety and ground safety are the same as those described for the JSF IJTS Alternative 1.

6.8.2.2 Environmental Consequences (Safety – JSF IJTS Alternative 2)

Parking JSF aircraft per JSF IJTS Alternative 2 would exacerbate an existing violation of explosive safety separation requirements to the adjacent Perimeter Road. In October 2000, the DoD raised the required separation from 0 to 750 feet. The requirement has not been enforced yet due to a grandfather clause. However, a mission change from longstanding research and development explosives operations to Air Education and Training Command (AETC) training operations would void the grandfathering; such a change would necessitate either closing Perimeter Road to all but munitions traffic or obtaining a formal exception to the explosives safety rules (Burke, 2007).

6.8.3 No Action Alternative

Under the No Action Alternative, Eglin AFB would continue to employ requirements/procedures associated with explosive and ground safety in order to operate and maintain aircraft to support diverse mission requirements. No impacts to safety have been identified in the projects listed in Chapter 2 (Section 2.7, No Action Alternative). As a result, no adverse impacts would occur under the No Action Alternative.

6.9 SOLID WASTE

6.9.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.9.1.1 Existing Conditions (Solid Waste – JSF IJTS Alternative 1)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

6.9.1.2 Environmental Consequences (Solid Waste – JSF IJTS Alternative 1)

The impacts of this alternative include the nonrecycled municipal solid waste generated by new personnel at Eglin AFB and the construction and demolition (C&D) waste generated from demolishing, constructing, and renovating facilities to accommodate JSF operations.

JSF IJTS Solid Waste Generation

The increase in population at Eglin AFB will result in an increase of municipal solid waste. The quantity of additional municipal solid waste generated from an increase in personnel was calculated using the USEPA generation rates and equations provided in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

Approximately 21,982 pounds (about 11 tons) of municipal solid waste is anticipated to be generated on a daily basis by the new people associated with the JSF IJTS, including military and civilian personnel and family members (an estimated 4,885 people). This quantity is based upon a waste generation rate of 4.5 pounds per person per day for 365 days (one year) and assumes that personnel would be living throughout the ROI, with the majority expected to reside within Okaloosa County, thereby increasing the county's solid waste generation.

The waste generated from the additional population would result in an annual increase of municipal solid waste generated in Okaloosa County on an annual basis (Florida Department of Environmental Protection [FDEP], 2006e) by approximately 4,012 tons.

This would increase the total quantity of municipal solid waste generated in Okaloosa County (250,006 tons per year) by approximately 2 percent. The latest available statistics indicate that approximately 16 percent of municipal solid waste in Okaloosa County is recycled (FDEP, 2006e). Application of this statistic to new waste projections indicate that, if recycling holds steady, the quantity of additional waste requiring disposal in a Class I landfill on an annual basis would be approximately 3,370 tons. This would result in an increase in solid waste generated annually in Okaloosa County by approximately 1.4 percent. It is not anticipated that such an increase would be perceived as an adverse impact due to the availability of existing landfill capacity within the area for the foreseeable future, as discussed in Chapter 3.

JSF IJTS Debris From Aircraft Maintenance

Maintenance of the F-35 aircraft will result in the generation of debris from replacement parts and components. Due to the fact that the aircraft is new, valid waste estimates specific to the F-35 are not available at this time. For estimating purposes, a larger combat aircraft was selected, the F-15.

The operating empty weight of the F-15 is approximately 31,700 pounds (15.85 tons) (Global Security, 2007), which is within the range of empty weights of the F-35 variants (e.g., 28,975 pounds to 34,468 pounds, or 14.49 to 17.23 tons). For this reason and because of the availability of debris generation information associated with the F-15, the F-15 aircraft was selected as a surrogate for the F-35 in the debris analysis.

The estimate of debris was based upon information on the F-15 maintenance at Robbins AFB, where programmed depot maintenance is conducted. Based upon servicing information at Robbins AFB approximately 329 pounds of metal including steel, aluminum, and titanium was generated per each of the 110 programmed depot maintenance events on the F-15 aircraft. Although programmed depot maintenance occurs on a five-year basis, it is a major maintenance event and therefore was assumed to result in the largest quantity of debris generated during normal aircraft operations.

The mass of debris generated during the programmed depot maintenance of the F-15 was used as the mass of debris expected from each F-35 on an annual basis. Using 329 pounds per aircraft as the annual debris generation rate, it is anticipated that the maintenance of 107 F-35s will produce approximately 35,203 pounds (17.6 tons) of metallic debris. It was assumed that this scrap metal debris from aircraft maintenance will be recycled and, since it is not disposed of, would not result in an impact to landfill capacity.

JSF IJTS C&D Debris

The development of the cantonment area would result in the generation of wastes associated with the construction of new facilities and the demolition or renovation of

existing structures. C&D debris includes materials from constructing buildings, concrete and asphalt rubble, and land clearing debris.

The estimate of C&D debris was calculated using the USEPA generation rates provided in Chapter 3 (Section 3.9.3, Analysis Methodology, Construction/Demolition Debris Estimation) multiplied by the square footage of structures undergoing construction, demolition, or renovation.

As discussed in Chapter 2, a total of 3,998,812 ft^2 of new construction would be required for 33 new facilities/buildings, taxiways, and runways (Section 2.5.2.2, Alternatives Carried Forward for JSF IJTS, JSF IJTS Alternative 1, and Table 2-14, Proposed Facilities Associated With JSF IJTS Alternative 1). In addition, JSF IJTS Alternative 1 would include the demolition or renovation of 2,961,830 ft^2 of existing facilities.

The generation rate for demolition activities was used to estimate C&D debris generated from renovation activities, providing a conservative estimate of renovation-generated wastes. It is anticipated that the actual generation rate for the renovation of the West Apron would be lower than calculated. In addition, debris associated with construction of paved areas or roadways is often reused in other projects, which would result in less material for disposal at a Class III landfill.

A total of 237,319 tons of debris would be generated during construction, renovation, and demolition activities. Slightly over 46 percent (109,326 tons) of this total is associated with the repair and renovation of the West Apron.

Construction is anticipated to commence in CY 2008 and conclude in CY 2010, with a duration of approximately three years. Although the annual quantities of C&D waste generated in a given year will depend upon ongoing construction activities, this analysis averages the total quantity of C&D waste across each year for an estimated annual generation rate of 79,106 tons of debris per year.

The analysis estimated the amount of debris generated during construction, renovation, and demolition activities for the JSF IJTS Alternative 1 and compared that quantity to the average amount of C&D debris generated in Santa Rosa and Okaloosa Counties to evaluate the increase of waste expected during the construction phase. The Walton County Landfill was not included within the evaluation since it accepts wastes from only Walton County residents. For estimating purposes, all C&D wastes were assumed to be disposed of at a single landfill. Percent estimates are based upon the annual quantity of project-generated waste compared to the five-year county average. The five-year county average of C&D debris generated and disposed in Okaloosa and Santa Rosa Counties is 78,116 and 102,600 tons per year, respectively.

The debris generated during the JSF IJTS Alternative 1 construction activities would increase landfill use in Okaloosa County by approximately 101 percent or by 77 percent

in Santa Rosa County over the three-year period. Based upon information from local landfill owners/operators, C&D landfills have not reached full capacity and are not expected to be adversely impacted from these increases (Floyd, 2005; Ensor, 2005; Lingenfelter, 2005; Anderson, 2005).

As previously stated, this evaluation is based upon all project-generated debris being disposed of at a single landfill. The landfills selected for detailed evaluation were those located within the ROI that were used by Eglin AFB for disposal. As discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions), additional landfill resources are available for waste disposal activities. Due to the quantities associated with construction activities, it is possible that actual disposal of debris generated during the construction phase would occur at multiple facilities rather than at a single landfill. For example if the C&D wastes were equally disposed of in both landfills located in Okaloosa and Santa Rosa Counties, the overall increase in the disposal rate would be cut by half, resulting in a 51 percent increase in the annual disposal rate in Okaloosa County and a 38 percent increase in Santa Rosa County. By utilizing additional landfills within the nearby area, it is anticipated that the overall impact to any single landfill could be reduced to an annual increase of approximately 20 to 30 percent during the years that construction was ongoing. Because multiple landfills would be utilized for disposal of the debris, and because the life expectancy of these facilities range from 18 to 30 years, the Air Force anticipates that sufficient capacity exists within the area for the anticipated waste volumes. Based upon the life expectancies of the landfills within the area, the overall impact of the increase in C&D waste during construction may be perceived as potentially adverse at individual landfills although sufficient capacity appears to be available within the region over the life cycle of the available landfill(s).

6.9.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.9.2.1 Existing Conditions (Solid Waste – JSF IJTS Alternative 2)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

6.9.2.2 Environmental Consequences (Solid Waste – JSF IJTS Alternative 2)

Solid waste impacts from the addition of personnel and from aircraft maintenance would be the same as the JSF IJTS Alternative 1 (Section 6.9.1.2).

JSF IJTS Construction and Demolition Debris

The solid waste generation for JSF IJTS Alternative 2 would vary from that associated with the JSF IJTS Alternative 1. This variance is due to an overall increase in facility construction and demolition required for the implementation of this alternative. As

discussed in Chapter 2, a total construction footprint of approximately 3,447,562 ft^2 would be required for the JSF IJTS Alternative 2 along with the demolition/renovation of an additional 4,041,635 ft^2 of existing facilities (Section 2.5.2.3, Alternatives Carried Forward for JSF IJTS, JSF IJTS Alternative 2, and Table 2-15, Proposed Facilities Associated With JSF IJTS Alternative 2).

Using the equations presented in the solid waste Analysis Methodology section in Chapter 3 (Section 3.9.3), a total of 6,706 tons of debris would be generated from construction activities, and 313,227 tons of debris would be generated from demolition/renovation activities. The total quantity of debris associated with construction and renovation/demolition activities was estimated at approximately 319,933 tons to establish the necessary JSF IJTS structures. A displaced action has also been identified as part of the JSF IJTS Alternative 2 that requires the movement of the Aero Club to building 1398 or 1399. This facility will require renovation that will generate an additional quantity of C&D waste. The square footage of each structure is 10,614 ft^2. Therefore, regardless of which building is chosen to house the Aero Club, the quantity of debris generated during renovation remains the same. Taking this displaced action into consideration increases the quantity of C&D waste generated under this alternative by a total of 1,645,170 pounds or 823 tons. That is, this displaced action will bring the total estimated quantity of C&D debris for JSF IJTS Alternative 2 to approximately 320,756 tons.

Construction is anticipated to commence in CY 2008 and conclude in CY 2010, with a duration of approximately three years. Although the annual quantities of C&D waste generated in a given year would depend upon ongoing construction activities, this analysis averages the total quantity of C&D waste across each year for an estimated annual generation rate of 106,919 tons of debris per year.

The analysis estimated the amount of debris generated during construction, renovation, and demolition activities for the JSF IJTS Alternative 2 and compared that quantity to the average amount of C&D debris generated in Santa Rosa and Okaloosa Counties to evaluate the increase of waste expected during the construction phase. The Walton County Landfill was not included within the evaluation since it accepts wastes from only Walton County residents. For estimating purposes, all C&D wastes were assumed to be disposed of at a single landfill. Percent estimates are based upon the annual quantity of project-generated waste compared to the five-year county average. The five-year county average of C&D debris generated and disposed of in Okaloosa and Santa Rosa Counties is 78,116 and 102,600 tons per year, respectively.

For the landfills evaluated, the debris generated during JSF IJTS Alternative 2 construction activities would increase landfill use in Okaloosa County by approximately 137 percent or by 104 percent in Santa Rosa County over the three-year period. Based upon information from local landfill owners/operators, C&D landfills

have not reached full capacity and are not expected to be adversely impacted from these increases (Floyd, 2005; Ensor, 2005; Lingenfelter, 2005; Anderson, 2005).

The landfills selected for detailed evaluation were those located within the ROI that were used by Eglin AFB for disposal. As discussed in Chapter 3 (Section 3.9.2) additional landfill resources are available for waste disposal activities. Due to the quantities associated with construction activities, it is possible that actual disposal of debris generated during the construction phase would occur at multiple facilities rather than at a single landfill. For example, if the C&D wastes were equally disposed of in both landfills located in Okaloosa and Santa Rosa Counties, the overall increase in the disposal rate would be cut by half, resulting in a 69 percent increase in the annual disposal rate in Okaloosa County and a 52 percent increase in Santa Rosa County. By utilizing additional landfills within the nearby area, it is anticipated that the overall impact to any single landfill could be reduced to an annual increase by approximately 30 to 50 percent during the years that construction was ongoing. Because multiple landfills would be utilized for disposal of the debris, and because the life expectancy of these facilities range from 18 to 30 years, the Air Force anticipates that sufficient capacity exists within the area for the anticipated waste volumes. Based upon the life expectancies of the landfills within the area, the overall impact of the increase in C&D waste during construction may be perceived as potentially adverse at individual landfills although sufficient capacity appears to be available within the region over the life cycle of the available landfill(s).

6.9.3 No Action Alternative

The existing conditions of solid waste resources for the No Action Alternative are described in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions). The environmental consequences for the No Action Alternative are the same as those discussed in Chapter 4 (Section 4.9.6, No Action Alternative).

6.10 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

6.10.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

Eglin AFB is responsible for the management of hazardous materials throughout the installation, including Eglin Main Base and areas associated with the 33 FW. Practices described herein for the management of hazardous materials would be common to all JSF IJTS implementation scenarios.

6.10.1.1 Existing Conditions (Hazardous Materials and Hazardous Waste – JSF IJTS Alternative 1)

The existing conditions for hazardous materials and hazardous waste are discussed in Chapter 3 (Section 3.10.2, Region of Influence and Existing Conditions).

6.10.1.2 Environmental Consequences (Hazardous Materials and Hazardous Waste – JSF IJTS Alternative 1)

Hazardous Materials Management

Hazardous materials are employed at Eglin AFB to support a variety of mission activities. The DoD Pollution Prevention Strategy established an aggressive program to reduce or eliminate toxic chemicals and extremely hazardous substances associated with new weapon systems. The program integrates environmental considerations into acquisition documentation, strategies, plans, and the planning and awarding of contracts.

In keeping with these policies, the F-35 development program incorporates contractual requirements for hazardous materials control and pollution prevention in manufacture, operation, maintenance, support, and disposal over the life cycle of the weapon system. Accordingly, the F-35 uses the same fuel, lubricants, greases, and hydraulic fluids, etc., as the F-16 and F-15 aircraft use. Specific materials used as part of routine F-35 maintenance operations are listed in the F-35 Consumable Materials List (Lockheed Martin, 2006). Hazardous material policies and procedures currently in place at Eglin AFB will be sufficient to address any issues related to these materials.

Routine maintenance activities associated with the F-35 would include aircraft electrical systems, wheel and tire repair; jet engine testing and repair, structural and navigational/communication repairs; and aircraft wash down. Materials used during these activities would include solvents, sealants, epoxies, solder, paint and epoxy strippers, adhesives, refrigerants, coolants, hydraulic fluids, cleaners, lubricants, and degreasers.

The F-35 differs significantly from the F-15 or F-16 in the type of materials used throughout its construction. While F-15 and F-16 exterior surfaces are primarily constructed of aluminum, the F-35 makes extensive use of composite materials. Composites are used for a number of reasons: they possess excellent strength to weight ratios, do not fatigue like metals, are lightweight, and can be molded into a variety of shapes.

Maintenance activities on the F-35 may also include minor repairs to composite areas or components. Data on the specific composite materials utilized in the construction of the

F-35 are not available for this analysis; however, composite materials used on modern aircraft typically include carbon, glass, kevlar, graphite, boron, and hybrids of these materials. Although these materials may not be inherently dangerous, their repair typically includes the use of bonding agents or resins, which may contain hazardous materials. Additionally, these composite materials may require special surface coatings or cleaning processes and/or solvents to maintain their structural integrity or radar absorbing properties.

Procedures are currently used for maintenance and operations associated with other aircraft made of composite materials, including the F-117, F-22, and B-2. At Eglin, all materials that would be employed on the F-35 would undergo a review by Bio-environmental Engineering, Safety, and Environmental Management. In the event that any materials or processes are required for the F-35 that present any unique occupational hazards and associated health impacts hazards over those associated with current aircraft, Eglin AFB would develop and implement appropriate hazardous materials procedures to minimize all potential risks to personnel and the environment.

New buildings associated with the proposed cantonment area would be constructed utilizing normal construction methods, which would limit the use, to the extent possible, of hazardous materials. Petroleum products and other hazardous materials (e.g., paints and solvents) would be used during construction/renovation activities. These materials would be stored in the proper containers, employing secondary containment as necessary to prevent/limit accidental spills. All spills and accidental discharges of petroleum products, hazardous materials, or hazardous waste would be reported.

Eglin AFB has developed emergency response procedures and site-specific contingency plans for all hazardous materials locations. Procedures and responsibilities for responding to a hazardous material spill or other incidents are described in the AAC *Instruction 32-7003, Hazardous Waste Management* (U.S. Air Force, 2006e), and the Eglin AFB *Spill Prevention, Control, and Countermeasures (SPCC) Plan* (U.S. Air Force, 2005d). Any significant change in the quantity of hazardous materials used/stored on the installation resulting from implementation of the alternatives would be documented and reported, as required, to state and local emergency planning committees/local fire departments in the annual Tier II forms. No adverse impacts related to hazardous materials are anticipated from implementation of the alternatives.

Hazardous Waste Management

A quantitative assessment of the potential increase in the quantity of hazardous waste generated by the F-35 could not be performed, since specific F-35 data are not yet available. The F-35 Consumable Materials List (Lockheed Martin, 2006) presents

information regarding products used during routine F-35 maintenance, but provides no information regarding potential hazardous waste generation quantities/ranges. Instead, hazardous waste data for the F-15 aircraft were used.

During FY 2005, a total quantity of approximately 35,500 pounds (17.75 tons) of hazardous waste was generated by the 33 FW at Eglin, which operates the F-15 (Kauffman, 2006). This included waste paint or paint related materials, batteries, sealants, solvents and miscellaneous halogenated and nonhalogenated solvents. (The 33 FW also generates other wastes such as petroleum, oils, and lubricants, but these are not classified as hazardous wastes.)

Currently 54 F-15 aircraft are stationed at the 33 FW, averaging approximately 657 pounds of hazardous waste per aircraft per year. The F-35 is scheduled to be deployed in 2010 with final deployment in 2016. After full deployment in 2016, there would be a total of 107 aircraft (of all variants) stationed at Eglin. Assuming an equivalent generation rate to that of the F-15, the resulting quantity of hazardous waste generated by F-35 operations is estimated to be approximately 70,299 pounds (35.1 tons). The resulting total quantity of hazardous waste generated at the installation would then be 114 tons (79 tons currently plus 35 tons from F-35 operations).

Eglin is currently classified as a Large Quantity Generator (LQG) of hazardous waste. Eglin personnel indicate that because of Eglin's hazardous waste management capabilities, anticipated increases in waste generation would pose no adverse impacts on the waste management system (Birdsong, 2006). To manage these new waste streams, Eglin AFB would establish new initial accumulation points (IAPs) at generation locations, and personnel managing these locations would be properly trained in waste management. Implementation of pollution prevention and waste minimization measures would further reduce any anticipated impacts.

Some hazardous waste generated during F-35 maintenance operations may require special handling or a dedicated waste removal contractor due to the classified nature of some of the materials generated (Kauffman, 2006). In this case, Eglin would implement appropriate procedures to maintain required security. In the event that any hazardous waste is generated as a result of F-35 maintenance activities that present any unique hazards over those generated by the F-15 or other aircraft currently at Eglin, the base would implement appropriate hazardous waste control procedures to minimize all potential risks to personnel and the environment.

In order to support F-35 operations, several construction projects would be initiated as part of this action. Construction activities at the base would require the use of hazardous substances such as petroleum, oil, and lubricants. During construction, use

of these substances for fueling and equipment maintenance would create the potential for minor spills and releases. Compliance with Air Force best construction practices would reduce this potential to insignificant levels. In addition, an SPCC plan would be developed and implemented, and appropriate spill response equipment would be located on site.

Construction activities associated with the JSF IJTS would not be expected to generate hazardous wastes; however, renovation/demolition of some buildings could result in the production of LBP or asbestos wastes. The management of theses wastes would be performed according to prescribed procedures already in place. There is also a pollution prevention plan, designed to prevent or reduce pollution, reduce safety and health risks, and recycle wastes when possible. Wastes that cannot be recycled are disposed of in a manner approved by the USEPA, at licensed facilities.

Environmental Restoration Program Sites

Several Environmental Restoration Program (ERP) sites are located within the proposed footprint for the JSF IJTS Alternative 1 in the 33 FW area (Table 6-24 and Figure 6-5). Most of these sites are associated with contamination from prior fuels spills at the tank farm. The table also lists the single ERP site associated with the footprint for the proposed JSF IJTS MSA (under both alternatives). No munition response areas (i.e., areas that are known or suspected to contain unexploded ordnance) are located within close proximity to any of the proposed cantonment sites (Armstrong, 2006).

Table 6-24. ERP Sites Potentially Affected by JSF IJTS Alternative 1

Site	Description	Status	Potential Impacts – Required Actions/Mitigations
33 FW ERP Sites Potentially Affected by JSF IJTS Complex			
ST-66, Oil-water separator, building 1353, 33 FW	Heavily stained soil was found during the 1993 removal of a 2,000-gallon underground storage tank (UST) from beneath the washrack. Soil and groundwater contamination at the UST removal site and Oil-water Separator 1 were assessed under a state 62-770 Contamination Assessment. No contamination was found.	"No Further Action" (NFA) status has been approved for site.	None expected – Construction activities would be coordinated with Eglin's Environmental Restoration Branch.

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Table 6-24. ERP Sites Potentially Affected by JSF IJTS Alternative 1, Cont'd

Site	Description	Status	Potential Impacts – Required Actions/Mitigations
SS-267, F-15 Tornado Site	During a storm in 1998, an F-15 aircraft was damaged and 600 gallons of JP-8 jet fuel was spilled from the aircraft. The spill migrated to the area surrounding the liquid oxygen storage facility. Approximately 480 tons of contaminated soils were removed from the site. A site assessment in 2000 found no soil-groundwater contamination.	NFA has been approved for site.	None expected – Construction activities would be coordinated with the Environmental Restoration Branch.
ST-75/ST-67, building 1346, 33 FW	The site was identified as a potential source of contamination in 1994 when a 1,000-gallon UST was removed. The extent of the initial soil excavation was based on organic vapor analyzer (OVA) readings. Additional site investigations indicated a second plume in the southwest corner of the hydrant compound. The Remedial Action Plan (RAP) recommended an aquifer air sparge and soil vapor extraction (SVE) systems to address groundwater and soil contamination.	NFA has been approved for site.	None expected – Construction activities would be coordinated with the Environmental Restoration Branch.
ST-276, building 1360, 33 FW	In June 2002, more than 100 gallons of jet fuel were released to the ground from a 600-gallon bowser that was parked on a concrete slab north of building 1360. The fuel flowed to a grassy area. OVA results indicated contaminated soils to a depth greater than 10 feet.	NFA has been approved for site.	None expected – Construction activities would be coordinated with the Environmental Restoration Branch.
ST-116, Building 1391	Building 1391 is part of the ACC Sewage Treatment Plant. A 6,000-gallon underground tank diesel tank was previously located at the site. During tank removal activities in 1997, contaminated soil was identified at the site. The contaminated soil was removed and the pit filled with clean fill.	NFA has been approved for site.	None expected – Planned construction activities would not impact Building 1391.

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Table 6-24. ERP Sites Potentially Affected by JSF IJTS Alternative 1, Cont'd

Site	Description	Status	Potential Impacts – Required Actions/Mitigations
ST-101, Water Tower No. 1322, 33 FW	Analytical results of soil samples at tower sites revealed lead at elevated concentrations. The lead contamination is speculated to have resulted from previous sandblasting of the tower prior to refinishing. In 1999, all contaminated soils were excavated and removed. Confirmatory analyses showed that the remaining soils were below clean-up levels and posed no unacceptable human health risk.	NFA has been approved for site.	None expected – Planned construction activities would not impact water tower.
Site Potentially Affected by the Proposed Munitions Storage Area			
OT-29, Missile Maintenance Paint Stripper Pit	The site was in operation from 1976 to 1981 and was used to capture residues generated from the paint stripping of large missile components. A site investigation, including a risk assessment, in 1992/1993 concluded that there are no unacceptable risks related to the concentrations of lead found in the soil and groundwater. No corrective action was proposed.	NFA has been approved for site.	None expected – Construction activities would be coordinated with the Environmental Restoration Branch.

Source: U.S. Air Force, 2003b, and Armstrong, R., 2006
33 FW = 33rd Fighter Wing; ACC = Air Combat Command; AAS = Aquifer Air Sparge; ERP = Environmental Restoration Program; JSF IJTS = Joint Strike Fighter Initial Joint Training Site; NFA = no further action; OVA = organic vapor analyzer; RAP = Remedial Action Plan; SVE = soil vapor extraction; UST = underground storage tank

No impacts are anticipated from the presence of these ERP sites. As the table indicates, planned construction activities near existing ERP sites would be coordinated with Eglin's Environmental Restoration Branch to ensure no adverse impacts to these sites. Regardless, should any unusual odor, soil, or groundwater coloring be encountered during development activities in any areas, the Environmental Restoration Branch would be contacted immediately.

Asbestos-Containing Material

Asbestos debris may be generated as a result of proposed building renovation or demolition activities. Asbestos-containing materials (ACMs), such as mastic and floor tiles, have been identified in older buildings on the base, including buildings associated with ACC at the 33 FW and Eglin Main Base. C&D debris generated as a result of any renovation/demolition activities would be characterized for the presence of asbestos to determine whether to dispose of it as solid waste or hazardous waste (U.S. Air Force, 2004b and 2006f).

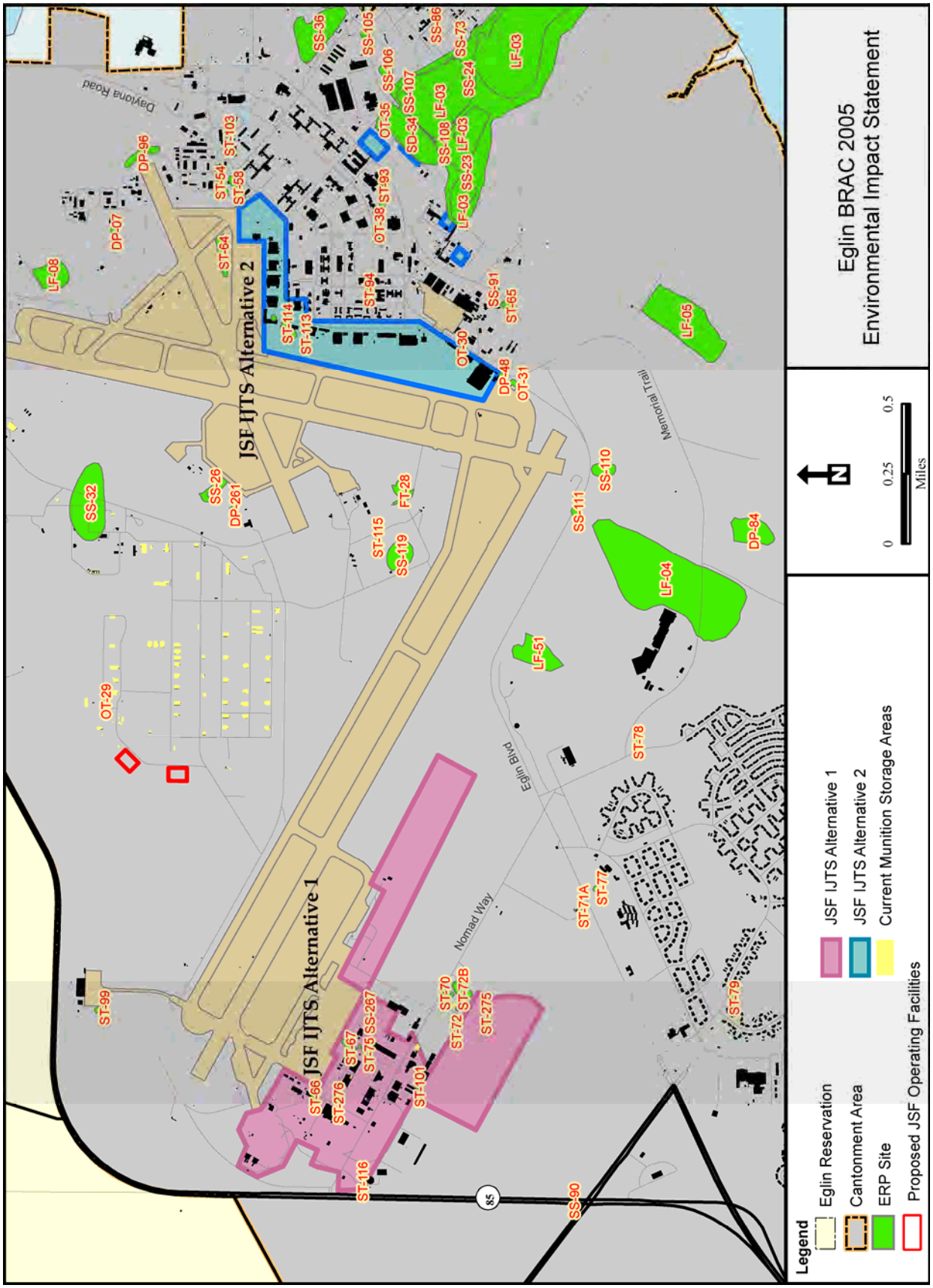

Figure 6-5. JSF IJTS Alternatives 1 and 2 – ERP Sites Located in the Vicinity of Alternatives

Proper disposal of asbestos wastes would be conducted as directed by the National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 Code of Federal Regulations [CFR] 61.40–157). Contractor personnel would have to be trained and certified. Also, the contractor would need to submit an asbestos work/disposal plan for any demolition. Transport and disposal documentation records, including signed manifests, would also be required. Implementation of these management requirements would mitigate any adverse impacts resulting from ACM. ACM would not be employed for new construction; therefore, there would be beneficial impacts associated with the removal of existing ACM.

Lead-Based Paint

LBP debris may be generated as a result of proposed building renovation/demolition activities. Materials containing LBP have been found in older buildings on the base. Demolition/renovation of structures known to contain LBP would be conducted in accordance with applicable regulations. Proper disposal of lead-containing wastes would also be conducted in accordance with state and federal regulations, including the Toxic Substances Control Act (TSCA) and the Occupational Safety and Health Act. Further, these wastes would be accompanied by a waste manifest and disposed of at a state-approved facility. The appropriate management of LBP is not expected to create adverse impacts. LBP would not be employed for new construction; therefore, there would be beneficial impacts from the removal of existing LBP.

6.10.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.10.2.1 Existing Conditions (Hazardous Materials and Hazardous Waste – JSF IJTS Alternative 2)

The existing conditions of environmental factors associated with hazardous materials are described in Chapter 3 (Section 3.10.2, Region of Influence and Existing Conditions).

6.10.2.2 Environmental Consequences (Hazardous Materials and Hazardous Waste – JSF IJTS Alternative 2)

The environmental consequences associated with hazardous materials management, hazardous waste management, ACM, and LBP for JSF IJTS Alternative 2 are the same as those described for the JSF IJTS Alternative 1 (Section 6.10.1.2).

The potential exists for impacts to ERP sites located to the east side of the Eglin Main runway (JSF IJTS Alternative 2). Several ERP sites are located within and in the vicinity of the proposed footprint of the JSF IJTS Alternative 2 (Table 6-25 and shown previously in Figure 6-5). Most of these sites are associated with contamination from prior fuels spills. The table also lists the single ERP site associated with the footprint for the proposed JSF IJTS MSA (under both alternatives).

Table 6-25. ERP Sites Potentially Affected by JSF IJTS Alternative 2

Site	Description	Status	Potential Impacts – Required Actions/Mitigations
33 FW ERP Sites Potentially Affected by JSF IJTS Complex			
OT-30, Electric Battery Shop	Site OT-30 operated from the early 1960s to 1983 or 1984. Facility operations included the discharge of neutralized battery acid onto the ground outside Building 136. Based on RCRA Facility Investigation and risk assessment data, there are no unacceptable risks associated with chemical concentrations found at the site.	"No Further Action" (NFA) status has been approved for site.	None expected – Construction activities would be coordinated with Environmental Restoration Branch.
OT-31, Paint Shop	Paint booth has been operating adjacent to building 127 since 1976. Wastewater containing paint residue was discharged directly to a drainage ditch. Wastewater is now routed to sanitary sewer. No contaminants of potential concern (COPCs) have been identified at the site; therefore, no risk evaluation was conducted.	NFA has been approved for site.	None expected – Construction activities would be coordinated with the Environmental Restoration Branch.
Site LF-03, Eglin Main Landfill, DRMO, CE Storage Yard	Site consists of a small concrete pad used for dumping recreational vehicle wastes. This pad spills into a Y-shaped, concrete-lined depression that was filled with water, organic matter, and other miscellaneous debris during a 1991 visit. The depressed concrete and surrounding soils had stressed vegetation identified adjacent to the depression, as well as black staining believed to be from petroleum, oils, or lubricants (POLs).	Land Use Controls and Long-Term Monitoring have been approved for this site with annual inspections.	None expected – Construction activities would avoid infrastructure associated with LF-03 remediation activities.
SD-34, Motor Pool, building 500, OWS Area	Building 500 has been used as a base fleet vehicle maintenance facility since the mid-1940s and has two oil-water separators (OWSs). One OWS services the steam-cleaning area and the second a trench drain in the vehicle maintenance area. The OWSs receive water that may contain oil, fuel, antifreeze, transmission fluid, and various solvents; both OWSs discharge to the sanitary sewer. Prior to the installation of the OWSs, wastewater was discharged to a nearby drainage ditch. The OWSs have been known to overflow during periods of excessive storm water entering the drains; diversion boxes have recently been installed to correct the situation. As a result of past practices and overflows, contaminants may have accessed the surrounding soils.	NFA has been approved for site.	None expected – Construction activities would be coordinated with the Environmental Restoration Branch.

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Table 6-25. ERP Sites Potentially Affected by JSF IJTS Alternative 2, Cont'd

Site	Description	Status	Potential Impacts – Required Actions/Mitigations
OT-35, Seventh Street BX Station, OWS, building 501	The Seventh Street base exchange (BX) gasoline station has been in operation since 1955 and is approximately 1 acre in size. Fuel is no longer dispensed from this facility (underground storage tanks [USTs] have been removed); however; four service bays are used for automobile repair. Floor drains lead to the OWS, which is believed to discharge to the sanitary sewer. Fuels, oils, greases, antifreeze, solvents, and other automotive fluids may have entered the OWS. Minor staining was noted in the service bays during the 1991 site visit.	The groundwater remediation system with associated operation and maintenance (O&M) and monitoring is ongoing.	None expected – Construction activities would avoid infrastructure associated with OT-35 remediation activities.
DP-48, Welding/Electroplating Shop	The site is located near King Hangar at the 46th Test Wing Welding and Electroplating Facility. The cyanide vats and rinse water collection tanks were closed in 1994-1995. Through interviews it was determined that Point of Interest (POI) No. 305 is the same as ERP Site No. DP-48 located at building 127. Based on this information, it was recommended that no further work be performed with regard to DP-48.	NFA has been approved for site.	None expected - Construction activities near this site would be coordinated with the Environmental Restoration Branch.
ST-54, Waste Fuel Storage Tank, building 989	A site inspection conducted in 1991 found some minor staining on the wash rack concrete pad and four drums of motor oil. The wash rack drains to the OWS, which discharges to the sanitary sewer. As a result, no evidence of contamination or release was identified at this site.	Post-closure remediation monitoring ongoing, semiannual groundwater sampling.	None expected - Construction activities near this site would avoid infrastructure associated with ST-54 remediation activities.
ST-58, Military Gas Station	Site consists of a canopy sheltering two pump islands, an unmanned kiosk, and a tank field containing three large fiberglass USTs. In September 1991, a former tank field consisting of five USTs was removed. A large JP-8 spill occurred in March 2002. System optimization is currently ongoing to ensure effective treatment of dissolved plume contamination.	NFA has been approved for site.	None expected - Construction activities near this site would be coordinated with the Environmental Restoration Branch.
ST-64 Aero Club, building 68	Consists of a aircraft fueling area and aircraft parking apron. A former UST was excavated in November 1991. A contamination assessment was completed and reviewed by the Florida Department of Environmental Protection (FDEP). A Site Rehabilitation Completion Order was issued by FDEP on 16 September 1994, specifying NFA.	NFA has been approved for site.	None expected - Construction activities near this site would be coordinated with the Environmental Restoration Branch.

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Table 6-25. ERP Sites Potentially Affected by JSF IJTS Alternative 2, Cont'd

Site	Description	Status	Potential Impacts – Required Actions/Mitigations
ST-113, Rapcon building 104	The site consisted of two 1,000 gallon diesel fuel USTs located between buildings 104 and 116. Tanks were removed in November 1997, and soil samples were collected and a closure assessment was conducted. All samples exhibited headspace readings below 50 parts per million (ppm), and the tank excavations were backfilled with clean fill.	NFA has been approved for site.	None expected - Construction activities near this site would be coordinated with the Environmental Restoration Branch.
ST-114, Airfield Lighting, building 116	The site consisted of one 500 gallon UST located south of Lighting building 116. The tank stored diesel used for an emergency generator. The tank was removed in October 1997, and a closure assessment was conducted. All soil samples exhibited headspace readings below 50 ppm. The tank excavation was backfilled with clean fill.	NFA has been approved for site.	None expected - Construction activities near this site would be coordinated with the Environmental Restoration Branch.
Site Potentially Affected by the Proposed Munitions Storage Area			
OT-29, Missile Maintenance Paint Stripper Pit	The site was in operation from 1976 to 1981 and was used to capture residues generated from the paint stripping of large missile components. A site investigation, including a risk assessment, in 1992/1993 concluded that there are no unacceptable risks related to the concentrations of lead found in the soil and groundwater. No corrective action was proposed.	NFA has been approved for site.	None expected – Construction activities would be coordinated with the Environmental Restoration Branch.

Source: U.S. Air Force, 2007d (ERP SSR June 2007)
33 FW = 33rd Fighter Wing; BX = base exchange; CE = Civil Engineering; COPC = contaminants of potential concern; ERP = Environmental Restoration Program; FDEP = Florida Department of Environmental Protection; JSF IJTS = Joint Strike Fighter Initial Joint Training Site; ppm = parts per million; NFA = no further action; O&M = operation and maintenance; OWSs = oil-water separators; POI = Point of Interest; POLs = petroleum, oils, or lubricants; UST = underground storage tank

No impacts are anticipated from the presence of these ERP sites. As the table indicates, sites with ongoing remediation activities would be avoided (LF-03, OT-35, ST-54). Construction on or near other sites would be possible with prior coordination with the Environmental Restoration Branch. Regardless, should any unusual odor, soil, or groundwater coloring be encountered during development activities in any areas, the Environmental Restoration Branch would be contacted immediately.

6.10.3 No Action Alternative

Under the No Action Alternative, Eglin AFB would continue to use hazardous materials and generate hazardous wastes as part of day-to-day operations to support various operations and maintenance activities. The types of hazardous materials used/stored or hazardous waste generated would continue. However, with the cessation of 33 FW operations, the total quantity of hazardous materials used/hazardous waste generated would decrease from current amounts.

Existing procedures for the management, procurement, handling, storage, issuing, and disposal of hazardous materials used on the base would remain unchanged Additionally, no adverse impacts would occur with the implementation of the projects listed in Chapter 2 (Section 2.7, No Action Alternative).

6.11 PHYSICAL RESOURCES

6.11.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.11.1.1 Existing Conditions (Physical Resources – JSF IJTS Alternative 1)

Soils

The topography of the proposed project area is relatively flat with slopes that are less than 1 percent. The landscape is characterized by mild rises in land elevation, forming slight plateau-ridge features intermingled with mild slope-depression topography. Generally, these features are indistinguishable to the naked eye under natural vegetated conditions. Soils types for this alternative are listed below and shown in Figure 6-6. For comparative purposes, primary soils are presented in Table 6-26 below, showing attributes and the amount of acreage for each soil type. For a description of each soil type, see Appendix G, *Physical Resources*.

Table 6-26. JSF IJTS Alternative 1 – Soil Types and Characteristics

Soil name	Erosion Risk	Attributes	Soil Type	Acreage	
				Cantonment	MSA
Lakeland Sand slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	27	382
Urban Land	Very low	Variable	Variable	145	3

MSA = munitions storage area

The primary soil type that occurs at the JSF IJTS Alternative 1 location is the Lakeland Sand soil series. Key physical properties of Lakeland soils include greater than or equal to (≥) 90 percent quartz sand, a rapid infiltration rate, high permeability, and less than (<) 1 percent organic matter. The almost pure sand texture and ensuing high permeability rate creates a landscape of excessively drained soils that have a high capacity to move water through the soil but limited capacity to hold water and nutrients in the soil. At the proposed JSF IJTS Alternative 1 location, Urban Land is located around facilities and a current runway. Since these Urban Land soils are already either paved or landscaped, they do not pose an erosion problem.

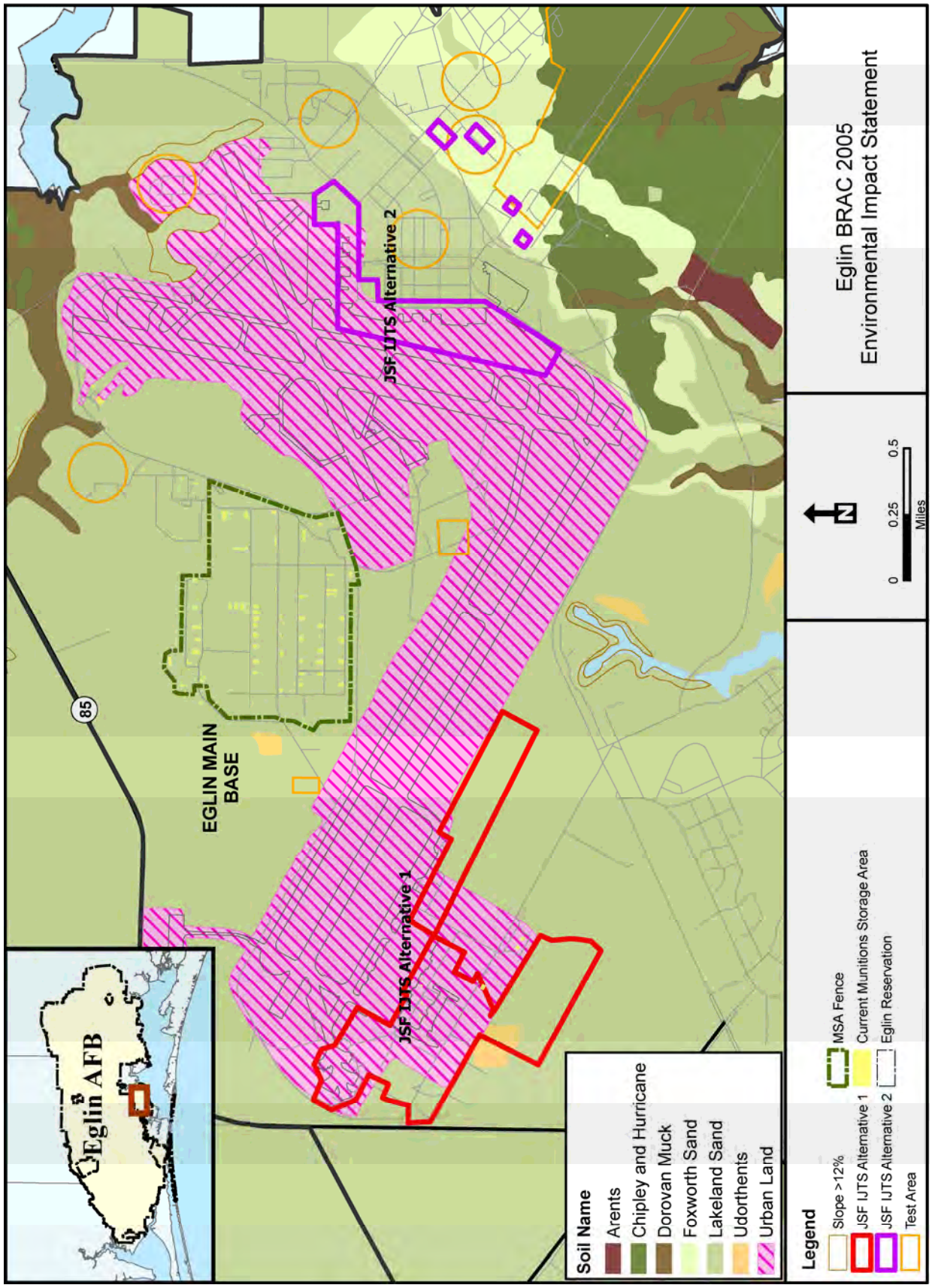

Figure 6-6. JSF IJTS Alternatives 1 and 2 – Soils in the Proposed Cantonment Area

Water Resources

This section provides descriptions of the qualitative and quantitative characteristics (existing conditions) of water resources for the locations identified for JSF IJTS Alternative 1.

Surface Water

No surface water features lie adjacent to the project area of JSF IJTS Alternative 1. However, a branch of Toms Creek is located within the proposed MSA and covers approximately 4.7 acres (Figure 6-7).

Surface Water Quality

Toms Creek (which covers approximately 4.7 acres of the proposed MSA) flows into Toms Bayou, which is a smaller surface water resource that drains into Boggy Bayou and out into Choctawhatchee Bay. Toms Creek and Toms Bayou are not on Florida's 303(d) List of Impaired Surface Waters, but Boggy Bayou is on the List because dissolved oxygen levels were a Parameter of Concern on the 1998 303(d) List (FDEP, 2006f). This bayou has been proposed for delisting due to improved dissolved oxygen levels (FDEP, 2006g). However, Boggy Bayou has been identified as "Potentially Impaired for the Biology Listed Parameter" and as "Verified Impaired for the Bacteria Listed Parameter" and thus is on the current 303(d) list for high bacterial levels (FDEP, 2006d). Choctawhatchee Bay is also on the 303(d) list for many different parameters (FDEP, 2006d).

Wetlands and Floodplains

There are no wetland or floodplain areas in close proximity to the JSF IJTS Alternative 1 site (Figure 6-7). However, there is a wetland area within the proposed MSA. This wetland area, confined within the area of Toms Creek, is about 4.7 acres and is classified as palustrine (non-tidal wetlands, lacking vegetation) (U.S. Air Force, 2006b) (Figure 6-7).

Coastal Zone

The JSF IJTS Alternative 1 site and MSA lie within the jurisdictional concerns of the FDEP under the Coastal Zone Management Act (CZMA). Coastal zone definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources). Eglin prepared a CZMA determination to address the impacts to the coastal zone (Appendix I, *CZMA Determination*).

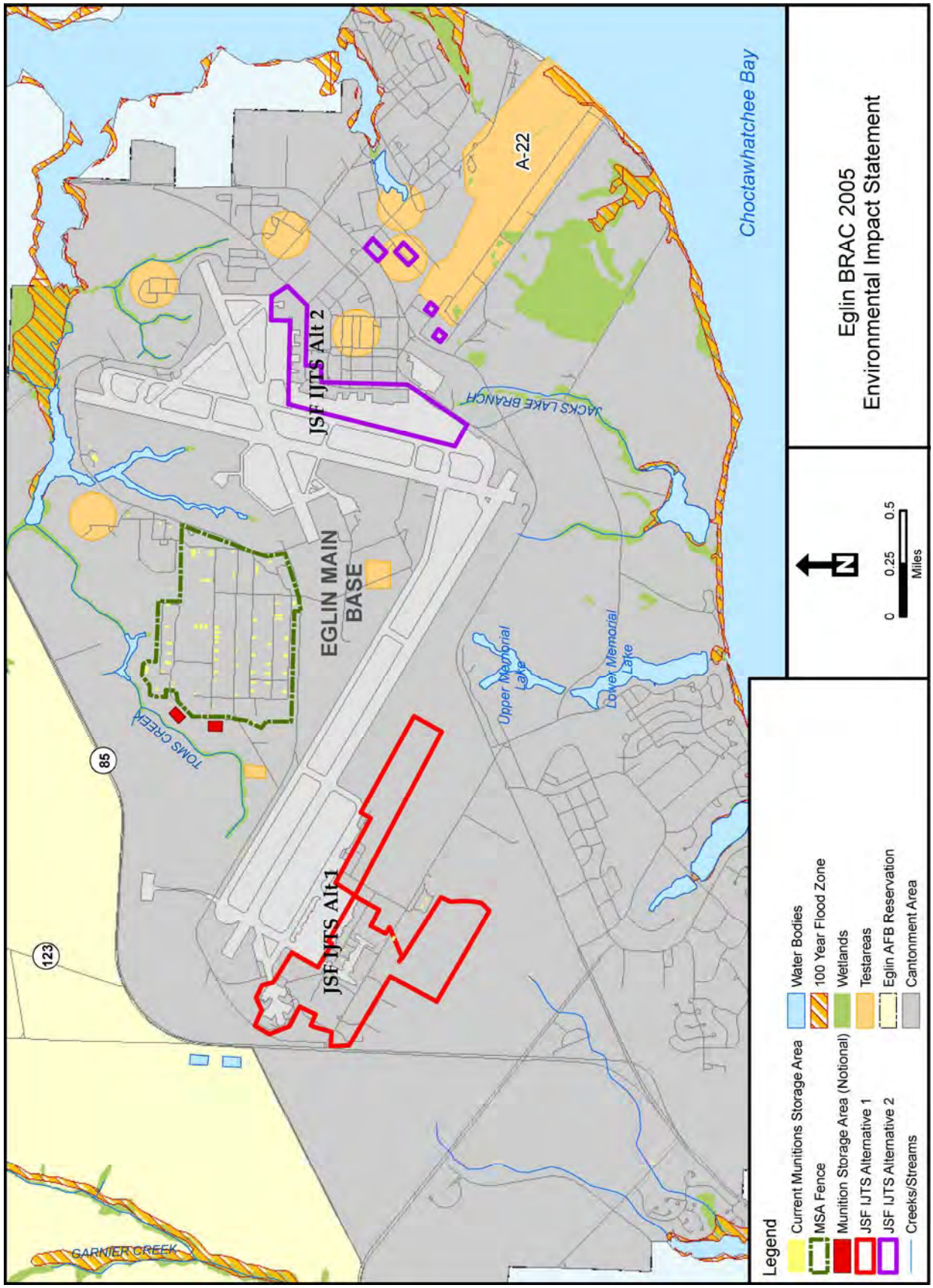

Figure 6-7. JSF IJTS Alternatives 1 and 2 – Water Resources Near the Cantonment Areas

Stormwater

The JSF IJTS Alternative 1 location (which is within the current 33 FW location) is an area that is already developed and consists of 17 percent impermeable surface (U.S. Air Force, 2005h). It also includes stormwater drainages and treatment areas to handle stormwater runoff.

6.11.1.2 Environmental Consequences (Physical Resources – JSF IJTS Alternative 1)

Soils

The JSF IJTS Alternative 1 would not have an adverse impact on soils. Construction, demolition, and renovation covering approximately 100 acres at the proposed site have little potential to affect soils and create conditions that could result in serious erosion episodes. Most of the area in the JSF IJTS Alternative 1 site is Urban Land and covered with pavement, cement, or existing buildings. The soils within the JSF IJTS Alternative 1 area that are not currently developed have relatively limited erodibility, and the natural terrain is generally flat. When vegetation is cleared, rainfall events can cause water to move across nonvegetated surfaces and transport soils into local water bodies. Prevention of this transport, through minimizing ground disturbances during construction and vegetation clearance, in addition to providing erosion minimization measures such as BMPs, can help prevent the transport of sediments. Permits that are required, such as National Pollutant Discharge Elimination System (NPDES) permits, address the effects of ground discharge on maintaining clean water. Utilization of BMPs is one of the primary methods of preventing discharge of sediments into water sources.

BMPs can consist of using one or more of the following measures to slow erosion: (1) hay bales, (2) silt fences, and (3) vegetation buffers. Unless a proposed activity is relocated because of possible heavy impacts to soil erosion, the previously mentioned erosion control practices are best for slowing or halting erosion. Construction sites normally incorporate silt fences and hay bales to slow soil creep into local waterways, creeks, and ponds. Vegetation can help slow eolian (wind-blown) erosion.

Water Resources

Surface Water

The surface water nearest the JSF IJTS area is Upper Memorial Lake, which is approximately 6,400 feet southeast of the site, and the proposed MSA does contain a branch of Toms Creek that runs through its northern border. However, the proposed location for JSF IJTS Alternative 1 would not have a direct impact on water resources. The only potential indirect impacts associated with water resources in this area concern stormwater runoff. As stated above, the potential for transporting sediments offsite is

low because of the flat terrain and limited soil erodibility. Therefore, stormwater impacts to surface waters would not be adverse.

The creation of more impervious areas (just south of Nomad Way) could require the construction of additional stormwater management systems (i.e., pond, swale) to provide on-site storage of stormwater. On-site storage of stormwater would prevent direct discharge of stormwater runoff to any surface waters, thereby reducing potentially adverse impacts to water quality (FDEP, 2002). The addition of any new stormwater infrastructure would not adversely impact the seasonal-high water table. A Stormwater Erosion and Sedimentation Control Plan, a Storm Water Pollution Prevention Plan (SWPPP), and construction BMPs, implemented by FDEP regulations, would help manage stormwater runoff.

In accordance with the Florida Water Conservation Act (Florida Statutes 553.14), the proposed construction, demolition, and renovation at the proposed site would incorporate water conservation measures to the greatest extent possible. Landscaping would consist of native, drought-tolerant vegetation to reduce water use. Any plans involving irrigation would be coordinated through Eglin's Environmental Engineering Section prior to implementation. These efforts would protect the Eglin water supply by reducing consumptive uses of water withdrawn from the Floridan Aquifer (U.S. Air Force, 2001a).

Applicable permitting requirements would be satisfied in accordance with Florida Administrative Code (FAC) Rule 62-25 and the NPDES. The proponent and any contractors would adhere to all applicable regulatory requirements, which would serve to either offset or minimize any potential impacts from construction operations. The proponent would coordinate with the Environmental Engineering Section to submit a notice of intent to use the Generic Permit for Stormwater Discharge under the NPDES program prior to project initiation according to Florida Statute Section 403.0885.

The JSF IJTS Alternative 1 construction activities would also require coverage under the Generic Permit for Stormwater Discharge for Large and Small Construction Activities, where 1 or more acres of land are disturbed (FAC Rule 62-621). The proponent would incorporate a comprehensive Stormwater Erosion and Sedimentation Control Plan and an SWPPP into the final design plan. Stormwater permits and any necessary utility extension permits would require coordination between the proponent and the Environmental Engineering Section. The proponent would obtain all appropriate permits prior to the commencement of any ground-disturbing activities. The Air Force anticipates no adverse impacts to water quality from the implementation of the JSF IJTS Alternative 1 given the site characteristics. Further, the aforementioned permits would be obtained and the site-specific management actions would be implemented as required by FDEP.

Wetlands and Floodplains

The JSF IJTS Alternative 1 location is not within close proximity of any wetlands or floodplains. Wetlands associated with a branch of Toms Creek are located in the northern portion of the proposed MSA. No construction would occur in wetland areas, so no direct impacts would be expected. The only potential indirect impacts would be associated with stormwater runoff.

The soil type at the proposed MSA is Lakeland Sand, which consists of very deep, excessively drained, rapidly permeable soils on nearly level to very steep uplands (Overing et al., 1995). These soil characteristics allow for rapid infiltration (absorption into the soil) of stormwater and reduce the potential for indirect impacts to nearby wetlands.

As required by the aforementioned FDEP permits, the Air Force will implement as required site-specific management actions to control stormwater, ensuring further protection of nearby wetlands. The "Potential Mitigations" subsection under Section 4.11.1.2 (Environmental Consequences) in Chapter 4 provides a comprehensive list of the BMPs necessary to reduce indirect impacts. No adverse impacts to wetlands under the JSF IJTS Alternative 1 proposed MSA are expected.

Stormwater

Under the JSF IJTS Alternative 1 action, the JSF IJTS would take over the area currently occupied by the 33 FW. The stormwater drainages and treatment areas already in place have the capacity to handle all the stormwater runoff created from the impervious surfaces in that area. An additional construction area (just to the south of Nomad Way would create more impervious surfaces. To determine the increase in stormwater runoff from additional impervious surfaces, the WinTR-55 model was utilized as described in Chapter 4 (Section 4.11.1.2, Environmental Consequences, Water Resources).

The area that additional construction would occur is currently wooded land. Assumptions used in the stormwater modeling program were that the vegetation would be cleared and 86 acres (which is the footprint size of the additional construction) of impervious surfaces would be added. The model was run using a 25-year storm (a storm that produces 10.25 inches of rain in a 24-hour period). According to the WinTR-55 model, when the 86 acres is vegetated as it is currently, only about 1.32 inches of stormwater would run off-site. When the same 86 acres become impervious surfaces, stormwater runoff would increase to about 10.00 inches.

However, the area soils are Lakeland sands, which have a high rate of permeability (up to 20 inches an hour [Overing et al., 1995]). Due to the relatively flat terrain and absence of surface waters, wetlands, and floodplains, stormwater flow off-site would likely be contained by the soils and the nearby stormwater drainage areas. Additional

stormwater drainage and storage facilities would likely need to be constructed since this is a typical state requirement for construction projects. For more information about stormwater permits and BMPs, see the preceding *Surface Water* section. No adverse impacts due to stormwater runoff are expected from this alternative. Furthermore, the Air Force will obtain the aforementioned permits and implement as required site-specific management actions mentioned in the *Surface Water* section.

Permits, Management Actions, and BMPs

The permits, management actions, and BMPs for JSF IJTS Alternative 1 are the same as those discussed in Chapter 4 (Section 4.11.1.2, Environmental Consequences, Permits/Plans).

6.11.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.11.2.1 Existing Conditions (Physical Resources – JSF IJTS Alternative 2)

Soils

The topography of the proposed project area is relatively flat with slopes that are less than 1 percent. The landscape is characterized by mild rises in land elevation, forming slight plateau-ridge features intermingled with mild slope-depression topography. Generally these features are indistinguishable to the naked eye under natural vegetated conditions. Soil types for this alternative are listed below in Table 6-27 and shown previously in Figure 6-6. For comparative purposes, primary soils are presented below, showing attributes and the amount of acreage for each soil type. Detailed soil information can be found in Appendix G, *Physical Resources*.

Table 6-27. JSF IJTS Alternative 2 – Soil Types and Characteristics

Soil name	Erosion Risk	Attributes	Soil Type	Acreage
Lakeland Sand slope 0-5%, 5-12%, 12-30%	Moderate	Yellowish brown to grayish brown	Sand	15
Urban Land	Very low	Variable	Variable	41
Foxworth Sand	Low to moderate	Unconsolidated marine sediments, brown loam	Loamy Sand	7

Water Resources

This section provides descriptions of the qualitative and quantitative characteristics of water resources for the locations identified for JSF IJTS Alternative 2. Because JSF IJTS Alternatives 1 and 2 share the same plans for the MSA, water resources for the MSA are previously described under the JSF IJTS Alternative 1 section and are not discussed here.

Surface Water

No surface water features lie adjacent to the project area of JSF IJTS Alternative 2. The closest surface water resources to JSF IJTS Alternative 2 are the drainages associated with Boggy Bayou (approximately 1 mile away) (shown previously in Figure 6-7).

Surface Water Quality

Surface water quality issues for JSF IJTS Alternative 2 would be similar for Boggy Bayou as those stated under the JSF IJTS Alternative 1 surface water quality discussion.

Wetlands and Floodplains

There are no wetland or floodplain areas in close proximity to the JSF IJTS Alternative 2 site (Figure 6-7).

Coastal Zone

The JSF IJTS Alternative 2 site lies within the jurisdictional concerns of the FDEP under the CZMA. Coastal zone definitions, regulations, and requirements are discussed in Chapter 3, Section 3.11.5 (Definition of Water Resources) and Section 3.11.8 (Laws and Regulations, Water Resources). Eglin prepared a CZMA determination to address the impacts to the coastal zone (Appendix I, *CZMA Determination*).

Stormwater

The JSF IJTS Alternative 2 location is an area that is already developed and contains a high amount of impermeable surfaces. It also includes stormwater drainage and storage areas to handle stormwater runoff.

6.11.2.2 Environmental Consequences (Physical Resources – JSF IJTS Alternative 2)

This section details the potential impacts of JSF IJTS Alternative 2 in relation to soils/erosion due to stormwater runoff. The MSA is not discussed in this section as the impacts are the same as those described for JSF IJTS Alternative 1.

Soils

JSF IJTS Alternative 2 would not adversely impact soils. Construction, demolition, and renovation activities at the JSF IJTS Alternative 2 site, covering approximately 89 acres, have little potential to affect soils and create conditions that could result in serious erosion episodes because this very urbanized area already contains structures, is relatively flat, and does not require the removal of vegetation areas. Soils and terrain at the alternative construction site are not naturally associated with erosion. However, if erosion minimization measures (such as BMPs to prevent an increase in transportation of sediments) are not practiced, then the demolition portion of the project could exacerbate soil erosion. Erosion control measures would need to be implemented to minimize erosion. These include (but are not limited to) silt screens, hay bales, and grass seeding as needed so that surface runoff does not contaminate local water bodies.

A Stormwater Erosion and Sedimentation Control Plan, an SWPPP, and construction BMPs are required under FDEP regulations. The proponent shall obtain all permitting requirements in accordance with FAC Rules 62-25 and 62-621, as described previously under the JSF IJTS Alternative 1 discussion. No adverse impacts to soils are anticipated based on the soil characteristics at the site. The Air Force will obtain the aforementioned permits and implement BMPs as required.

Water Resources

No water resources are in or adjacent to the JSF IJTS Alternative 2 site. Therefore, there would be no direct impacts to groundwater, surface water, wetlands or floodplains. Potential indirect impacts pertaining to stormwater would be the same as those discussed in JSF IJTS Alternative 1. For effects to water resources in regard to the MSA, see Section 6.11.1.2.

Permits, Management Actions, and BMPs

The permits, management actions, and BMPs for JSF IJTS Alternative 2 are the same as those discussed in Chapter 4 (Section 4.11.1.2, Environmental Consequences, Permits/Plans).

6.11.3 No Action Alternative

Under the No Action Alternative, no construction, demolition, or renovation would occur for the JSF IJTS. The list of current or future actions that compose the No Action Alternative as described in Section 2.7 would not significantly affect physical resources described in Section 3.11, Physical Resources.

The No Action Alternative would involve activities on D-51, Duke Field, and Eglin Main Base as presented in Section 2.7. Because they involve ground disturbance and an increase in impervious surface area, specific projects with the potential to impact soil and water resources would be the construction of the VA CBOC and the JRF. However, environmental analysis for the VA CBOC discounted direct impacts since there are no surface waters, wetlands, or floodplains within or adjacent to the construction footprint. The JRF construction activities would occur approximately 500 feet from Weekly Pond and about 1,000 feet from Weekly Bayou. Environmental analysis found no adverse impacts to soils, water resources, or water quality given the attainment of the required permits and the implementation of BMPs defined in the SWPPP (U.S. Air Force, 2005 and 2007a).

These construction actions require coverage under the Generic Permit for Stormwater Discharge from Construction Activities that Disturb 1 or More Acres of Land (Rule 62-621, FAC). Both actions would be required to incorporate an SWPPP into the final design plan.

Given the assessments above, no adverse impacts to soil or water resources are anticipated under the No Action Alternative.

6.12 BIOLOGICAL RESOURCES

6.12.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.12.1.1 Existing Conditions (Biological Resources – JSF IJTS Alternative 1)

Flora and Fauna

Of Eglin's major ecological associations, only the Sandhills ecological association is found within or adjacent to the cantonment area (Table 6-28 and Figure 6-8). Eglin would clear only a small portion of this area. Most of the proposed area is already considered Landscaped/Urban. No invasive nonnative plant species have been documented within the JSF IJTS Alternative 1 location or the Eglin Main Base MSA (Eglin GIS, 2007c).

Table 6-28. JSF IJTS Alternative 1 – Acres of Habitats

Location	Sandhills	Landscaped/ Urban
ALT 1	75	210
JSF MSA	32	315

Sensitive Habitats and Sensitive Species

A small High Quality Natural Community is located along the north boundary of the proposed MSA (Figure 6-9). This High Quality Natural Community is associated with the Okaloosa darter stream riparian area.

Based on existing information, species documented to occur or that may potentially be present within the JSF IJTS Alternative locations are identified in Table 6-29 and Figure 6-9. Florida black bears have been sighted near all of the sites (Figure 6-9). Due to the presence of Sandhills habitat, there is potential for the presence of gopher tortoises, eastern indigo snakes and Florida pine snakes; however, due to fire suppression and the surrounding urban landscape, it is unlikely. An Okaloosa darter stream (Toms Creek) is located north of the proposed MSA (Figure 6-9). Inactive red-cockaded woodpecker (RCW) trees are located within the MSA (Figure 6-9).

Table 6-29. JSF IJTS Alternatives – Sensitive Species Potentially Occurring In or Near the Sites

Scientific Name	Common Name	Status	Sites
Reptiles			
Drymarchon corais couperi	Eastern indigo snake	FT, ST	All
Gopherus polyphemus	Gopher tortoise	ST	All
Pituophis melanoleucus	Florida pine snake	SSC	All
Birds			
Picoides borealis	Red-cockaded woodpecker	FE, ST	MSA (inactive trees)
Falco sparverius paulus	Southeastern American kestrel	ST	MSA
Fish			
Etheostoma okaloosae	Okaloosa darter	FE, SE	MSA
Mammals			
Ursus americanus floridanus	Florida black bear	ST	All

Sources: Eglin GIS Data, 2007a; U.S. Air Force, 2002a
Status: FE = Federally endangered; FT = Federally threatened; SE = State Endangered; ST = State threatened; SSC = State Species of Special Concern

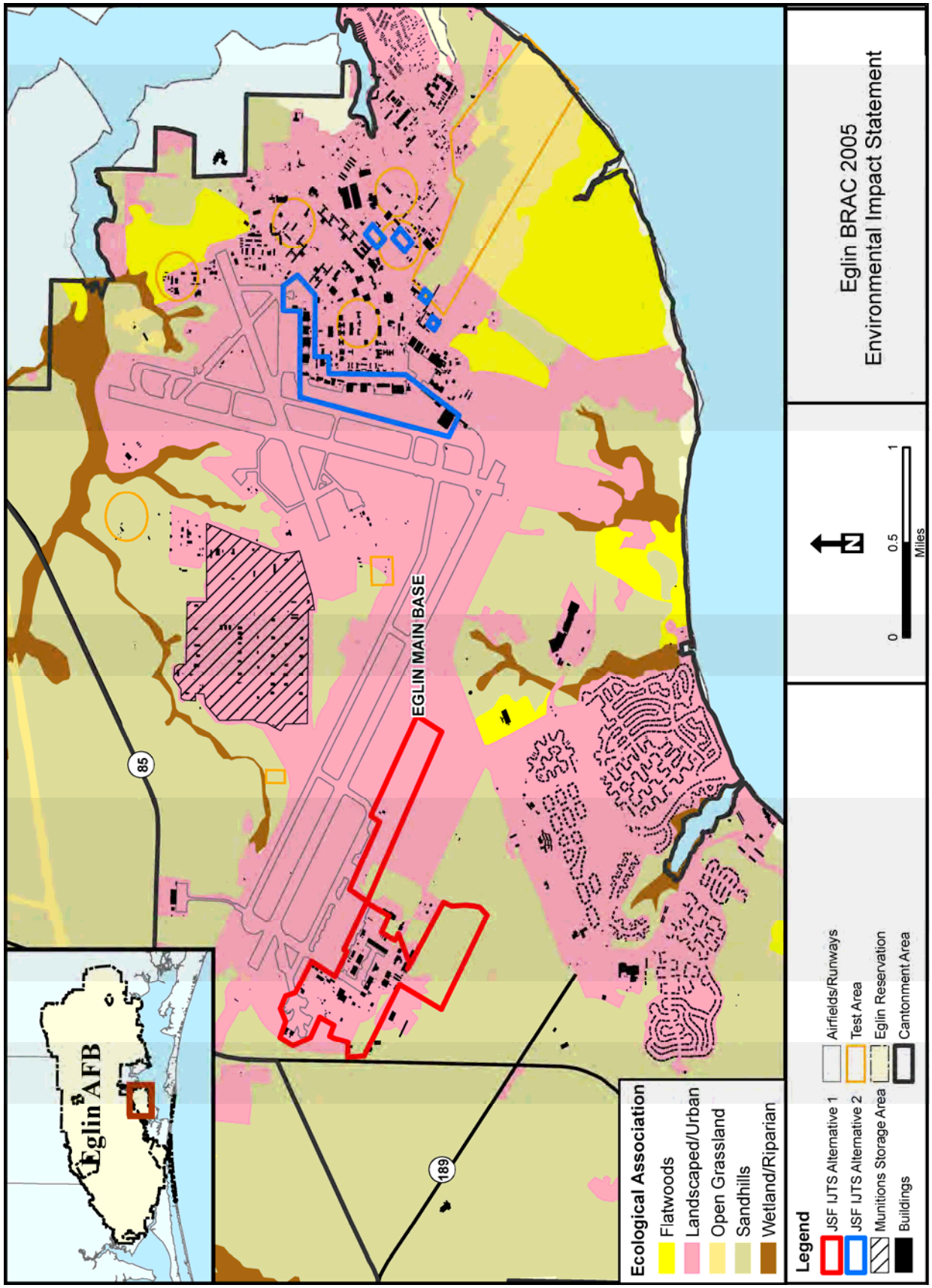

Figure 6-8. JSF IJTS – Ecological Associations

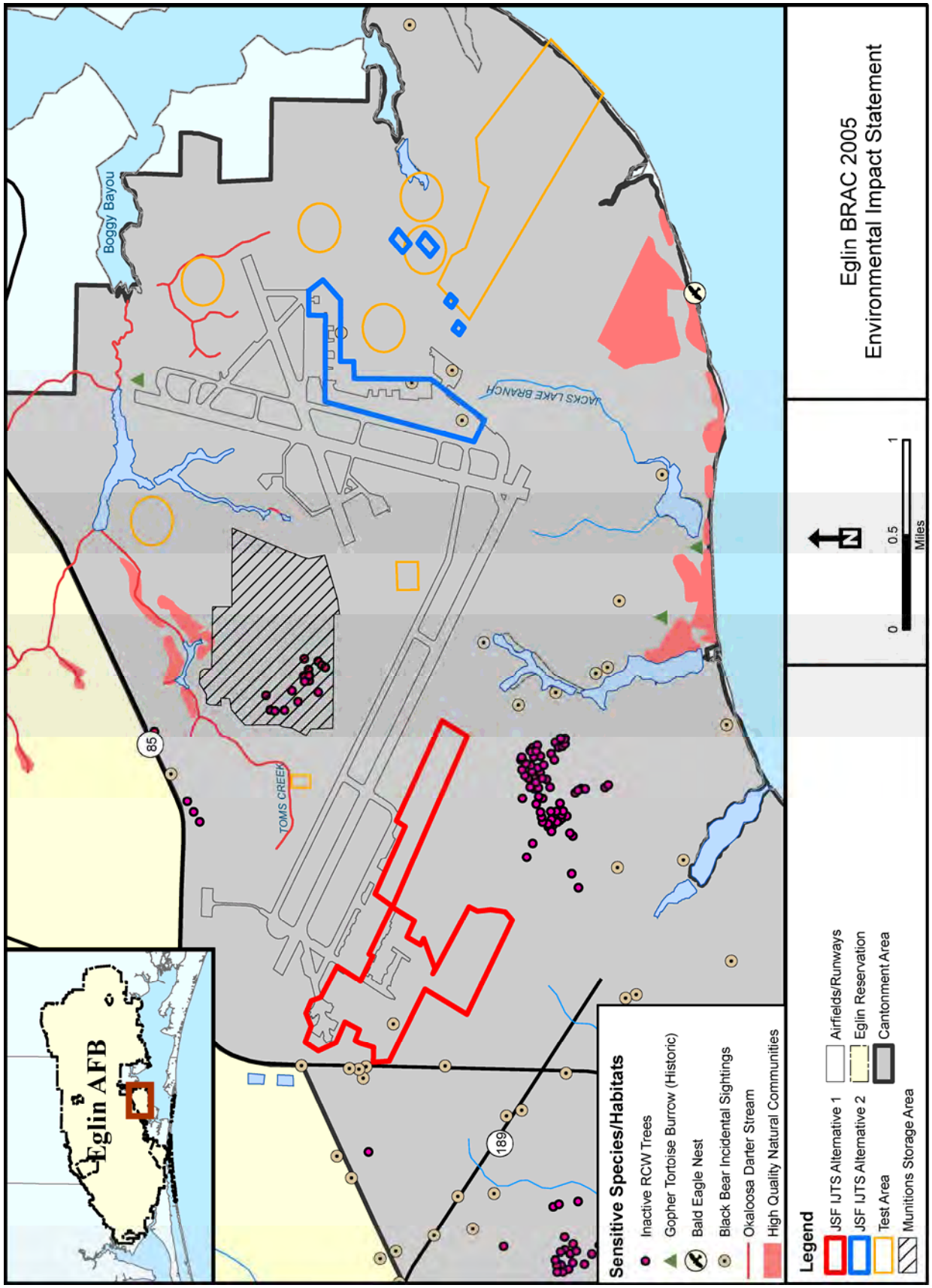

Figure 6-9. JSF IJTS – Sensitive Habitats and Sensitive Species

6.12.1.2 Environmental Consequences (Biological Resources – JSF IJTS Alternative 1)

This section discusses potential impacts to biological resources located within and adjacent to the JSF IJTS Alternative 1 area and MSA. Analysis focuses on assessing the potential for impacts to biological resources from land clearing, demolition, construction, and daily cantonment activities, as well as on identifying methods to reduce the potential for negative impacts to biological resources from these activities. A significant impact would be one that is likely to jeopardize the continued existence of the species.

Sensitive Species

The JSF IJTS Alternative 1 area is almost entirely urban/landscaped, and therefore is not considered good wildlife habitat. Animals that use the area are likely habituated to the noise and human presence in the existing developed areas and the adjacent flight line. Daily cantonment operations would not add an appreciable increase in noise; impacts to wildlife from noise associated with the cantonment area would be minimal.

Development of the JSF IJTS may increase or decrease the potential for human-bear interaction. Black bears have been sighted near the proposed location, possibly attracted due to a human presence (garbage, etc.), as many more sightings are located near urbanized areas. In addition, 50 bears have been killed since 1984 by automobiles on roads that border Eglin property (Eglin GIS, 2007a). It is not possible to know whether development of the IJTS would increase bear activity (foraging in garbage, etc.) or decrease it (avoidance of human-related noise, etc.).

Construction activities and vehicle traffic associated with daily cantonment operations may also affect the state-listed gopher tortoise and federally endangered indigo snake. Although it is unlikely these species would be present due to poor habitat conditions, surveys for these species would occur immediately prior to construction. If any animals were located during the surveys, a relocation permit would be obtained from the Florida Fish and Wildlife Conservation Commission (FWC) and animals in imminent danger from construction would be relocated. Instructing vehicle and equipment operators to stop and allow tortoises, indigo snakes, and bears to move away from the area before continuing activities would minimize the potential for vehicle strikes.

Sixteen inactive cavity trees for the federally endangered RCW are located within the MSA. Eglin's Natural Resources Section biologists indicate there is an extremely low potential for this cluster to become active because the habitat is not suitable for future colonization (Gault, 2006). No good foraging habitat is available near the trees, with most of the surrounding habitat consisting of sand pine. Additionally, the closest

active clusters are over 5 miles away, and RCWs do not fly this great a distance, particularly with no foraging habitat available. This area is not significant or of importance in future RCW management or as an emphasis area as designated by the *Eglin Integrated Natural Resources Management Plan* (U.S. Air Force, 2007f). Furthermore, a letter from the U.S. Fish and Wildlife Service (USFWS) on 5 June 1997 concurs with Eglin's Natural Resources Section that any future developments impacting RCW inactive trees on Eglin Main Base are not likely to adversely affect the RCW (USFWS, 1997).

The Okaloosa darter (federally endangered species) stream north of the MSA (Toms Creek) would not be affected by daily operations at the MSA due to the large distance between the proposed MSA expansion area and the stream (approximately 700 feet); however, the darter may be affected by sedimentation and runoff from the construction and demolition activities at the MSA. Utilization of erosion control measures such as silt fencing near Toms Creek would reduce impacts. There is no standard guidance for vegetative buffers along Okaloosa darter streams; however a 100-foot, vegetated buffer is commonly recommended for stream protection.

Since the proposed JSF IJTS Alternative 1 area is primarily urban/landscaped and located adjacent to the flight line with little wildlife value or sensitive habitats, overall impacts to biological resources from the JSF IJTS Alternative 1 land clearing, construction, and daily activities would not be significant. There is an extremely low potential for the inactive trees within the MSA to become active because the habitat is not suitable for future colonization; thus JSF IJTS Alternative 1 activities are not likely to adversely affect the RCW. Due to the large distance between the MSA and the Okaloosa darter stream, and the likely requirement for erosion control measures at the MSA expansion site, JSF IJTS Alternative 1 is not likely to adversely affect the Okaloosa darter. However, due to the overall potential for impacts to federally listed species, an Endangered Species Act (ESA) Section 7 consultation with the USFWS has been conducted (Appendix H, *Biological Resources*).

Invasive Nonnative Species

Disturbance to soil and vegetation from land clearing and construction could enhance conditions for the establishment and spread of invasive nonnative plant species. However, because the majority of the cantonment area would be covered by buildings, pavement, or landscaped areas, there would not be many areas with the proper environment for the establishment of invasive nonnative plant species. Additionally, all landscaping and plantings of vegetation would conform to the Presidential Memorandum dated 26 April 1994, *Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds*, and Executive Order 13112, *Invasive Species*, both of which require the planting of regional natives in landscaping. Mitigations are available

to reduce the potential for invasive nonnative plant species infestations (see Section 6.12.4). Impacts to flora or fauna from invasive nonnative species would not be significant.

6.12.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.12.2.1 Existing Conditions (Biological Resources – JSF IJTS Alternative 2)

The JSF IJTS Alternative 2 site is considered Landscaped/Urban (Figure 6-8 and Table 6-30). The MSA is the same as for JSF IJTS Alternative 1. All of the flora, fauna, sensitive habitats and sensitive species listed and discussed for JSF IJTS Alternative 1 are the same for JSF IJTS Alternative 2 (see Section 6.12.1.1.) (Figure 6-9).

Table 6-30. JSF IJTS Alternative 2 – Acres of Habitats

Alternative	Sandhills	Landscaped/ Urban
ALT 2	1	131

6.12.2.2 Environmental Consequences (Biological Resources – JSF IJTS Alternative 2)

Similar to the JSF IJTS Alternative 1 location, the JSF IJTS Alternative 2 cantonment area is almost entirely urban/landscaped, and therefore is not considered good wildlife habitat. Impact analysis and potential mitigations for the JSF IJTS Alternative 2 cantonment area and MSA are the same as those discussed above for the JSF IJTS Alternative 1. Thus, impacts to biological resources from the JSF IJTS Alternative 2 land clearing, construction, and daily activities would not be significant.

6.12.3 No Action Alternative

The No Action Alternative would involve activities on Eglin Main Base, which is primarily landscaped/urban, with smaller areas of Sandhills habitat. On Eglin Main Base, inactive RCW trees, black bears, and one Okaloosa darter stream are present.

Under the No Action Alternative, impacts to biological resources from clearing, construction, and everyday cantonment operations from the JSF IJTS would not occur. The predictable actions relevant to the JSF IJTS that are to occur at Eglin through the year 2015 are located on Eglin Main Base, where wildlife habitat quality is poor. Construction on Eglin Main Base would occur primarily in areas that are already developed, thus overall impacts to biological resources from the No Action Alternative would not be significant.

6.12.4 Potential Mitigations

As stated in Chapter 2 (Section 2.4.2.1), there are certain operating constraints based on current agreements with the USFWS for threatened and endangered (T&E) species

protection. Additionally, all terms and conditions resulting from the BRAC Section 7 consultation with the USFWS would be implemented. Below are potential additional mitigations to reduce or remove impacts to biological resources from JSF IJTS and MSA activities:

- Immediately prior to clearing, conduct surveys for gopher tortoises and indigo snakes. If any animals are found, apply to the FWC for a relocation permit, and relocate these animals to another area on Eglin according to FWC guidelines.
- Provide project personnel with a description of the eastern indigo snake, including information on its behaviors, its protection under federal law, and instructions not to injure, harm, or kill this species.
- Direct personnel to cease any activities if a black bear, indigo snake, or gopher tortoise is sighted and allow the animal sufficient time to move away from the site on its own before resuming any activities. Immediately contact Eglin's Natural Resources Section.
- Restrict vehicles within the MSA to established roads and paved areas.
- Maintain at least a 100-foot vegetated buffer along the Okaloosa darter stream at the MSA.
- Utilize erosion control measures such as silt fencing near the Okaloosa darter stream at the MSA.
- To reduce potential seed sources, treat areas with known invasive nonnative species problems.
- To avoid spreading invasive nonnative species, do not drive vehicles in areas with known invasive nonnative species problems. If a vehicle is driven in such an infested area, clean the vehicle before it is driven to a noninfested area.
- Use only native plants for landscaping.

6.13 CULTURAL RESOURCES

6.13.1 JSF IJTS Alternative 1: 33rd Fighter Wing Area (Preferred Alternative)

6.13.1.1 Existing Conditions (Cultural Resources – JSF IJTS Alternative 1)

The Area of Potential Effects (APE) for cultural resources under the JSF IJTS Alternative 1 covers 230 acres and is depicted by Figure 2-24 (JSF IJTS Complex Alternative 1 and Alternative 2 Proposed Locations) in Chapter 2. The ground in this area is heavily disturbed because of previous development and the construction of a

large drainage swale along Nomad Avenue. In addition, an unnamed roadway currently bisects the APE. No archaeological resources are documented within the area proposed for the JSF IJTS Alternative 1 (Thomas and Campbell, 1992). The 230 acres within this APE are identified as heavily disturbed and have low potential for cultural resources. As a result, these acres were not surveyed for cultural resources. One archaeological site, 8OK228, is present within the boundaries of the MSA. It is a single-component prehistoric artifact scatter and was determined to be ineligible for nomination to the National Register of Historic Places (NRHP) (Thomas and Campbell, 1992; refer to Appendix F for details on Section 106 coordination to date).

Also located within the APE of the JSF IJTS Alternative 1 is the Strategic Air Command (SAC) Alert Historic District. This proposed project area contains Area 1, Area 2 and Area 3 of the SAC District (Figure 6-10). Contributing resources for Area 1 consist of building 1355 and taxiway C. Contributing resources for Area 2 include buildings 1315, 1321, 1326, 1328, 1339, 1341, 1343, 1344, 1345, 1351, 1352, 1353, and taxiway A. Area 3 of the SAC District includes buildings 1318, 1285, 1286, and 1287 (Table 6-31) (Eglin AFB, 2003b).

Table 6-31. JSF IJTS Alternative 1 – Historic Structures Located Within Areas 1, 2, and 3, SAC Alert Historic District

Site Number	Building ID	Name	Notes	Year Built
Area 1				
	Taxiway C	Taxiway C	Cold War Resource-NRHP Listed-Contributing member	1960
8OK01392	001355	SAC Alert Molehole (Crew Readiness)	Cold War Resource-NRHP Listed-Contributing member	1959
Area 2				
8OK01382[a]	**001315**	**SAC Squadron Operations**	**Cold War Resource-NRHP Listed-Non-contributing member**	**1959**
	001321	**Supply and Equipment Warehouse**	**Cold War Resource-NRHP Listed-Contributing member**	**1962**
8OK01384	**001326**	**SAC General Purpose Aircraft Repair Shop**	**Cold War Resource-NRHP Listed-Non-contributing member**	**1959**
8OK01385	**001328**	**SAC Armament and Electronics Shop**	**Cold War Resource-NRHP Listed-Contributing member**	**1959**

Continued on the next page…

Table 6-31. JSF IJTS Alternative 1 – Historic Structures Located Within Areas 1, 2, and 3, SAC Alert Historic District, Cont'd

Site Number	Building ID	Name	Notes	Year Built
	001339	**Fuel Systems Maintenance Dock**	**Cold War Resource-NRHP Listed-Contributing member**	**1963**
	001341	Oil and Grease Storage	Cold War Resource-NRHP Listed-Contributing member	1961
8OK01386	**001343**	**SAC Nose Dock for the B-52**	**Cold War Resource-NRHP Listed-Contributing member**	**1959**
8OK01387	**001344**	**SAC Nose Dock for the B-52**	**Cold War Resource-NRHP Listed-Contributing member**	**1959**
8OK01388	**001345**	**SAC Maintenance Nose Dock**	**Cold War Resource-NRHP Listed-Contributing member**	**1959**
8OK01389	001351	SAC "Quail" (GAM-72 Ground Attack Missile) Run-Up Shop	Cold War Resource-NRHP Listed-Contributing member	1959
8OK01390	**001352**	**SAC "Hound Dog" (AGM-28 Air to Ground Missile) Service Shop**	**Cold War Resource-NRHP Listed-Contributing member**	**1959**
8OK01391	**001353**	**SAC GAM-77 Run-Up Shop**	**Cold War Resource-NRHP Listed-Non-contributing member**	**1959**
	Taxiway A	Taxiway A	Cold War Resource-NRHP Listed-Contributing member	1960
Area 3				
	001285	**Inspection and Surveillance Shop**	**Cold War Resource-NRHP Listed-Contributing member**	**1959**
	001286	Multiple Cubicle Magazine Storage	Cold War Resource-NRHP Listed-Contributing member	1959
	001287	Multiple Cubicle Magazine Storage	Cold War Resource-NRHP Listed-Contributing member	1959
8OK01383	**001318**	**SAC Maintenance Docks**	**Cold War Resource-NRHP Listed-Contributing member**	**1971**

a. **Boldface type** indicates buildings considered for renovation or demolition under JSF IJTS Alternative 1

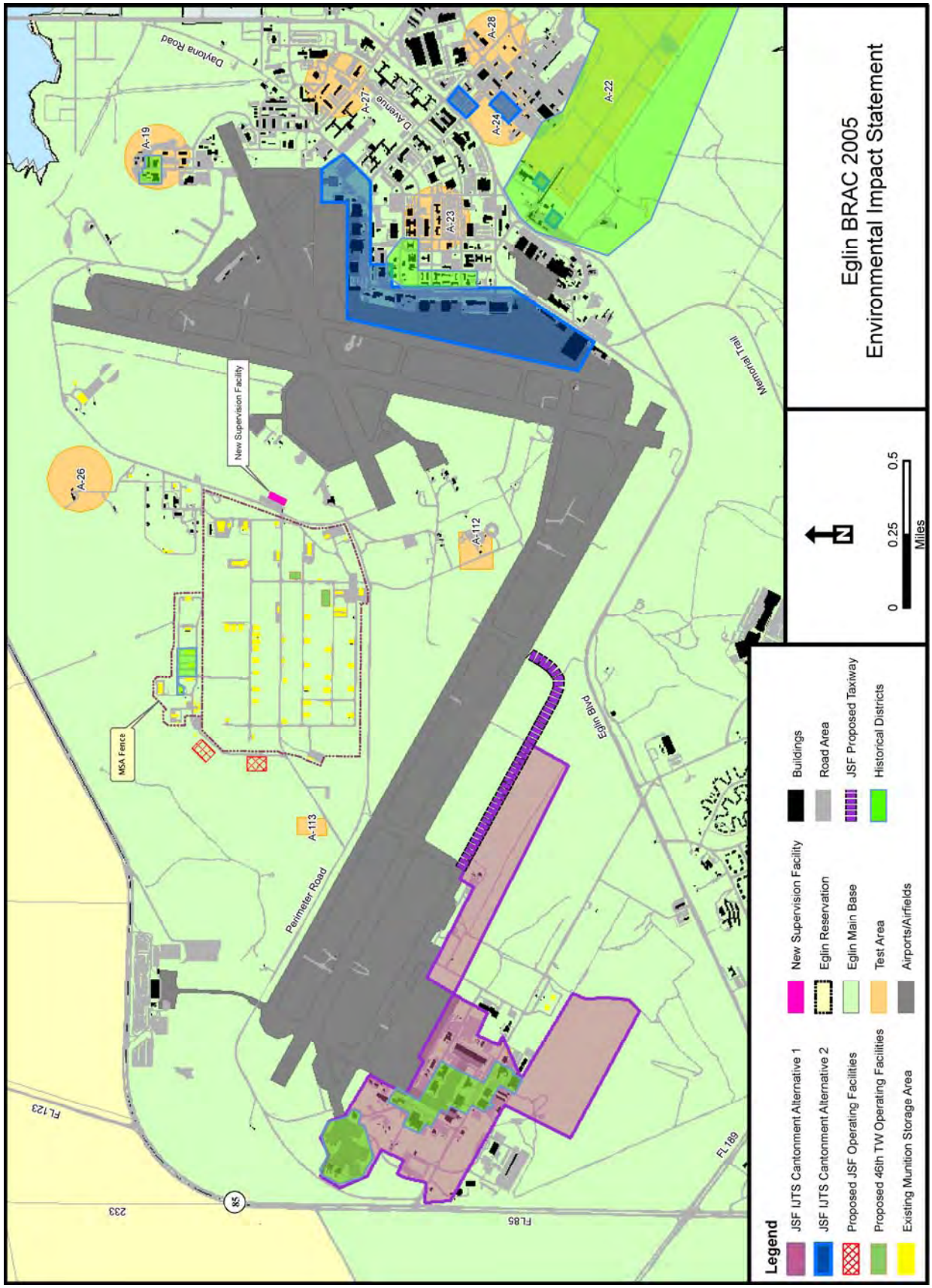

Figure 6-10. Historic Districts at Eglin Main Base

6.13.1.2 Environmental Consequences (Cultural Resources – JSF IJTS Alternative 1)

No known NRHP-eligible archaeological sites are located within the JSF IJTS Alternative 1 area. Eglin's Cultural Resources Branch, in consultation with the State Historic Preservation Office/Tribal Historic Preservation Office (SHPO/THPO), determined that no additional archaeological survey is required for this area.

Other considerations for the historic districts are the effects of F-35 aircraft operations on the occupants and buildings within the historic district. Potential impacts due to noise are discussed in Chapter 7 within the cultural resources section.

The JSF IJTS implementation calls for a number of buildings located near the Eglin Main Base airfield to be constructed, renovated, or demolished. JSF IJTS Alternative 1 includes the renovation and demolition of approximately 38 existing facilities. Potential adverse effects to cultural resources include the planned demolition of five structures (buildings 1339, 1343, 1345, 1352, and 1353), and the potential renovation of seven other structures within the SAC Alert Historic District (buildings 1285, 1315, 1318, 1321, 1326, 1328, and 1344). These buildings are part of the SAC Alert Historic District, which was previously evaluated as eligible for the NRHP. After consultation with the SHPO/THPO as per Eglin's 2003 programmatic agreement regarding historic and archaeological resources, mitigation or protection of these resources will be required for all affected facilities (see 2003 programmatic agreement entitled *Preservation and Protection of Historic and Archaeological Resources*, located in Appendix F, *Cultural Resources*).

6.13.2 JSF IJTS Alternative 2: East Side of Eglin Runway

6.13.2.1 Existing Conditions (Cultural Resources – JSF IJTS Alternative 2)

The APE for cultural resources for the JSF IJTS Alternative 2 is depicted by Figure 2-24 (JSF IJTS Complex Alternative 1 and Alternative 2 Proposed Locations) in Chapter 2 of this document. No archaeological surveys were conducted in the 131-acre parcel on the 46 TW side because of extensive development-related disturbance. No archaeological resources or historic cemeteries are documented within the main area proposed for the JSF IJTS Alternative 2. Within the MSA, 107 acres have been surveyed for cultural resources. One archaeological site, 8OK228, is present within the boundaries of the MSA. This site is a prehistoric artifact scatter determined to be ineligible for nomination to the NRHP (Thomas and Campbell, 1992). In addition, buildings 1285, 1286, and 1287 in the MSA are NRHP-eligible resources, which are also part of the SAC Alert Historic District. Buildings 1398 and 1399 are also affected under this alternative, but they are considered noncontributing members to this district (Table 6-32; refer to Appendix F for details on Section 106 coordination).

Table 6-32. JSF IJTS Alternative 2 – Historic Structures Located Within SAC Alert Historic District

Building ID[1]	Name	Period	Status	Year Built
001398	Hush House	Cold War	Noncontributing	1989
001399	Hush House	Cold War	Noncontributing	1989

1. Both buildings are considered for renovation under JSF IJTS Alternative 2

In addition, the Eglin Field National Historic District is located within this alternative area (Figure 6-10). This is one of two listed NRHP Historic Districts on Eglin AFB. Contributing resources, a noncontributing member, and structures proposed for renovation or demolition at the Eglin Field Historic District are presented in Table 6-33.

Table 6-33. Eglin Field National Historic District (8OK1532)

Site Number	Facility Number	Site Name (Current Use)	Year Built	Notes
8OK01296	000002	Command Headquarters (Law Center)	1943	NRHP Listed-Contributing member
8OK01297	000004	Chapel (College Facility)	1943	NRHP Listed-Contributing member
8OK01289	000006	Post HQ/Arctic Info Center (Wing Headquarters)	1943	NRHP Listed-Contributing member
8OK01298	000023	Family Housing Garage	1948	Noncontributing member
8OK01294	000025	Georgia Avenue Housing	1944	NRHP Listed-Contributing member
8OK01295	000026	Georgia Avenue Housing	1944	NRHP Listed-Contributing member
8OK01290	000027	Georgia Avenue Housing	1944	NRHP Listed-Contributing member
8OK01292	000028	Georgia Avenue Housing	1944	NRHP Listed-Contributing member
8OK01293	000029	Georgia Avenue Housing	1944	NRHP Listed-Contributing member
8OK01291	000030	Storage Building (Administrative Building)	1943	NRHP Listed-Contributing member
8OK01270	000200	Air Force Clinic (Flight Surgeon Clinic)	1943	NRHP Listed-Contributing member
8OK01271	000201	Base Officer Quarters (Air Force Clinic)	1943	NRHP Listed-Contributing member
8OK01272	000202	Base Officer Quarters (Air Force Clinic)	1943	NRHP Listed-Contributing member
8OK01267	000214	Base Officer Quarters (Air Force Clinic)	1943	NRHP Listed-Contributing member
8OK01268	000215	Air Force Office of Special Investigations Offices	1943	NRHP Listed-Contributing member
8OK01269	000216	Base Officer Quarters (Electronic Research Test Facility)	1943	NRHP Listed-Contributing member

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Table 6-33. Eglin Field National Historic District (8OK1532), Cont'd

Site Number	Facility Number	Site Name (Current Use)	Year Built	Notes
8OK01253	000217	Base Officer Quarters (Environmental Health Offices)	1943	NRHP Listed-Contributing member
8OK01252	000218	Base Officer Quarters (Medical Command & Administration)	1943	NRHP Listed-Contributing member
8OK01250	000220	Base Officer Quarters (Non Air Force Administration Office)	1943	NRHP Listed-Contributing member
8OK01531[a]	**000238**	**Visiting Officer Quarters (Cultural Resources Facility)**	**1943**	**NRHP Listed-Contributing member**
8OK01251	**000246**	**Headquarters Group (same)**	**1943**	**NRHP Listed-Contributing member**

a. **Boldface type** indicates buildings considered for renovation or demolition under JSF IJTS Alternative 2.

6.13.2.2 Environmental Consequences (Cultural Resources – JSF IJTS Alternative 2)

No known NRHP-eligible archaeological sites are located within the JSF IJTS Alternative 2 area. Eglin's Cultural Resources Branch, in consultation with the SHPO/THPO, determined that no additional archaeological survey is required for this alternative area.

The JSF IJTS implementation calls for a number of buildings located near the eastern side of Eglin Main Base's airfield to be constructed, renovated, or demolished. The JSF IJTS Alternative 2 would include the renovation or demolition of approximately 30 existing facilities, listed in Table 2-15 (*Proposed Facilities Associated With JSF IJTS Alternative 2*) in Chapter 2. Adverse effects to cultural resources may include the planned demolition or renovation of contributing resources within the Eglin Field National Historic District and SAC Alert Historic District. Potential adverse effects to cultural resources would include the planned demolition of two structures within the Eglin Field Historic District (buildings 238 and 246), and the potential renovation of one other structure within the SAC Alert District (building 1285). All of these structures to be demolished or renovated are considered to be contributing elements to either the SAC Alert Historic District or Eglin Field Historic District.

Other considerations for these historic districts are the effects of F-35 aircraft operations on the buildings within the historic district. Potential impacts due to noise are discussed in Chapter 7 within the cultural resources section.

Because these buildings are part of districts evaluated as eligible for nomination to the NRHP, or are already listed, mitigation or protection of these resources will be required

for all affected facilities (see 2003 programmatic agreement entitled *Preservation and Protection of Historic and Archaeological Resources*, located in Appendix F, *Cultural Resources*).

6.13.3 No Action Alternative

Under the No Action Alternative, the BRAC-related actions as described in Chapter 2 (Section 2.5, Operational Requirements for JSF IJTS) would not occur. If BRAC-related actions do not occur at Eglin, and if the list of projects in Section 2.7 and Section 9.1.3 proceeded, no known adverse effects to cultural resources would be expected.

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7. JSF FLIGHT TRAINING – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

7.1 INTRODUCTION

This chapter describes the affected environment and the environmental consequences associated with each flight training alternative for the Joint Strike Fighter (JSF) at Eglin Air Force Base (AFB), addressing flight operations at Eglin Main Base, Duke Field, Choctaw Field, and Special Use Airspace (SUA) as well as munitions training on designated test areas (TAs). Table 7-1 provides an overview of the resources potentially affected by this action and respective analyses conducted. Some resource areas were not evaluated; the rationale for elimination is also identified in Table 7-1.

As indicated in Section 1.1 and 2.6 of the EIS, the development of JSF aircraft is a dynamic process with uncertainties, and at this early stage of development limited data are available on its performance characteristics. The limited data and knowledge available were used to assess the impacts of JSF flying operations and identify possible mitigations. As the program evolves, the Air Force and other Services will gain greater understanding of the aircraft's performance characteristics and will be better able to define and assess impacts from its operation. The Air Force will use an adaptive management process, Environmental Management Systems (EMS), and other processes, to monitor and evaluate the JSF Program to identify ways to address program-related impacts and manage noise issues. Although every effort will be made by the proponent to fund identified mitigations, application of some proposed mitigation measures may be subject to Congressional appropriations.

Table 7-1. Resource Areas Analyzed for Environmental Consequences Associated With the JSF Flight Training Alternatives

Resource Area	Section	Brief Description of Scope of Analysis
Airspace	7.2	Analysis focused on congestion associated with airspace utilization.
Noise	7.3	Noise analysis concentrated on impacts associated with aircraft and munitions activities.
Land Use	7.4	Analysis focused on on-base and off-base land use compatibility impacts based on the AICUZ guidelines.
Socioeconomics	7.5	Analysis focused on potential impacts to minority and low-income populations in relation to noise, as well as special risks to children.
Transportation	N/A	Transportation would not be impacted by any JSF flight training alternative and was therefore not analyzed.
Utilities	7.6	Analysis focused on the existing infrastructure, current use, and any predefined capacity or limitations as set forth in permits or regulations for potable water, wastewater, electrical, and natural gas at Eglin Main Base, Duke Field, and Choctaw Field.

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Table 7-1. Resource Areas Analyzed for Environmental Consequences Associated with the JSF Flight Training Alternatives, Cont'd

Resource Area	Section	Brief Description of Scope of Analysis
Air Quality	7.7	Analysis focused on emissions associated with aircraft flying at elevations less than 3,000 feet, as well as emissions generated by munitions activities.
Safety	7.8	Analyses focused on potential safety issues associated with aircraft operations, ground operations, and munitions training. These issues were evaluated to assess how the activity would increase or decrease safety risks to military personnel, the public, and property.
Solid Waste	7.9	Analysis focused on identifying the types and quantities of solid wastes generated from government actions and requiring disposal, including municipal solid waste, C&D waste, and munitions debris. Land-clearing waste was not calculated as these wastes, which include soils and vegetative material, would be either used as fill, sold for wood product production, or burned under a burn permit and would not require disposal.
Hazardous Materials	7.10	Analysis focused on identifying the type and quantity of materials and wastes that would be associated with proposed munitions training activities. These data were evaluated against the Eglin AFB's 2005 baseline data and the existing capability for managing these materials/wastes.
Physical Resources	7.11	Analysis focused on potential impacts to soils and water resources from munitions use.
Biological Resources	7.12	Analysis focused on impacts to sensitive species and sensitive habitats from air operations and munitions use.
Cultural Resources	7.13	Analysis considered the impact of JSF noise on occupied historic structures both on and off Eglin AFB property.

AICUZ = Air Installation Compatible Use Zone; AFB = Air Force Base; C&D = Construction and Demolition; JSF = Joint Strike Fighter

7.2 AIRSPACE

7.2.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.2.1.1 Existing Conditions (Airspace – JSF Flight Training Alternative 1)

The existing airspace conditions are the same for each JSF flight training alternative. These conditions are discussed in Chapter 3 (Section 3.1.2, Region of Influence and Existing Conditions).

7.2.1.2 Environmental Consequences (Airspace – JSF Flight Training Alternative 1)

JSF flight training operations would impact air traffic controller workload and contribute to increased congestion (air and ground delays) for military and civilian aircraft across the region. The JSF flight operations would contribute to an already congested airspace created by the continuing growth of other civilian and military

aviation customers in the region. The complex regional airspace configuration and use calls for modifications involving all of the civilian and military users of the airspace. The regional airspace study discussed in Section 7.2.4 could support regional airspace configuration and use that reduces or minimizes congestion.

7.2.2 JSF Flight Training Alternative 2

7.2.2.1 Existing Conditions (Airspace – JSF Flight Training Alternative 2)

The existing airspace conditions are the same for each JSF flight training alternative. These conditions are discussed in Chapter 3 (Section 3.1.2, Region of Influence and Existing Conditions).

7.2.2.2 Environmental Consequences (Airspace – JSF Flight Training Alternative 2)

The impacts would be the same as JSF Flight Training Alternative 1.

7.2.3 No Action Alternative

The existing conditions for the No Action Alternative are the same as those discussed in Chapter 3, Section 3.1.2 (Region of Influence and Existing Conditions).

The deactivation of the 33rd Fighter Wing (33 FW) and the departure of their F-15s would result in decreased number of air traffic control (ATC) operations and would reduce congestion across the region.

7.2.4 Mitigations

Basing the F-35 at Eglin AFB could intensify congestion in an area already facing many airspace challenges. However, these challenges could be mitigated and managed. Table 7-2 lists potential measures for each alternative to lessen the effects from all increased flight operations across the region.

Table 7-2. Mitigation and Management Measures

Mitigation and Management Measures	Alternative 1	Alternative 2	No Action Alternative
Enhanced Scheduling Procedures	X	X	--
Improved Command and Control	X	X	--
Regional Airspace Study	X	X	--
Enhanced Airport Traffic Control Procedures	X	X	--
Expanded Operating Hours	X	X	--
Additional Air Traffic Controllers	X	X	--

Enhanced scheduling procedures could allow for a more efficient movement of aircraft and effective use of resources (aircraft, airspace, personnel) associated with individual sorties. Enhanced scheduling could help deconflict events such as heavy range usage,

scheduled airline arrivals and departures, heavy usage times for the Destin airport, large-scale exercises, and the forecasted weather (good or bad).

Improved command and control (C2) is another measure that could be implemented to reduce the effects of the F-35 on local flight activities. Eglin currently utilizes the Range Operations Command and Control (ROCC) facility, which is responsible for providing limited C2 for aircraft using the local ranges. This facility meets or exceeds all current requirements. An improved C2 facility could provide proactive guidance to aircraft operating in the local area, something the ROCC currently accomplishes on a limited basis.

Recommendations from a regional airspace study could be implemented to minimize congestion. A study could involve gathering requirements, analyzing possible reconfigurations, establishing enhanced management procedures and processes, and guiding implementation of these recommendations.

Enhanced airport traffic control procedures and additional staff may assist ATC in safely moving additional aircraft through the already-constrained airspace. Standard instrument procedures, standard arrivals, controlled departure times, and slot times are all procedures currently employed at congested airports and could be implemented at Eglin. Additional approach systems, precision and nonprecision, could provide additional flexibility.

Expanded operating hours is another management technique that could allow the F-35 program to achieve their objectives. The proposed flying hours for the 33 FW are 0700-2300 (7:00 AM to 11:00 PM), Monday through Friday. Wing leadership may need to reevaluate the proposed hours if they are not able to accomplish their mission. This may entail flying sorties during the weekends or early in the morning.

7.3 NOISE

This section discusses direct impacts of noise on annoyance, hearing loss, and nonauditory health impacts in humans and on damage to structures. Additional discussion of specific noise impacts on other affected resources can be found in Section 7.4 (Land Use), Section 7.5 (Socioeconomics and Environmental Justice), Section 7.12 (Biological Resources), and Section 7.13 (Cultural Resources). Appendix E, *Noise*, presents information on noise metrics and details the methods used to model aircraft and munitions noise levels.

The environmental impacts of training elements common to all alternatives are discussed for JSF Flight Training Alternative 1 and are not repeated in the discussion of other alternatives. Examples of JSF training elements that do not vary between the alternatives are JSF SUA use (including subsonic and supersonic flight) and munitions use.

7.3.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.3.1.1 Existing Conditions (Noise – JSF Flight Training Alternative 1)

The noise environments in the immediate vicinity of Eglin Main Base, Duke Field, and Choctaw Field (described in the following subsections) are dominated by aircraft noise. Since all JSF flight training alternatives utilize the same three airfields, the existing conditions at these three airfields are described in this section; descriptions are not repeated for each alternative.

Computerized noise modeling of existing conditions was conducted for this analysis to incorporate the newly available topography effects model. Use of the topography effects model increases accuracy of the results and maintains consistency with methodology used to model the Proposed Action. For this reason, existing conditions noise contours are not the same size and shape as previously published noise contours, despite using the same aircraft operations data inputs (U.S. Air Force, 2006d).

Eglin Main Base

Military aircraft based at Eglin Main Base include the F-15C, F-15E, UH-1, F-16, A-10, MC-130, and C-32. The Eglin Aeroclub operates several types of small aircraft, providing pilot training and aircraft rental for general aviation. The Okaloosa Regional Airport is located on Eglin AFB and currently hosts four commercial air carriers that utilize several common commercial aircraft types. Military aircraft based at other installations use the airfield at Eglin Main Base in conjunction with testing and training operations at the nearby Eglin Range. Transient aircraft that use Eglin Main Base include the majority of aircraft types in the military inventory and differ in type from month to month and year to year. Aircraft operational data used to produce baseline Eglin Main noise contours are the same as that used to produce noise contours shown in the 2006 Eglin AFB *Air Installation Compatible Use Zone (AICUZ) Study* (U.S. Air Force, 2006d).

Duke Field

Duke Field is home to the 919th Special Operations Wing (919 SOW), which operates C-130 aircraft. In addition, Duke Field is regularly used by Air Force Special Operations Command (AFSOC) and other transient aircraft in conjunction with tests and training in nearby ranges. Transient aircraft using Eglin AFB, including Duke Field, consist of most of the aircraft types in Department of Defense (DoD) inventory, and types differ from month to month and year to year. Baseline noise contours for Duke Field are based on operational data gathered in 2005 by the Air Force Center for Environmental Excellence (Lester, 2006).

Choctaw Field

Choctaw Field currently supports touch-and-go and primary flight training in the T-34 and T-6 aircraft. Choctaw Field is frequently visited by transient aircraft, which vary

widely in type from month to month and year to year and include most aircraft types in the DoD inventory. These transient aircraft are typically conducting tests and training at nearby ranges. In addition, the F/A-18C/D Navy Blue Angels regularly practice at Choctaw Field in the summer. Noise contours for Choctaw Field resulting from current aircraft operations are based on the same aircraft operational data used to produce noise contours shown in the Choctaw Joint Land Use Study (Santa Rosa County, 2003).

Overview

Time-averaged aircraft noise levels at the three installations are represented using the day-night average sound level (DNL) noise metric in Figure 7-1. The DNL metric is described in Chapter 3 (Section 3.2, Noise).

Table 7-3 lists on-base and off-base acreage and estimated off-base population affected by each noise contour. Population numbers were estimated using 2000 U.S. Census Bureau data. The numbers of acres and population affected by each noise contour at Eglin Main and Duke Field are calculated together because, under certain action scenarios, noise contours for the two installations are conjoined. The two installations are discussed as one unit throughout this section. Schools impacted by high noise levels are discussed in Section 7.5 (Socioeconomics and Environmental Justice).

Table 7-3. Acreage and Population Affected by Elevated Noise Levels Under Baseline Conditions in the Vicinity of Airfields

Noise Level (dB DNL)	Acres On-Installation	Acres Off-Installation	Off-Installation Population
Eglin Main / Duke Field			
65-70	3,249	476	1,204
70-75	2,292	219	767
75-80	1,444	57	142
80-85	794	0	0
>85	1,017	0	0
Total	8,798	752	2,113
Choctaw Field			
65-70	511	84	0
70-75	103	0	0
75-80	0	0	0
80-85	0	0	0
>85	0	0	0
Total	614	84	0
Total (all three installations)			
65-70	3,763	560	1,204
70-75	2,395	219	767
75-80	1,444	57	142
80-85	794	0	0
>85	1,017	0	0
Total	9,412	836	2,113

dB = decibels; DNL = day-night average sound level
Population estimates were based on 2000 U.S. Census Bureau data. The number of persons currently residing in affected areas may differ from what has been stated.

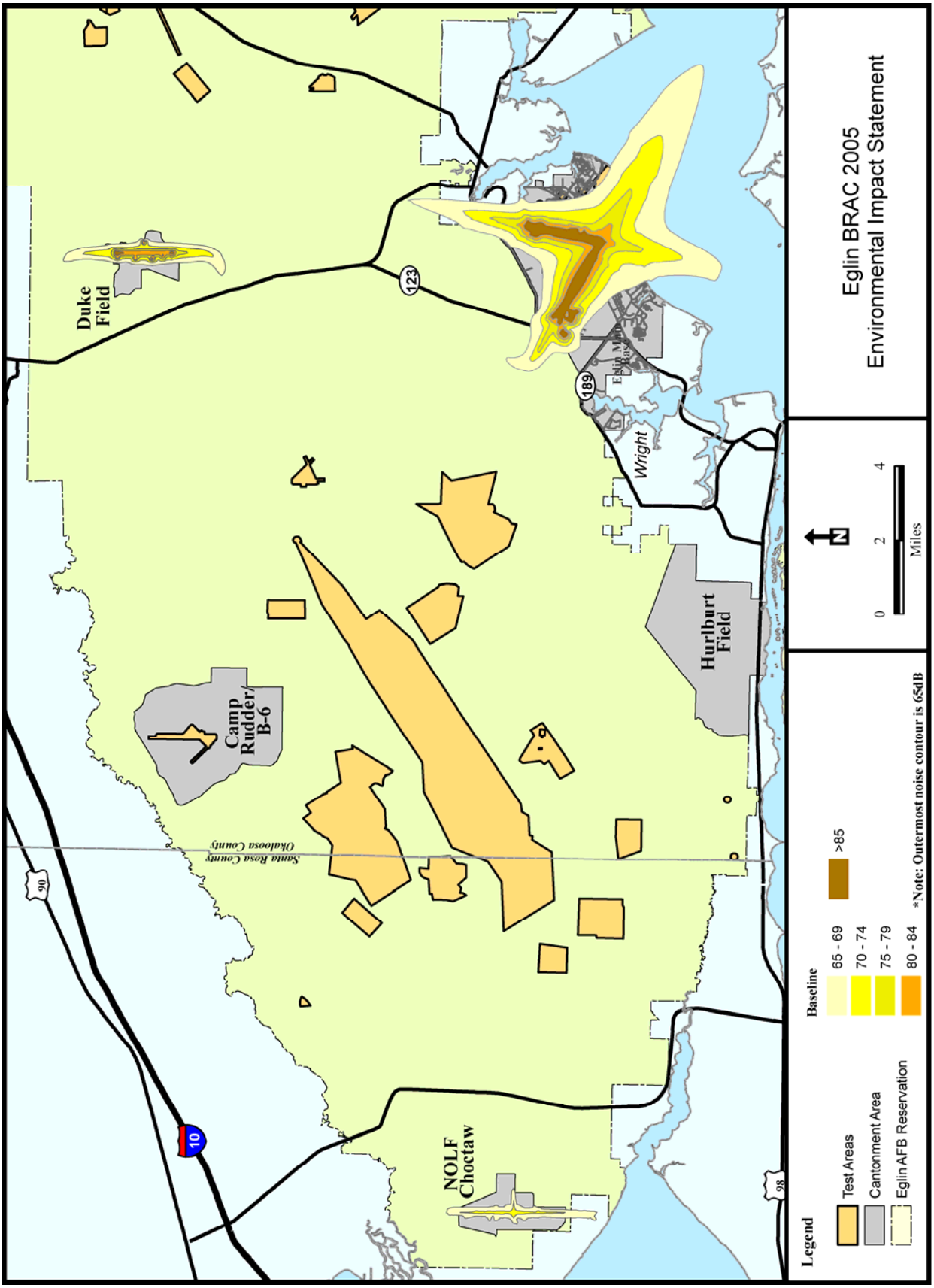

Figure 7-1. Baseline Noise Contours Near Eglin Main Base, Duke Field, and Choctaw Field

Special Use Airspace Units

The location of affected military operating areas (MOAs), military training routes (MTRs), restricted areas (denoted R-X), and warning areas (denoted W-X) are shown in Figure 7-2. Warning Area 151 (W-151) is not shown in this map because there are no noise sensitive receptors that underlie it. SUA units are currently used by a wide variety of military aircraft. While civilian aircraft do fly through warning areas, MOAs, and MTRs, their passage is not recorded by the DoD and the noise generated is generally low in comparison to the noise generated by military aircraft. Training in restricted areas occurs fairly frequently (26 percent of total) during "environmental night" (10:00 PM to 7:00 AM). The MOAs and warning areas are used less frequently during nighttime at 8 percent and 6 percent, respectively. MTRs are currently not used during the nighttime period. Current onset-rate adjusted monthly day-night average sound level (DNL_{mr}) noise levels were calculated based on representative estimates of military aircraft types, configuration, and frequency of operations (Table 7-4).

Ambient noise levels beneath the airspace have not been measured. However, areas under the MOAs and MTRs are generally rural with scattered population centers (Figure 7-2). Table 7-4 lists estimated population density beneath affected SUA units. SUA units that overlie water are assumed to be dominated by natural sounds, such as waves, birds, and wind. Users of this area include fishermen and pleasure boaters. Noise in over-water areas is also applicable to determination of biological impacts. Ambient noise levels beneath affected SUA units are assumed to be similar to settings in other locations. The U.S. Environmental Protection Agency (USEPA) has stated 44 decibels (dB) and 51 dB as typical DNL noise levels at a farm area and a low-density residential area, respectively (USEPA, 1974). Ambient noise levels beneath over-land SUA are assumed to be 45 dB DNL. Noise levels underneath the warning areas, which lie over the Gulf of Mexico, are assumed to be similar to other open areas dominated by natural sounds. The Grand Canyon, with estimated noise levels of 35 dB DNL (Miller, 2002) was chosen as a conservative (likely lower than actual) estimate of noise levels in W-151. In instances where aircraft noise is less than the ambient noise level, ambient noise would be dominant and that ambient level is listed in the table instead of the aircraft noise level. It should be recognized that, even when average noise level is below ambient, aircraft noise may still be audible and some percentage of people may become highly annoyed. The percentage of the population with potential to be highly annoyed was calculated using the accepted dose-response relationship between DNL and annoyance, as described in Finegold et al., 1994. The calculation of percent highly annoyed is less accurate when dealing with very low population densities and very low noise levels as the statistical relationship is still valid but with more scatter in the data.

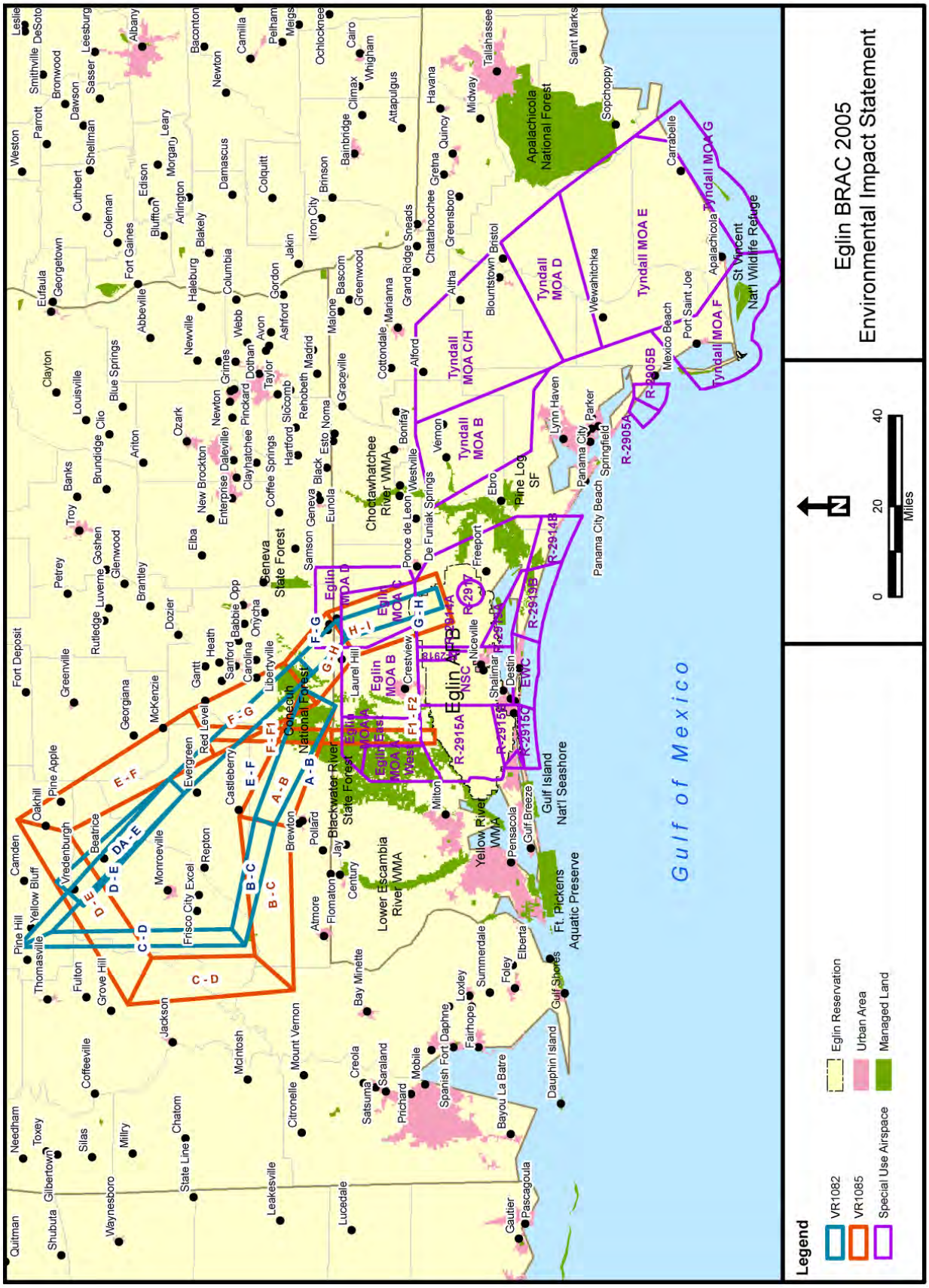

Figure 7-2. Location of Affected Military Airspace Units

Table 7-4. Time-Averaged Noise Level and Percentage of Population Highly Annoyed Beneath SUA Under Baseline Conditions

MOA/Restricted Airspace	Noise Level (DNL_{mr})	% Highly Annoyed[a]	Off-Installation Size (acres)	Estimated Population Overflown[b]
R-2914A	54	3	149,383	8,482
R-2914B	<45	< 1	29,393	4,015
R-2915A	65	12	40,033	3,335
R-2915B	55	3	8,275	32,589
R-2915C	<45	< 1	3	0
R-2919A	<45	< 1	7,898	7,028
R-2919B	<45	< 1	24,269	5,302
Eglin MOA – A	<45	< 1	159,144	3,657
Eglin MOA – C	<45	< 1	116,319	5,119
Tyndall MOA C/D/E/F	<45	< 1	1,547,755	46,295
W-151A	<35	n/a	1,847,040	0
W-151B	<35	n/a	1,770,240	0
W-151C	<35	n/a	1,460,480	0
W-151D	<35	n/a	1,785,600	0
W-151E	<35	n/a	450,560	0
W-151F	<35	n/a	686,720	0
VR-1082, segment A-B	<45	< 1	121,600	1,710
VR-1082, segment B-C	<45	< 1	110,720	2,249
VR-1082, segment C-D	<45	< 1	98,560	1,540
VR-1082, segment D-E	<45	< 1	115,200	3,060
VR-1082, segment E-F	<45	< 1	115,200	1,800
VR-1082, segment F-G	<45	< 1	32,640	1,377
VR-1082, segment G-H	<45	< 1	47,360	2,368
VR-1085, segment A-B	<45	< 1	185,600	4,930
VR-1085, segment A-B	<45	< 1	206,720	6,460
VR-1085, segment A-B	<45	< 1	172,160	2,690
VR-1085, segment D-E	<45	< 1	232,960	2,912
VR-1085, segment E-F	<45	< 1	256,640	3,609
VR-1085, segment F-G	<45	< 1	177,280	3,047
VR-1085, segment G-H	<45	< 1	101,760	4,293
VR-1085, segment H-I	<45	< 1	130,560	6,732

DNL_{mr} = onset-rate adjusted monthly day-night average sound level; MOA = military operating area
a. The percentage of the population expected to be highly annoyed was calculated based on the Schultz curve, as modified by Finegold (Finegold et al., 1994).
b. The number of residents overflown was estimated using 2000 U.S. Census Bureau data.

Supersonic flight training using F-15 and F-16 aircraft in W-151 currently occurs between altitudes of 5,000 feet above ground level (AGL) and 50,000 AGL. An estimated 1 percent of the 933 hours per year spent by all aircraft types training in W-151 occurs during nighttime (10:00 PM – 7:00 AM). Table 7-5 lists the frequency of sonic booms and time-averaged noise level resulting from supersonic aircraft operations under baseline conditions in each of the subunits of W-151. Many sonic booms generated during higher-altitude supersonic training, as occurs in W-151, never reach the ground. This effect, known as "Mach cutoff," is a result of atmospheric temperature gradients and is explained further in Appendix E, *Noise*.

Sonic boom impacts on shore areas are further minimized through operational restrictions. Namely, aircraft are not allowed to fly at supersonic speed within 25 miles of the shore and pilots are instructed to avoid flying at supersonic speeds towards the shoreline (which minimizes "projecting" booms toward the shore).

Table 7-5. Sonic Booms Under Baseline Conditions

Airspace Component	Baseline		
	CDNL (dB)	Booms per Day	Booms per Month*
W-151A	45	0.15	3
W-151B	44	0.15	3
W-151C	45	0.15	3
W-151D	44	0.15	3
W-151E	43	0.1	2
W-151F	43	0.1	2

CDNL = C-weighted decibel day-night average sound level; dB = decibels
* Assumed 20 flying days per month

Table 7-6 lists representative sonic boom peak overpressures for various aircraft that may currently operate in W-151. Actual sonic boom peak overpressures vary based on event-specific factors related to aircraft maneuvering and atmospheric conditions.

Table 7-6. Sonic Boom Peak Overpressures for Various Aircraft at Mach 1.2, Level Flight

Aircraft	Altitude (feet AGL)				
	5,000	10,000	20,000	30,000	40,000
F-15C	9.4 psf	5.4 psf	2.9 psf	1.9 psf	1.5 psf
F-16C	7.6 psf	4.4 psf	2.3 psf	1.5 psf	1.2 psf
F/A-18	8.8 psf	5.0 psf	2.7 psf	1.7 psf	1.3 psf
F/A-22	9.9 psf	5.7 psf	3.0 psf	2.0 psf	1.5 psf

AGL = above ground level; psf = pounds per square foot

Eglin Range

Detonation of high-explosives (HE) munitions is currently a major noise source on the Eglin Range. Munitions used include several types of bombs, missiles, and explosives charges. Figure 7-3 depicts time-averaged HE munitions noise levels (CDNL) on the range at or near target areas proposed for use by the F-35. Peak noise levels resulting from individual detonation events do not normally exceed 130 dB at off-range locations. The peak noise level of 130 dB is the threshold above which risk of complaints is considered "high" (U.S. Army Center for Health Promotion and Preventive Medicine [USACHPPM], 2005). However, peak noise levels between 115 dB and 130 dB, which are associated with low to moderate risk of complaints, may be regularly experienced off-range as a result of munitions training.

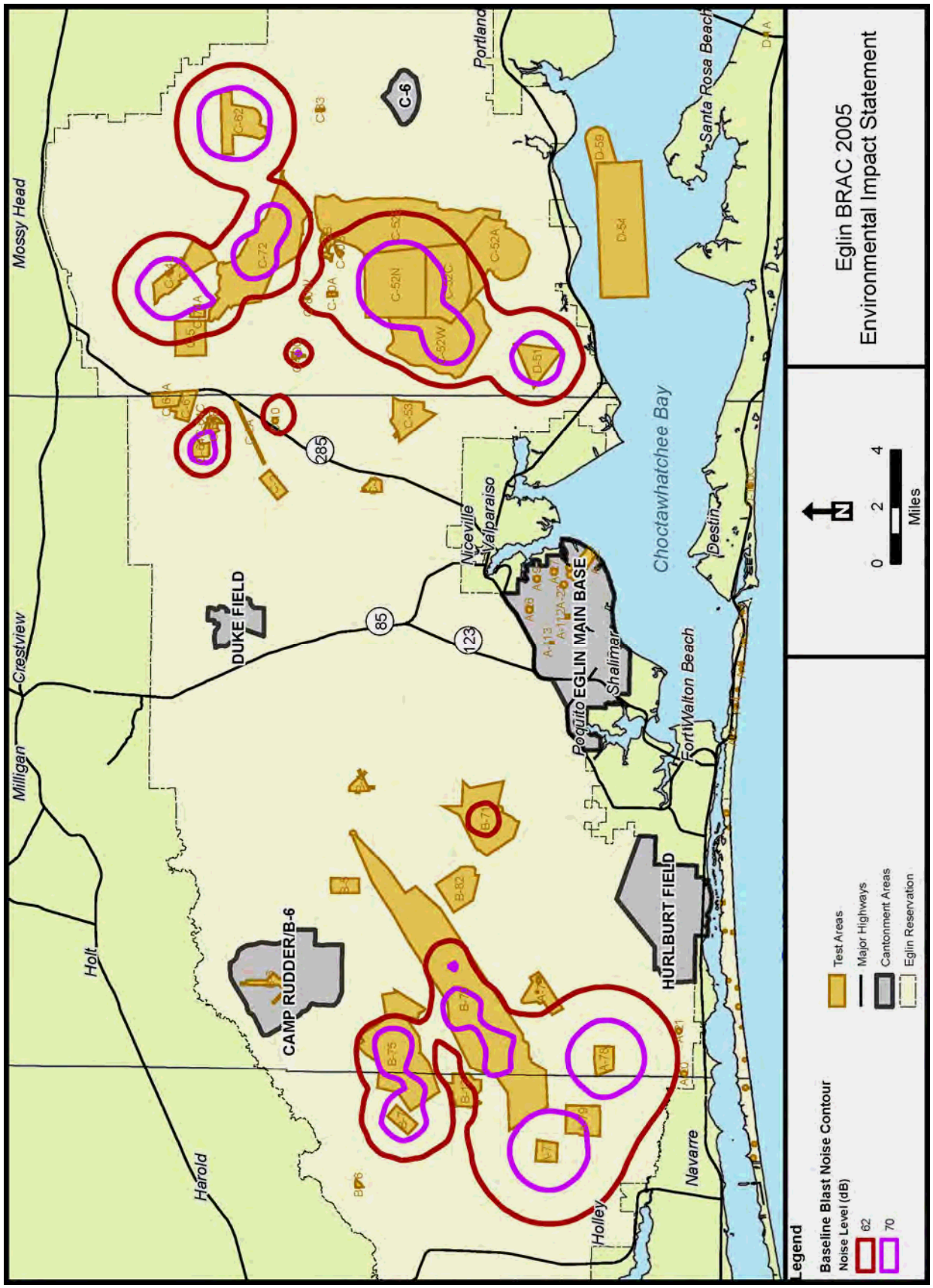

Figure 7-3. High-Explosives Munitions Noise (CDNL) Under Baseline Conditions

7.3.1.2 Environmental Consequences (Noise – JSF Flight Training Alternative 1)

Eglin Main/Duke Field

Noise conditions at Eglin Main Base and Duke Field are discussed together because noise contours would extend continuously between the two airfields under two of the three alternatives. Thus, the conditions at both locations are analyzed as a single noise environment.

Under this alternative, 51 percent of the total proposed JSF airfield operations would take place at Eglin Main Base and 35 percent would take place at Duke Field. The remaining 14 percent of airfield operations would take place at Choctaw Field. Additional descriptions of JSF airfield operations under JSF Flight Training Alternative 1 can be found in Chapter 2 (Section 2.6.5, Alternatives for JSF Flight Training). The percentage of airfield operations accomplished between 10:00 PM and 7:00 AM is shown in Table 7-7.

Table 7-7. Percentage of Airfield Operations Occurring Between 10:00 PM and 7:00 AM Under JSF Flight Training Alternative 1

Operation	Eglin Main	Duke Field	Choctaw Field
Departures	0	6	6
Arrivals	5	3	2
Closed Patterns	0	6	4

Table 7-8 lists noise levels for various aircraft at an altitude of 1,000 feet while the aircraft are in several different flight configurations that would be commonly used in the airfield vicinity. In a common takeoff configuration, the JSF would be 9 dB louder than the F-15. This difference would be perceived as being almost twice as loud (10 dB difference is perceived as being twice as loud). In cruise configuration, the JSF would be 18 dB louder than the F-15. In common airfield approach configuration, the JSF would be 10 dB louder than the F-15. These differences in sound exposure level (SEL) correspond to the JSF being perceived as two to three times louder than the F-15.

Table 7-8. Sound Exposure Level (SEL) in dB for F-35 and Other Fighter Aircraft at 1,000 feet AGL

Condition	F-35A			F-15C			F/A-18 A/B/C/D			F/A-18E/F		
	Power	Speed	SEL	Power	Speed	SEL	Power	Speed	SEL	Power	Speed	SEL
Takeoff/ Mil	100 % ETR	300	121	90% NC	300	112	96.5% NC	250	117	96% N2	250	117
Cruise	55 % ETR	350	107	90% NC	350	89	85% NC	300	96	84% N2	300	95
Approach	50 % ETR	170	108	80% NC	160	98	88% NC	140	109	85% N2	130	113

Note: ETR = engine thrust request

"Speed" is knots indicated airspeed

Noise contours under JSF Flight Training Alternative 1 are depicted in Figure 7-4. On-base acreage, off-base acreage, and estimated off-base population impacted by various noise levels under this alternative are listed in Table 7-9. Impacted off-base population was estimated using data from the most recent U.S. Census. The Schultz curve defines a generally accepted dose-response relationship between transportation noise and community annoyance. This relationship, as updated by Finegold in 1994 (Finegold et al., 1994), was used to estimate noise annoyance levels in the communities surrounding installations proposed to support JSF training. Of the estimated 2,174 persons living off-base near Eglin Main and Duke Field that would be exposed to noise at greater than 75 dB DNL, approximately 37 percent to more than 70 percent (depending on their exact exposure level) would potentially be highly annoyed by noise. A larger percentage of the population can be expected to be annoyed to a degree less than "highly" annoyed. In addition to the residences affected, two hospitals would be impacted by noise at between 65 and 70 dB DNL.

Table 7-9. Acreage and Population Affected Under JSF Flight Training Alternative 1 in the Vicinity of Airfields

Noise Level (DNL)	Acres On-Installation	Acres Off-Installation	Off-Installation Population	Change in On-Installation Acres	Change in Off-Installation Acres	Change in Off-Installation Population
Eglin Main/Duke Field						
65-70	13,597	2,049	3,125	10,348	1,573	1,921
70-75	8,368	551	1,458	6,076	332	691
75-80	8,740	347	806	7,296	290	664
80-85	4,996	240	644	4,202	240	644
>85	7,511	215	724	6,494	215	724
Total	43,212	3,402	6,757	34,416	2,650	4,644
Choctaw Field						
65-70	3,266	2,392	114	2,755	2,308	114
70-75	2,659	1,085	0	2,556	1,085	0
75-80	2,364	1,031	0	2,364	1,031	0
80-85	1,212	239	0	1,212	239	0
>85	1,321	9	0	1,321	9	0
Total	10,822	4,756	114	10,208	4,672	114
Total (all three installations)						
65-70	16,863	4,441	3,239	13,103	3,881	2,035
70-75	11,027	1,636	1,458	8,632	1,417	691
75-80	11,104	1,378	806	9,660	1,321	664
80-85	6,208	479	644	5,414	479	644
>85	8,832	224	724	7,815	224	724
Total	54,034	8,158	6,871	44,624	7,322	4,758

dB = decibels; DNL = day-night average sound level
Population estimates were made based on 2000 U.S. Census Bureau data. The number of persons currently residing in affected areas may differ from what has been stated.

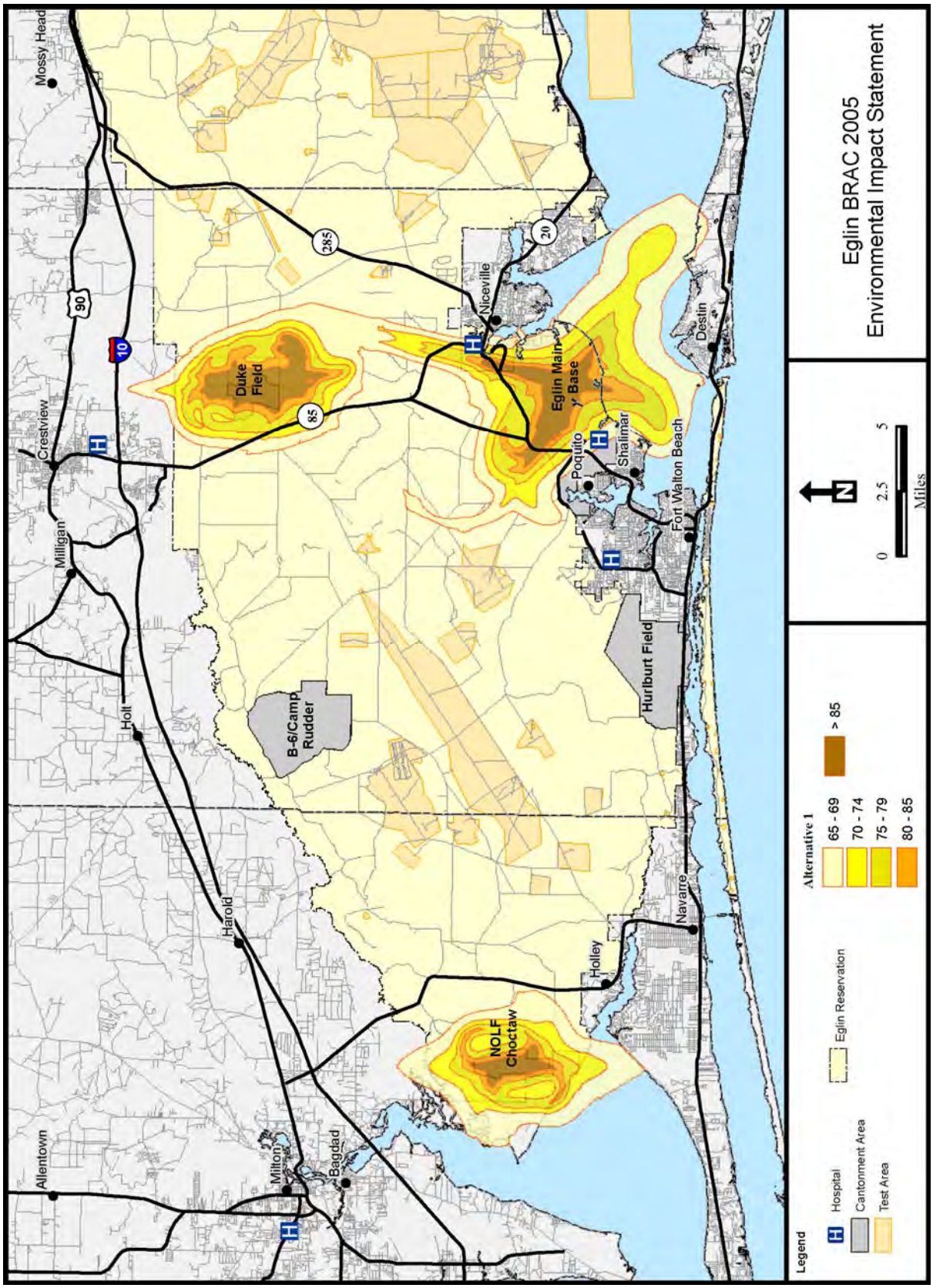

Figure 7-4. Noise Contours Under JSF Flight Training Alternative 1 in the Vicinity of Eglin Main Base, Duke Field, and Choctaw Field

The National Academy of Sciences 1977 report, *Guidelines for Preparing Environmental Impact Statements on Noise* (CHABA, 1977) states that community response to noise in these areas can be expected to be "very severe." Approximately 12 percent to 37 percent of the 4,583 individuals exposed to noise between 65 and 75 dB DNL would be expected to be highly annoyed by noise. Community reaction in these areas is expected to range between "significant" and "severe."

Individuals spending much of their time indoors are exposed to much less noise than individuals that spend large amounts of time outdoors. The USEPA's report, *Information on Levels of Environmental Noise Requisite to Protect Public Health With an Adequate Margin of Safety*, states that an average house in a region with a warm climate can be expected to provide 24 dB of exterior-to-interior noise level reduction (NLR) when the windows are closed and 12 dB NLR when the windows are open (USEPA, 1974). In general, houses are insulated better today than they were in 1974 when the USEPA report was published. Therefore, an NLR of 24 dB with the windows closed is considered to be a conservative estimate of actual average noise level reduction.

There is very little potential for hearing loss at noise levels below 75 dB DNL (CHABA, 1977). The DoD, U.S. Air Force, and the National Institute of Occupational Safety and Health (NIOSH) all have established occupational noise exposure damage risk criteria (or "standard") for hearing loss so as to not exceed 85 dB as an 8-hour time weighted average, with a 3 dB exchange rate in a work environment. (The exchange rate is an increment of decibels that requires the halving of exposure time, or a decrement of decibels that requires the doubling of exposure time. For example, a 3 dB exchange rate requires that noise exposure time be halved for each 3 dB increase in noise level. Therefore, an individual would achieve the limit for risk criteria at 88 dB, for a time period of 4 hours, and at 91 dB, for a time period of 2 hours.) The standard assumes "quiet" (where an individual remains in an environment with noise levels less than 72 dB) for the balance of the 24-hour period. Also, Air Force and Occupational Safety and Health Administration (OSHA) occupational standards prohibit any unprotected worker exposure to continuous (i.e., of a duration greater than one second) noise exceeding a 115 dB sound level. OSHA established this additional standard to reduce the risk of workers developing noise-induced hearing loss.

The F-35 engine may also generate significant low-frequency engine noise, which may adversely affect ground crews working in the immediate vicinity of the aircraft. The aircraft has just started production, and developmental and operational testing of the full capabilities of the aircraft has not been fully performed. As discussed in Chapter 2, for example, given the confluence of the mandatory BRAC deadline and the immaturity of the JSF aircraft and its performance data, the Air Force recognizes that there is incomplete and unavailable information but will continue to work with the JSF

Program Office (JPO) to obtain requisite information (i.e., engine noise data) and adjust training operations as the JSF training program at Eglin matures. As the program matures and more specific aircraft capabilities have been determined, the Air Force anticipates further analysis of (for example) the effect on ground crews, support, and administrative personnel working in the vicinity of the aircraft and on flight lines (40 CFR 1502.22 (b) (1)).

Nonauditory effects such as high blood pressure, coronary disease, ulcers, colitis, and migraine headaches have been linked to noise and are possible in areas exposed to elevated noise levels. Noise is generally viewed as being one of a number of general biological stressors and it is often difficult to determine whether noise has contributed to development of any particular health condition. Kryter (1980) states, "It is more likely that noise-related general ill-health effects are due to the psychological annoyance from the noise interfering with normal everyday behavior than it is from the noise eliciting, because of its intensity, reflexive response in the automatic or other physiological systems in the body." Currently available studies on the nonauditory impacts of noise are contradictory, and no accepted noise level threshold exists below which nonauditory effects can be entirely discounted.

Noticeable structural vibration may result from low-altitude JSF overflights. Physical effects of vibration are often experienced at peak noise levels of greater than 130 dB. Vibration may add to the annoyance generated by noise-related activity interruption.

Choctaw Field

Under this alternative, 14 percent of all proposed JSF airfield operations would take place at Choctaw Field. An estimated 114 persons living off-base would be affected at noise levels greater than 65 dB DNL, and no persons would be exposed to noise levels of greater than 75 dB DNL. There are no hospitals located within the Choctaw Field noise contours.

Special Use Airspace Units

Table 7-10 lists the SEL generated at varying altitudes over a receptor by the JSF and several other aircraft types common to the airspace near Eglin AFB. All noise levels provided are for aircraft at high power settings and high airspeeds, as would be used in military special use airspace. In this "airspace" flight configuration, at an overhead altitude of 500 feet AGL, the JSF is 17 dB louder than the F-15, which it would effectively replace at Eglin AFB. The JSF would typically be perceived as being much louder than the F-15.

Table 7-10. A-Weighted Sound Exposure Levels (SEL) for the JSF and Other Aircraft

Aircraft Type	Airspeed	Power Setting[2]	Altitude in Feet Above Ground Level[1]						
			300	500	1,000	2,000	5,000	10,000	20,000
F-15C	520	81% NC	116	112	107	101	90	80	65
F-35	500	Est% ETR*	133	129	121	112	99	87	74
F-16A	500	84% NC	106	102	97	90	80	69	56
F-18C/D	500	92% N2	118	114	108	101	89	77	62

ETR = engine thrust request, F-16 engine is PW-229; RPM = revolutions per minute, %NC = percent core RPM; %N2 = percent RPM at engine location #2

* estimated data ("Est") based on differential of F-16 on takeoff versus airspace conditions and ratioed to F-35 measured takeoff values

1. Level flight, steady high-speed conditions. Used standard acoustical conditions (70°F and 59 percent relative humidity).
2. Power setting metrics vary from engine to engine.

Aircraft Sound Exposure Level analysis has limited use because there are no accepted methodologies by which impacts to the environment are defined, however Table 7-11 is shown to provide a relative value of how quickly the sound of an aircraft on an MTR diminishes as the distance from a receiver increases. Should, for example, a receiver be directly underneath an F-35 that is flying on an MTR at 500 feet AGL, the receiver would be expected to experience an SEL of approximately 129 dB. However, should that same receiver be 1,000 feet to the side of the F-35, the SEL would be greatly reduced to a value under 109 dB. Should the receiver then be 2 nautical miles or farther from the side of the F-35, the noise is drastically reduced to less than 70 dB. The F-35 would be expected to use the majority of the MTR airspace (up to 10 nautical miles wide); the noise levels experienced by a person on the ground will vary on a day-to-day basis depending on where and if the aircraft fly.

Table 7-11. Sound Exposure Levels (SEL) Versus Distance Various Aircraft on MTRs

Aircraft Type	Airspeed	Power Setting[2]	SEL at 500 feet AGL for Various Sideline Distance in Feet[1]						
			1,000	3,000	6,000	9,000	12,000	15,000	24,000
F-15C	520	81% NC	105	94	84	76	68	61	<45
F-35	500	Est% ETR*	109	95	83	76	70	65	59
F-16A	500	84% NC	95	84	73	65	57	51	<45
F-18C/D	500	92% N2	106	94	82	73	65	58	<45

ETR = engine thrust request, F-16 engine is PW-229; RPM = revolutions per minute, %NC = percent core RPM; %N2 = percent RPM at engine location #2

1. Level flight, steady high-speed conditions. Used standard acoustical conditions (70°F and 59 percent relative humidity).
2. Power setting metrics vary from engine to engine.

Average noise levels beneath several SUA units (Figure 7-2) would increase substantially under the action alternatives (Table 7-12). Most notably, noise levels beneath R-2914A, Eglin MOA C, W-151 A/B/C/D/E/F, Tyndall MOA C/D/E/F, and all segments of VR-1082 and VR-1085 would be perceived as being twice as loud (an increase of greater than 10 decibels). Beneath certain other airspace units, noise levels

would remain the same or even decrease slightly. In many cases, aircraft noise is well below ambient levels under baseline conditions, and increases to near or above ambient noise levels under proposed conditions. In airspace units where noise levels remain similar or decrease, the JSF is expected to train at altitudes much higher than those used by the 33 FW F-15s.

The percentage of the affected population potentially highly annoyed (%HA) was calculated for overland SUAs/MTRs using the Schultz curve, as modified by Finegold et al. (1994). The established relationship between DNL and %HA is based on the effects of noise on communities, and it would not be expected to be applicable in over-water SUAs, where the affected population is transient (e.g., fishermen and pleasure boaters).

Increases in DNL noise level beneath SUA are the result of several factors. Of primary importance is the fact that the F-35 is a louder aircraft than the F-15 aircraft, which it will effectively replace at Eglin AFB (Table 7-10). Also, under the Proposed Action, the number of annual sortie operations occurring in the affected SUA units and MTRs would increase substantially by between 10 percent and 1,242 percent, respectively (see Chapter 2, Section 2.6.4, Alternatives Carried Forward for the JSF Flight Training, for more details). Approximately 3 percent of F-35 sortie-operations in MOAs, restricted airspace, and warning areas would occur during "environmental night" (10:00 PM to 7:00 AM). The F-35 would not perform sorties on MTRs during environmental night. The percentage of airspace operations occurring in restricted areas during environmental night would decrease from 26 percent to 18 percent. Meanwhile, the percentage of sortie operations occurring in warning areas and MOAs would each decrease to 5 percent from 6 percent and 8 percent, respectively. Flights on MTRs would not occur during environmental night under baseline or proposed conditions.

Flight paths within military airspace are semi-random. A point on the ground beneath the military airspace may or may not be overflown during any given sortie operation. However, it is assumed that, over time, all points on the ground will be overflown and noise effects were modeled accordingly. On MTRs aircraft are modeled as being more likely to fly near the route centerline, with the likelihood of overflight tapering off towards the edges of the route. To estimate noise impacts conservatively, the route centerline noise level is reported for the entire route corridor. Where MTRs or SUA overlap one another, overflights would be more frequent and noise levels would be higher. Where these overlaps would yield a range of noise levels beneath an airspace unit, Table 7-12 provides the range of noise levels. In the table, the lower number of the range is the noise level within the individual airspace and the higher number is the highest average noise level reached as a result of overlapping airspace units.

Table 7-12. Average Noise Level Beneath SUA Under Baseline and Proposed Conditions (All Action Alternatives)

Special Use Airspace	Baseline		Proposed (All Action Alternatives)		Change		SUA Characteristics	
	Noise Level (DNL_{mr})	% Population Highly Annoyed[a]	Noise Level (DNL_{mr})	% Population Highly Annoyed[a]	Noise Level (DNL_{mr})	% Population Highly Annoyed[a]	Lowest Expected JSF Altitude (feet AGL)	Estimated Population Overflown
R-2914A	54	3	71	25	17	22	500	8,482
R-2914B	<45	<1	<45	<1	0	0	10,000	4,015
R-2915A	65	12	74	33	9	21	500	3,335
R-2915B	55	3	54	3	-1	-1	5,000	32,589
R-2915C	<45	<1	<45	<1	0	0	10,000	0
R-2919A	<45	<1	45	<1	0	0	5,000	7,028
R-2919B	<45	<1	<45	<1	0	0	10,000	5,302
Eglin MOA - A	<45	<1	49	1	4	1	10,000	3,657
Eglin MOA - C	<45	<1	50-61[b]	2-7	5-16	1-6	10,000	5,119
Tyndall MOA C/D/E/F	<45	<1	64	11	19	10	300	46,295
W-151A	<35	n/a	48	n/a	13	n/a	5,000	0
W-151B	<35	n/a	48	n/a	13	n/a	5,000	0
W-151C	<35	n/a	48	n/a	13	n/a	5,000	0
W-151D	<35	n/a	41	n/a	6	n/a	5,000	0
W-151E	<35	n/a	42	n/a	7	n/a	5,000	0
W-151F	<35	n/a	42	n/a	7	n/a	5,000	0
VR-1082, segment A-B	<45	<1	73-76	30-40	28-31	29-39	500	1,710
VR-1082, segment B-C	<45	<1	73-76	30-40	28-31	29-39	500	2,249
VR-1082, segment C-D	<45	<1	73-75	30-37	28-30	29-36	500	1,540
VR-1082, segment D-E	<45	<1	73-75	30-37	28-30	29-36	500	3,060
VR-1082, segment E-F	<45	<1	73-75	30-37	28-30	29-36	500	1,800
VR-1082, segment F-G	<45	<1	59-61	6-7	14-16	5-6	1,500	1,377

Table 7-12. Average Noise Level Beneath SUA Under Baseline and Proposed Conditions (All Action Alternatives), Cont'd

Special Use Airspace	Baseline		Proposed (All Action Alternatives)		Change		SUA Characteristics	
	Noise Level (DNL_{mr})	% Population Highly Annoyed[a]	Noise Level (DNL_{mr})	% Population Highly Annoyed[a]	Noise Level (DNL_{mr})	% Population Highly Annoyed[a]	Lowest Expected JSF Altitude (feet AGL)	Estimated Population Overflown
VR-1082, segment G-H	<45	<1	59-71	6-25	14-26	5-24	1,500	2,368
VR-1085, segment A-B	<45	<1	73-76	30-40	28-31	29-39	500	4,930
VR-1085, segment B-C	<45	<1	71-75	25-37	26-30	24-36	500	6,460
VR-1085, segment C-D	<45	<1	71	25	26	24	500	2,690
VR-1085, segment D-E	<45	<1	71-75	25-37	26-30	24-36	500	2,912
VR-1085, segment E-F	<45	<1	71-75	25-37	26-30	24-36	500	3,609
VR-1085, segment F-G	<45	<1	71-75	25-37	26-30	24-36	500	3,047
VR-1085, segment G-H	<45	<1	57-61	4-7	12-16	3-6	1,500	4,293
VR-1085, segment H-I	<45	<1	57-71	4-25	12-26	3-24	1,500	6,732

AGL = Above Ground Level; DNL_{mr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level; n/a = not applicable; SUA = Special Use Airspace
Population estimates were made based on 2000 U.S. Census Bureau data. The number of persons currently residing in affected areas may differ from what has been stated.

a. Percentage of population highly annoyed was calculated using standard Air Force methodology, as described in Finegold et al. (1994).

b. Where MTRs or SUA overlap one another, overflights would be more frequent and noise levels would be higher, thus a range is provided. The lower number is the noise level within the individual airspace and the higher number is the highest average noise level reached as a result of overlapping airspace units.

The areas in which the affected MTRs and SUA are located are primarily rural/agricultural or open water. However, there are several towns that would be affected by increased noise as a result of the JSF flight training (see Chapter 1, Figure 1-4, Location of Eglin AFB Over-Land Airspace). Each of these towns is assumed to contain at least one noise-sensitive receptor. In addition, Conecuh National Forest, Blackwater River State Forest, Choctawhatchee River Water Management Area, Pine Log State Forest, St. Vincent National Forest, Yellow River Water Management Area, and Apalachicola National Forest would be exposed to high noise levels. These areas are used for several types of recreation, including hunting, fishing, and hiking, which could potentially be disrupted by aircraft overflights. In several areas underlying affected airspace, changes in noise level would be substantial and would potentially result in high levels of annoyance.

The F-35 training syllabus calls for a chase plane flown by an instructor pilot to follow student pilots during many of the training flights. As a result, the typical F-35 low-level overflight would consist of two F-35 aircraft in quick succession at low altitude, but typically no lower than 500 feet AGL for only a small fraction of the route length.

F-35 flight training would involve supersonic flight at altitudes of between 5,000 and 50,000 feet AGL in Warning Area 151 (W-151). Table 7-13 provides information on sonic boom noise resulting from this training.

Table 7-13. Sonic Booms Under Baseline and Proposed Conditions

Airspace Component	Baseline			Proposed		
	CDNL (dB)	Booms per Day	Booms per Month*	CDNL (dB)	Booms per Day	Booms per Month*
W-151A	45	0.15	3	46	0.25	5
W-151B	44	0.15	3	46	0.20	4
W-151C	45	0.15	3	46	0.25	5
W-151D	44	0.15	3	43	0.15	3
W-151E	43	0.10	2	43	0.10	2
W-151F	43	0.10	2	43	0.10	2

CDNL = C-weighted decibel day-night average sound level; dB = decibels
*Assumed 20 flying days per month

Aircraft currently using W-151 spend a greater percentage of time at supersonic speeds than the F-35 (8 percent versus 1.7 percent). However, the F-35 would carry out more sortie-operations in W-151 than had 33 FW F-15 aircraft, spending more time overall in the airspace units. Overall time spent in W-151 by all aircraft types would be expected to increase from 933 hours per year to 1,711 hours per year. As a result, despite the lower *percentage* of time spent at supersonic speeds, *total time* spent at supersonic speeds would increase slightly over current levels in most W-151 airspace

subunits. In addition, the F-35 aircraft would fly at supersonic speeds during "environmental night" more frequently (3 percent) than aircraft currently training in W-151 (1 percent). This increase in percentage of time spent flying in the late-night hours contributes to the slight increase in CDNL noise level that would occur under most of the W-151 subunits.

Peak sonic boom overpressures at sea level resulting from F-35 air combat training would be expected to be similar in magnitude to those experienced currently (Table 7-14). Actual sonic boom peak overpressures would vary based on specific factors related to aircraft maneuvering and atmospheric conditions.

Table 7-14. Sonic Boom Peak Overpressures for JSF and Other Aircraft at Mach 1.2, Level Flight

Aircraft	Altitude (feet AGL)				
	5,000	10,000	20,000	30,000	40,000
F-15C	9.4 psf	5.4 psf	2.9 psf	1.9 psf	1.5 psf
F-16C	7.6 psf	4.4 psf	2.3 psf	1.5 psf	1.2 psf
F/A-18	8.8 psf	5.0 psf	2.7 psf	1.7 psf	1.3 psf
F/A-22	9.9 psf	5.7 psf	3.0 psf	2.0 psf	1.5 psf
F-35	7.7 psf	4.5 psf	2.4 psf	1.6 psf	1.3 psf

AGL= above ground level; psf = pounds per square foot

Sonic booms under W-151 are relatively rare and would continue to be under the F-35 flight training alternatives. Changes in time-averaged sonic boom noise level (CDNL) under W-151 would be minimal (less than 2 dB) and would likely not be noticeable. Given that W-151 is located entirely over water, very few people (fishermen and recreational boaters) would be exposed to the sonic booms. Impacts associated with supersonic noise levels (average and peak) would be limited to potential for annoyance among people exposed.

Eglin Range

The proposed F-35 flight training includes delivery of munitions including the guided bomb unit (GBU)-12 (live), GBU-12 (inert), 25-mm, and munitions countermeasures unit (MJU)-8/27 flares to targets on the Eglin Range. Of the munitions types proposed to be used, only the live GBU-12 (635 annual) and 25-mm (208,518 annual) are expected to generate noise that would be audible off-range. Areas proposed for bombing practice with GBU-12 munitions (within training areas C-52E and B-82) are greater than 4 miles from the nearest range boundary. Training areas proposed for use in air-to-ground gunnery practice (25-mm cannon) are located greater than 1 mile (C-62) and greater than 2 miles (B-75) from the nearest range boundary.

The addition of proposed F-35 high-explosives munitions blast noise to current blast noise levels at and near ranges that would be used by the F-35 yielded no additional acreage off-range impacted at greater than 62 dB CDNL. The PK_{15}(met) associated with proposed HE munitions use would be as high as 120.5 dB at the closest off-range location to the bombing targets. This level would not exceed peak levels currently experienced off-range, which regularly exceed 130 dB. F-35 HE munitions training has the potential to cause some additional annoyance in off-range areas as the number of impulsive noise events expected to generate a "medium" risk of noise complaints would increase slightly.

The firing of 25-mm cannons was not modeled using a time-averaged noise level. Firing of the 25-mm cannon perpendicular to the listener at a distance of 1 mile would generate a PK_{15}(met) noise levels of 113.5 dB. This noise level is below the threshold level expected to generate a "low" risk of noise complaints.

7.3.2 JSF Flight Training Alternative 2

Under JSF Flight Training Alternative 2, 75 percent of total F-35 airfield operations would occur at Eglin Main Base. Fifteen percent of JSF operations would occur at Duke Field. The remaining 10 percent of airfield operations would take place at Choctaw Field. The percentage of airfield operations accomplished between 10:00 PM and 7:00 AM is shown in Table 7-15.

Table 7-15. Percentage of Airfield Operations Occurring Between 10:00 PM and 7:00 AM Under JSF Flight Training Alternative 2

Operation	Eglin Main	Duke Field	Choctaw Field
Departures	0%	6%	6%
Arrivals	6%	6%	6%
Closed Patterns	0%	6%	6%

F-35 munitions use and operations in SUA are identical to those described for Alternative 1. Noise impacts resulting from these actions are identical to those described for Alternative 1 and are not discussed again for Alternative 2.

7.3.2.1 Existing Conditions (Noise – JSF Flight Training Alternative 2)

The existing noise conditions at Eglin Main Base, Duke Field, and Choctaw Field are described under Section 7.3.1.1, JSF Flight Training Alternative 1.

7.3.2.2 Environmental Consequences (Noise – JSF Flight Training Alternative 2)

Noise contours under JSF Flight Training Alternative 2 are depicted in Figure 7-5. Off-base acreage underlying noise contours under JSF Flight Training Alternative 2 is shown in Table 7-16.

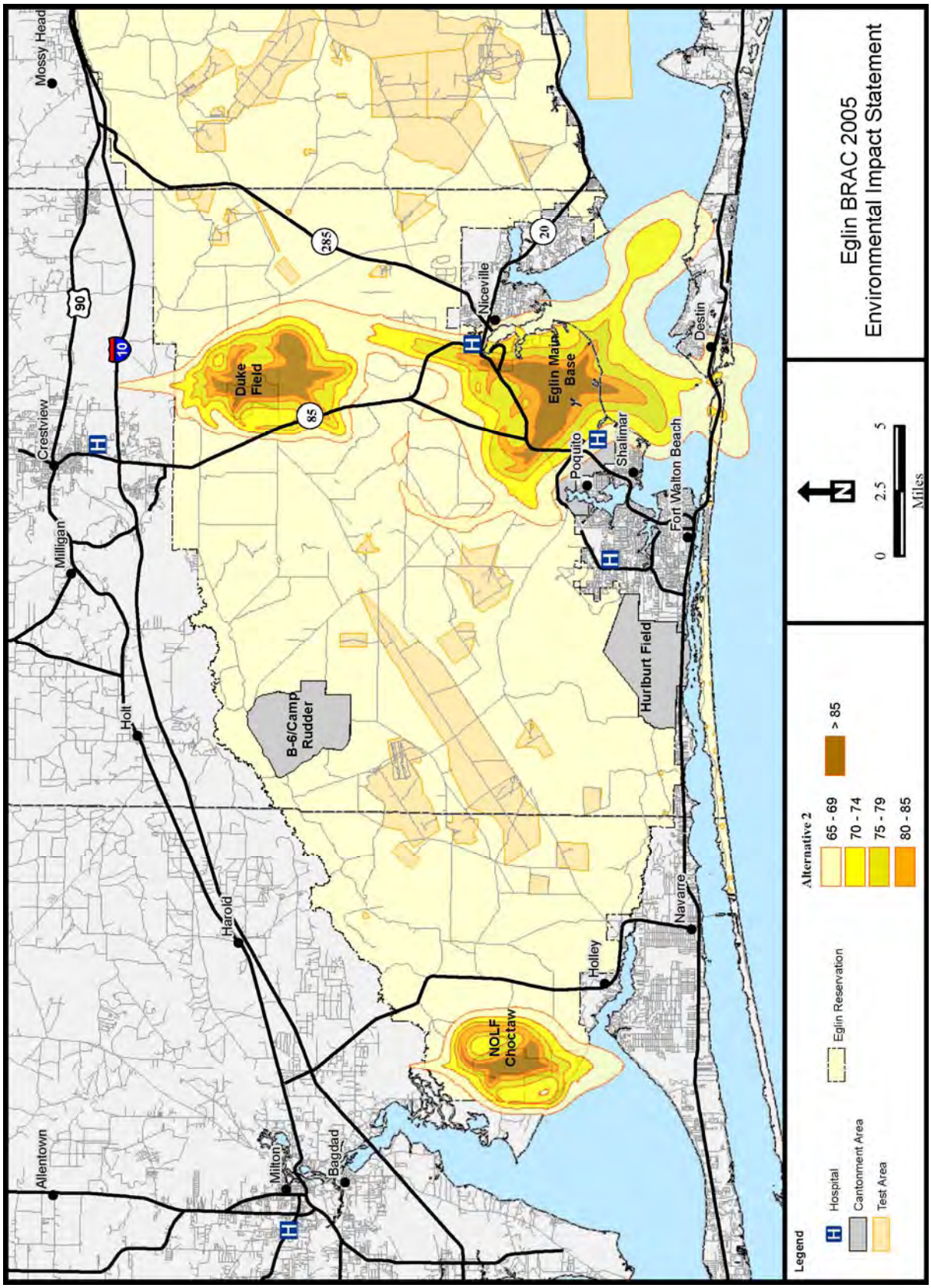

Figure 7-5. Noise Contours Under JSF Flight Training Alternative 2 in the Vicinity of Eglin Main Base, Duke Field, and Choctaw Field

Impacts associated with the implementation of JSF Flight Training Alternative 2 would be similar in type (e.g., annoyance, activity interference, possible health impacts) to impacts described for Alternative 1 but would differ in the number of people and acres impacted. Under JSF Flight Training Alternative 2, 2,721 persons living off-base near Eglin Main and Duke Field would be exposed to noise at greater than 75 dB DNL and an estimated 8,435 persons living off-base would be affected by noise between 65 and 75 dB DNL. Community reaction would range between "significant" and "very severe" (as classified in CHABA, 1977), depending on exact community location relative to the noise contours. Furthermore, under this alternative, one hospital would be affected by aircraft noise at 65–70 dB DNL and another would be affected by aircraft noise at 70–75 dB DNL.

Comparatively, in JSF Flight Training Alternative 1, 2,174 people would be exposed to noise at greater than 75 dB DNL or 547 fewer people than exposed in Alternative 2, for a 20 percent difference, and 4,583 people would be affected by noise between 65 and 75 dB DNL or 3,852 fewer people than affected in Alternative 2, for a 47 percent difference.

Table 7-16. Acreage and Population Affected by Elevated Noise Levels Under JSF Flight Training Alternative 2 in the Vicinity of Airfields

Noise Level (dB DNL)	Acres On-Installation	Acres Off-Installation	Off-Installation Population	Change in On-Installation Acres	Change in Off-Installation Acres	Change in Off-Installation Population
Eglin Main/ Duke Field						
65-70	15,315	3350	6,548	12,064	2,874	5,344
70-75	9,567	681	1,887	7,275	462	1,120
75-80	9,074	430	1,154	7,630	373	1,012
80-85	5,365	332	858	4,570	332	858
>85	7,024	215	709	6,008	215	709
Total	46,345	5,008	11,156	37,547	4,256	9,043
Choctaw Field						
65-70	2,262	535	6	1,751	451	6
70-75	2,094	1,241	0	1,991	1,241	0
75-80	1,822	542	0	1,822	542	0
80-85	1,504	60	0	1,504	60	0
>85	1,188	0	0	1,188	0	0
Total	8,871	2,378	6	8,256	2,294	6

Continued on the next page…

Table 7-16. Acreage and Population Affected by Elevated Noise Levels Under JSF Flight Training Alternative 2 in the Vicinity of Airfields, Cont'd

Noise Level (dB DNL)	Acres On-Installation	Acres Off-Installation	Off-Installation Population	Change in On-Installation Acres	Change in Off-Installation Acres	Change in Off-Installation Population
Total (all three installations)						
65-70	17,578	3,885	6,554	13,815	3,325	5,350
70-75	11,661	1,922	1,887	9,266	1,703	1,120
75-80	10,896	972	1,154	9,452	915	1,012
80-85	6,869	392	858	6,075	392	858
>85	8,213	215	709	7,196	215	709
Total	55,215	7,386	11,162	45,803	6,550	9,049

dB = decibels; DNL = day-night average sound level
Population estimates were made based on 2000 U.S. Census Bureau data. The number of persons currently residing in affected areas may differ from what has been stated.

Choctaw Field

Ten percent of total F-35 airfield operations would take place at Choctaw Field. Under Alternative 2, an estimated 0 persons living off-base would be impacted at greater than 75 dB DNL and an estimated 6 persons would be impacted at between 65 and 75 dB DNL. There are no hospitals located within the area that would be exposed to noise at greater than 65 dB DNL in the vicinity of Choctaw Field.

7.3.3 Approximation of Alternatives 1 and 2 at 2013

As indicated in Section 1.1 of the EIS, there are uncertainties associated with the JSF activities until the flight operations can be fully implemented and tested over time. Therefore, the Air Force will accommodate these unknowns by implementing an adaptive management approach.

Figure 7-6 shows the total number of aircraft at Eglin AFB from CY 2008 through CY 2017, including but not limited to the proposed F-35s previously detailed in Table 2-13 (*Proposed Delivery Schedule for F-35 Aircraft at Eglin AFB*). The figure also identifies key milestones in the F-35 acquisition program.

The two JSF proposed flight training alternatives used in the EIS present a high and low number of operations at each airfield based on the 2016 projected aircraft numbers and the current syllabus for the projected JSF training using Eglin Main Base and two existing and active auxiliary fields, Duke and Choctaw.

To help illustrate the noise environment over time, a "snapshot" was developed that represents Eglin AFB aircraft operations and related noise anticipated during 2013, at a specific point in time in the JSF delivery schedule. The snapshot represents the total

number of operations (approximately 302,800 annually) and the distribution among the three airfields projected for 2013 based on low-rate initial production. This is based on the number of all aircraft, including but not limited to the F-35, anticipated to be present at Eglin AFB by 2013, which is prior to the decisions on initial operational capability and full-rate production of the F-35 aircraft. (The full-rate production decision involves review of the JSF Program to determine whether it is sufficiently mature to begin full-scale production of the aircraft.)

The number of people exposed to noise at greater than 65 dB DNL is anticipated to be 3,870 during the 2013 approximation as compared to the 2016 end-state of 6,871 people associated with Alternative 1 and 11,162 associated with Alternative 2.

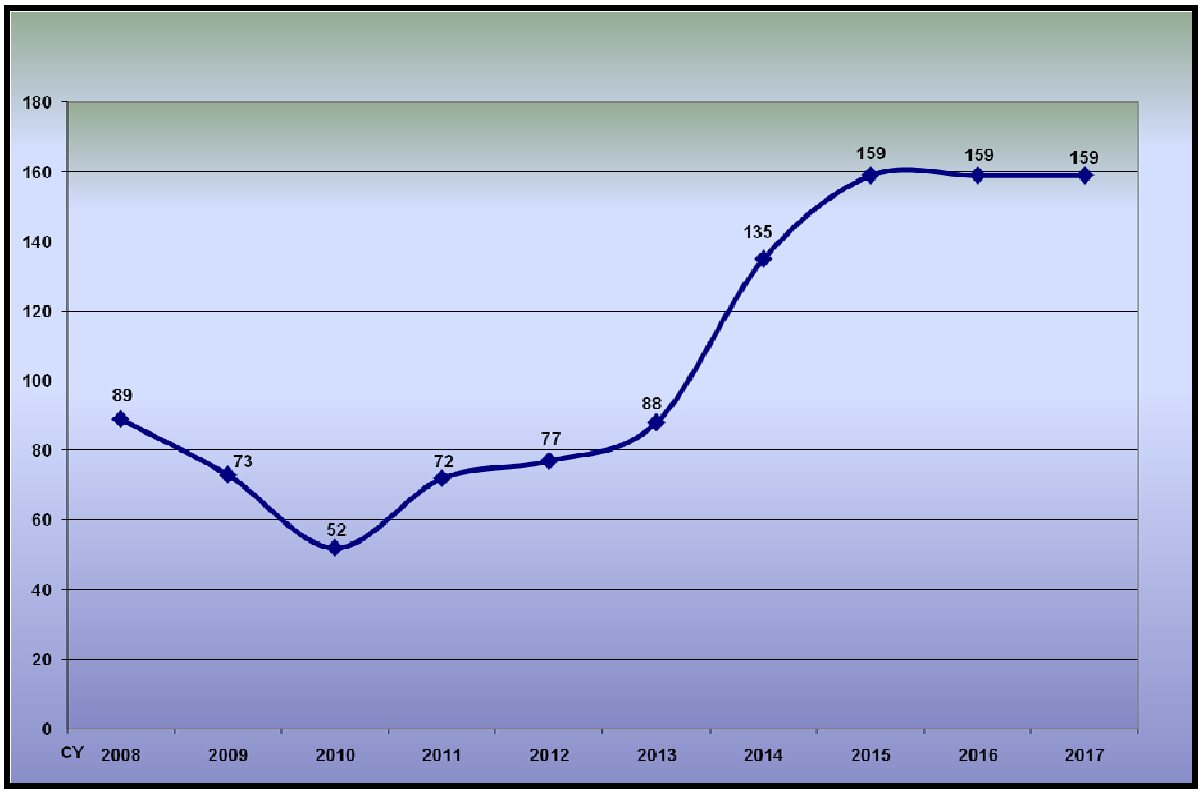

Figure 7-6. Number of All Aircraft at Eglin AFB Through 2017

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Figure 7-7 depicts the noise contours associated with the 2013 approximation for all aircraft, including but not limited to the F-35, for all three airfields while Figure 7-8 provides an illustration of the noise contours surrounding Eglin Main Base.

One important element is the overall noise experience created by the implementation of the JSF Program, which displays same trend as the total number of aircraft shown over time in Figure 7-6. In the early years of implementation, the local community will experience reduced noise as compared to the 2006 AICUZ because of the drawdown of 33 FW. However, as the JSF arrives in 2010, there will be increased levels of noise but that increase will not be accelerated until the 2013 time frame.

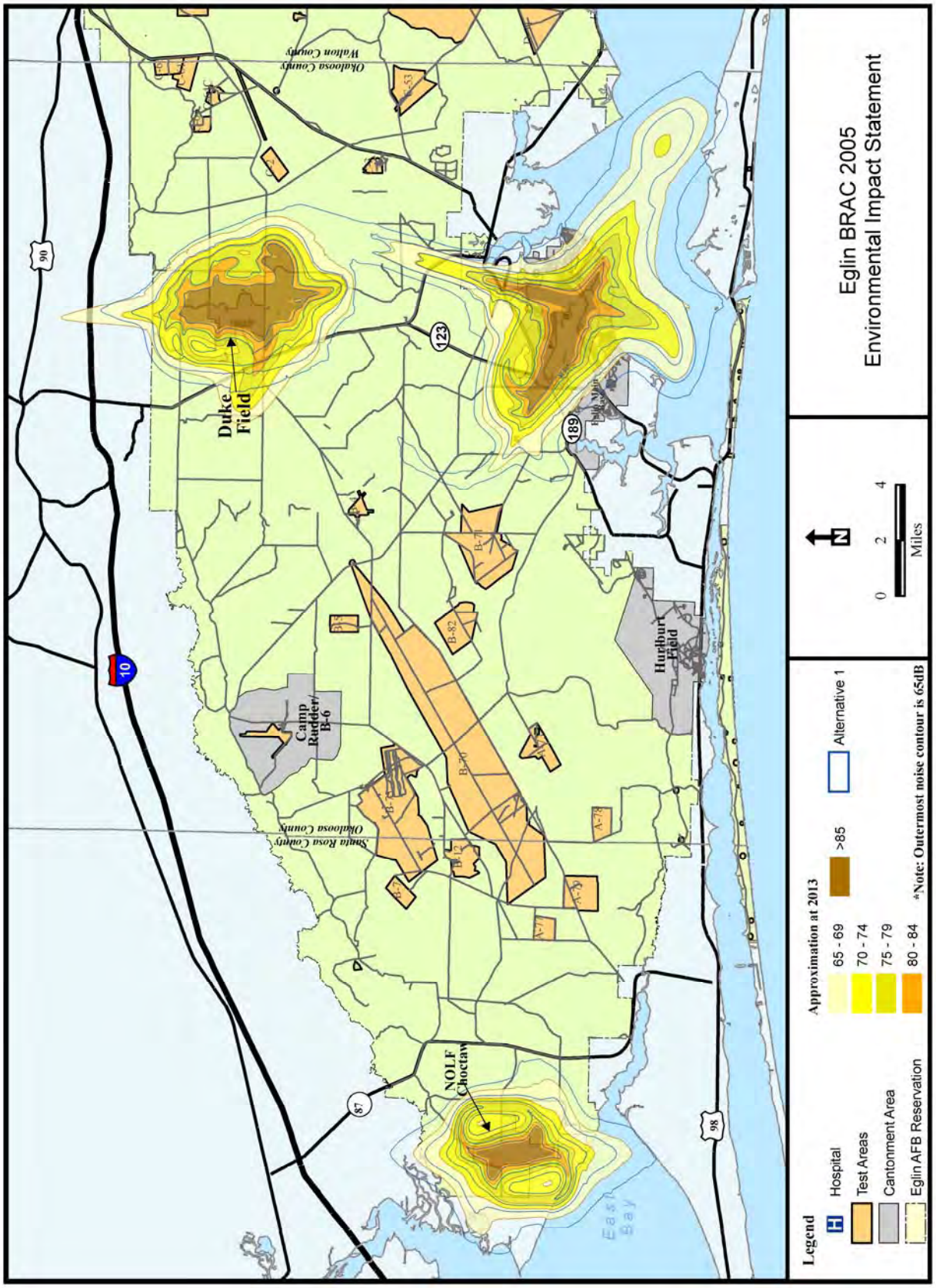

Figure 7-7. Projected Noise Contours at Eglin AFB in 2013 – All Three Airfields

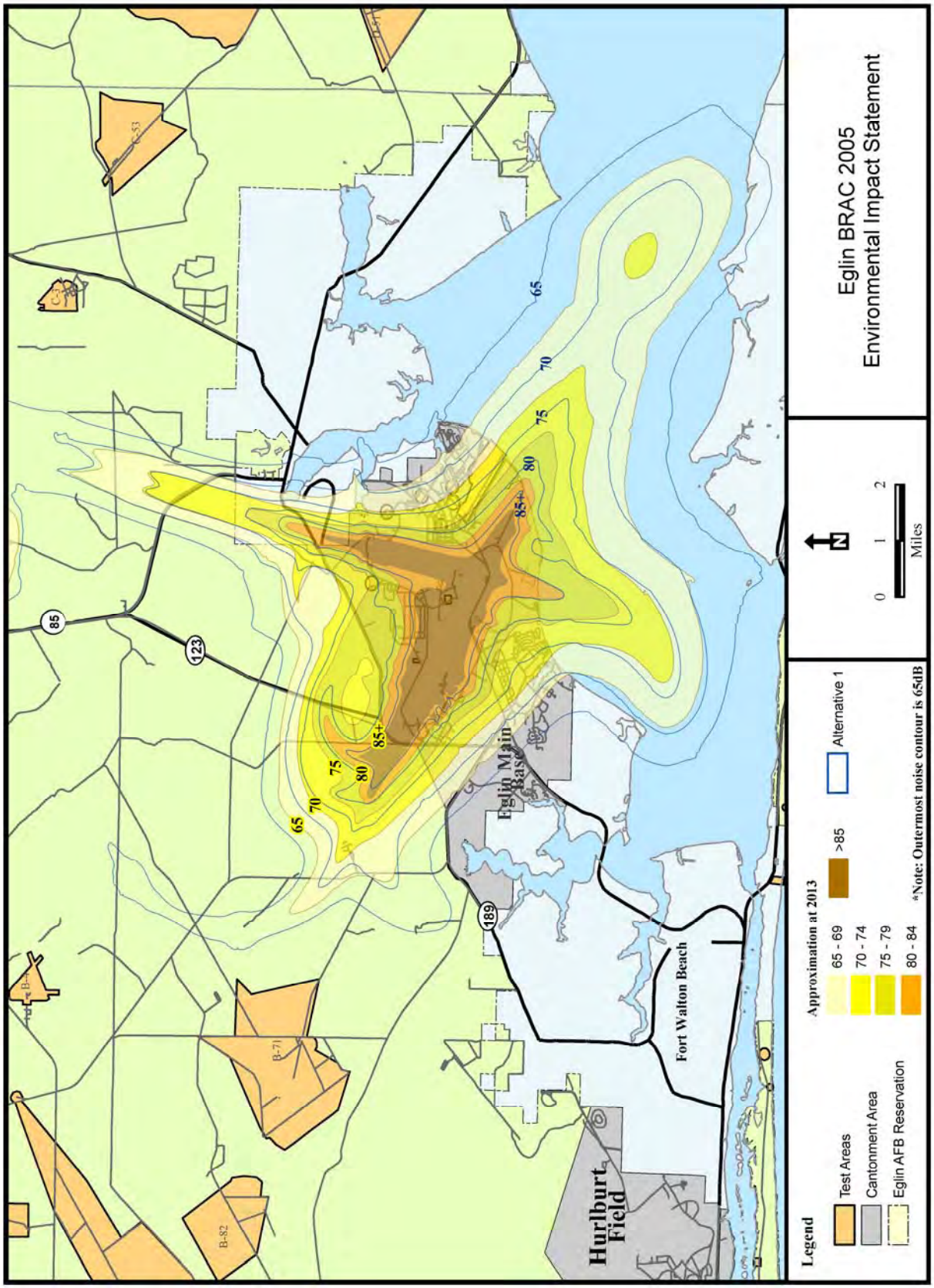

Figure 7-8. Projected Noise Contours at Eglin AFB in 2013 – Eglin Main Base

7.3.4 No Action Alternative

Eglin Main/Duke Field

Under the No Action Alternative, the 33 FW would draw down, resulting in a reduction in operations at Eglin AFB and a reduction in average noise level in the base vicinity. Noise contours reflecting this scenario are depicted in Figure 7-9. Off-base acreage affected by noise contours under this alternative is listed in Table 7-17. No hospitals are affected by noise at greater than 65 dB DNL under this alternative.

Noise impacts associated with the No Action Alternative would be positive or nonexistent. For individuals currently experiencing negative impacts associated with aircraft noise, positive impacts would include fewer interruptions of activities including sleeping, conversing, watching television, and any other activity that requires a quiet environment. Annoyance due to aircraft noise would decrease, as well.

Table 7-17. Acreage and Population Affected by Elevated Noise Levels Under the No Action Alternative in the Vicinity of Airfields

Noise Level (dB DNL)	Acres On-Installation	Acres Off-Installation	Off-Installation Population	Change in On-Installation Acres	Change in Off-Installation Acres	Change in Off-Installation Population
Eglin Main/ Duke Field						
65-70	3,392	364	1,032	140	-112	-172
70-75	1,951	223	676	-341	4	-91
75-80	1,154	77	205	-290	20	63
80-85	442	0	0	-352	0	0
>85	582	0	0	-434	0	0
Total	7,521	664	1,913	-1,277	-88	-200
Choctaw Field						
65-70	511	84	0	0	0	0
70-75	103	0	0	0	0	0
75-80	0	0	0	0	0	0
80-85	0	0	0	0	0	0
>85	0	0	0	0	0	0
Total	614	84	0	0	0	0
Total (all three installations)						
65-70	3,903	448	1,032	140	-112	-172
70-75	2,054	223	676	-341	4	-91
75-80	1,154	77	205	-290	20	63
80-85	442	0	0	-352	0	0
>85	582	0	0	-434	0	0
Total	8,135	748	1,913	-1,277	-88	-200

dB = decibels; DNL = day-night average sound level
Population estimates were made based on 2000 U.S. Census Bureau data. The number of persons currently residing in affected areas may differ from what has been stated.

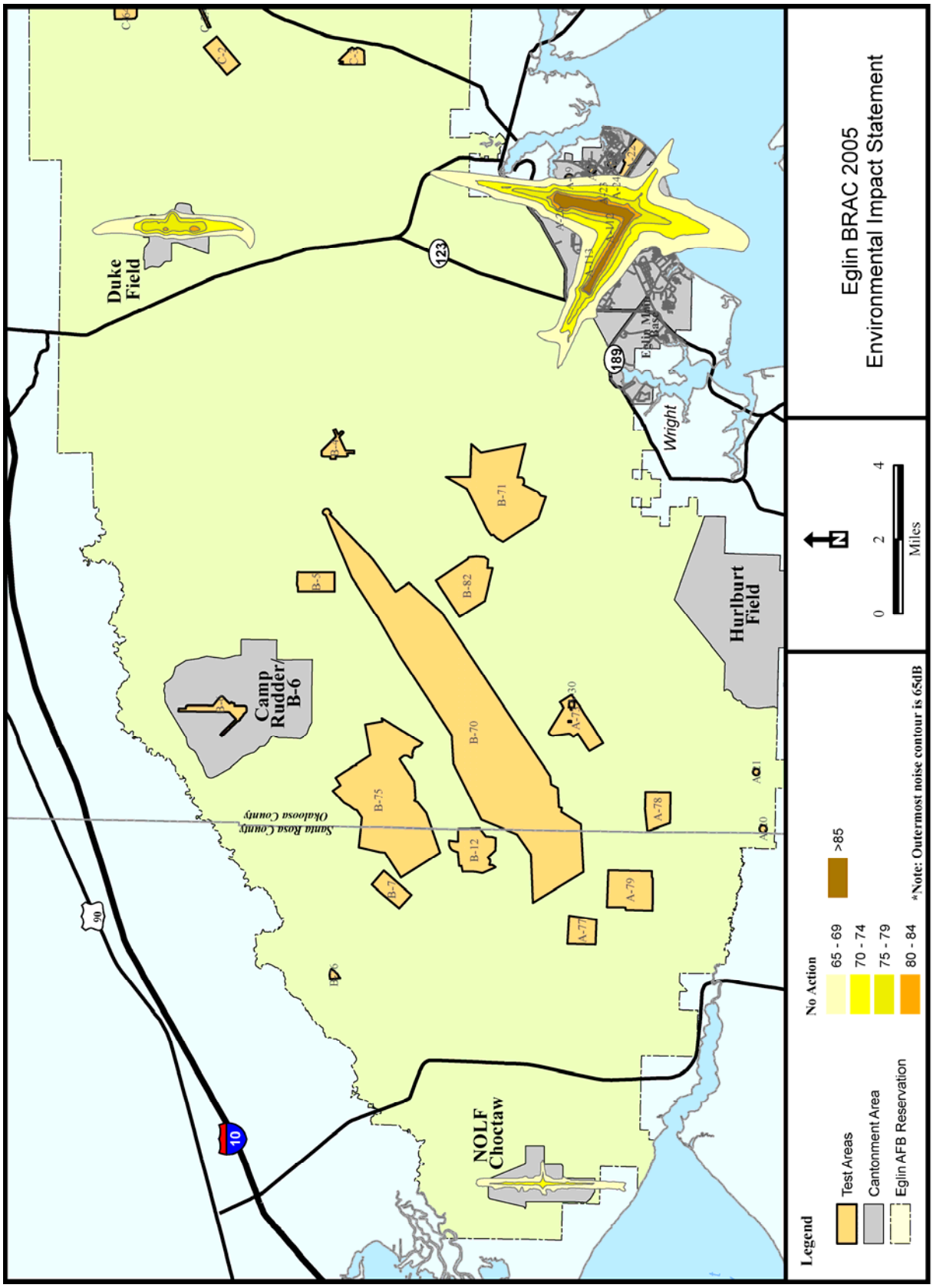

Figure 7-9. Noise Contours Under the No Action Alternative in the Vicinity of Eglin Main Base, Duke Field, and Choctaw Field

Choctaw Field

No change would occur in current flying operations at Choctaw Field under the No Action Alternative. Therefore, noise levels are expected to remain at current levels.

Special Use Airspace Units

Under the No Action Alternative, average noise levels beneath SUA would decrease or remain the same (Table 7-18). Decreases in noise level would be a result of the cessation of 33 FW flying operations after the drawdown of that unit. Aircraft not associated with the 33 FW would be expected to continue flying as they do currently. Because AFSOC aircraft would make up a larger percentage of total sorties and AFSOC aircraft carry out more operations at night, the percentage of operations occurring during environmental night would increase in Restricted Areas, Warning Areas and MOAs to 27 percent, 17 percent, and 8 percent, respectively. The percentage of the affected population potentially highly annoyed by aircraft noise would also decrease or stay the same. Noise impacts beneath military airspace under the No Action Alternative would be positive in nature.

Table 7-18. Average Noise Level Beneath SUA Under Baseline Conditions and the No Action Alternative

Special Use Airspace	Baseline		No Action		Change	
	Noise Level (DNL_{mr})	% Population Highly Annoyed	Noise Level (DNL_{mr})	% Population Highly Annoyed	Noise Level (DNL_{mr})	% Population Highly Annoyed
R-2914A	54	3	52	2.2	-2	-0.7
R-2914B	<45	<1	<45	< 1	0	0.0
R-2915A	65	12	62	8.4	-3	-3.9
R-2915B	55	3	53	2.5	-2	-0.8
R-2915C	<45	< 1	<45	< 1	0	0.0
R-2919A	<45	< 1	<45	< 1	0	0.0
R-2919B	<45	< 1	<45	< 1	0	0.0
Eglin MOA - A	<45	< 1	<45	< 1	0	0.0
Eglin MOA - C	<45	< 1	<45	< 1	0	0.0
Tyndall MOA C/D/E/F	<45	< 1	<45	< 1	0	0.0
W-151A	<35	n/a	<35	< 1	0	0.0
W-151B	<35	n/a	<35	< 1	0	0.0
W-151C	<35	n/a	<35	< 1	0	0.0
W-151D	<35	n/a	<35	< 1	0	0.0
W-151E	<35	n/a	<35	< 1	0	0.0

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Table 7-18. Average Noise Level Beneath SUA Under Baseline Conditions and the No Action Alternative, Cont'd

Special Use Airspace	Baseline		No Action		Change	
	Noise Level (DNL_{mr})	% Population Highly Annoyed	Noise Level (DNL_{mr})	% Population Highly Annoyed	Noise Level (DNL_{mr})	% Population Highly Annoyed
W-151F	<35	n/a	<35	< 1	0	0.0
VR-1082, segment A-B	<45	< 1	<45	< 1	0	0.0
VR-1082, segment B-D	<45	< 1	<45	< 1	0	0.0
VR-1082, segment D-E	<45	< 1	<45	< 1	0	0.0
VR-1082, segment E-F	<45	< 1	<45	< 1	0	0.0
VR-1082, segment F-G	<45	< 1	<45	< 1	0	0.0
VR-1082, segment G-H	<45	< 1	<45	< 1	0	0.0
VR-1085, segment A-B	<45	< 1	<45	< 1	0	0.0
VR-1085, segment B-E	<45	< 1	<45	< 1	0	0.0
VR-1085, segment E-F	<45	< 1	<45	< 1	0	0.0
VR-1085, segment F-G	<45	< 1	<45	< 1	0	0.0
VR-1085, segment G-H	<45	< 1	<45	< 1	0	0.0
VR-1085, segment H-I	<45	< 1	<45	< 1	0	0.0

DNL_{mr} = onset-rate adjusted monthly day-night average sound level
Population estimates were made based on 2000 U.S. Census Bureau data. The number of persons currently residing in affected areas may differ from what has been stated.

Supersonic flight training in the W-151 airspace would continue under the No Action Alternative. However, frequency of sonic booms would decrease as a result of the drawdown of the 33 FW F-15Cs. Total time spent by all aircraft types training in W-151 would decrease from 933 hours per year to 205 hours per year. Table 7-19 provides information on sonic boom noise under the No Action Alternative.

Table 7-19. Sonic Booms Under Baseline Conditions and the No Action Alternative

Airspace Component	Baseline			No Action		
	dB CDNL	Booms per Day	Booms per Month[1]	dB CDNL	Booms per Day	Booms per Month[1]
W-151A	45	0.15	3	38	0.05	1
W-151B	44	0.15	3	37	0.05	1
W-151C	45	0.15	3	38	0.05	1
W-151D	44	0.15	3	38	0.05	1
W-151E	43	0.1	2	36	0.05	1
W-151F	43	0.1	2	36	0.05	1

CDNL = C-weighted decibel day-night average sound level; dB = decibels
1. Assumed 20 flying days per month

Sonic booms are a relatively rare event under W-151 and would become more rare under the No Action Alternative. Time-averaged sonic boom noise level (CDNL) under W-151 subunits would decrease as well. Given that W-151 is located entirely over water, very few people would be expected to notice the decrease in sonic booms resulting from the drawdown of the 33 FW.

Eglin Range

Under the No Action Alternative, HE munitions use would not change from baseline conditions. The 33 FW has an air-to-air mission and, as such, drops a negligible number of air-to-ground munitions. Therefore, cessation of 33 FW F-15 operations would have little effect on the number and type of munitions dropped on the range. Munitions noise at the range would be as described in Section 7.3.1.1 (JSF Flight Training Alternative 1).

7.3.5 Mitigation

The development of JSF aircraft is a dynamic process and at this early stage of development there is limited data on its performance characteristics. The limited data and knowledge available were used to assess the impacts of JSF flying operations and identify possible mitigations. As the program evolves, the Air Force, the JPO, and other Services will gain greater understanding of the aircraft's performance characteristics and will be better able to define and assess impacts from its operation and then propose specific mitigation actions. Concurrently, the Air Force will use an adaptive management process to monitor and evaluate JSF flight operation impacts and identify ways to minimize noise in the region. Although every effort will be made by the proponent to fund identified mitigations, application of some proposed mitigation measures may be subject to Congressional appropriations. Mitigations will be developed and described per the requirements of 32 CFR 989.22(d).

Mitigations for aircraft noise can be applied at three locations: at the source (via systems engineering through the JPO), along the path, and at the receiver. There are three primary methods for mitigating noise from these sources. They are operational restrictions, BRAC implementation, and structural attenuation.

7.3.5.1 Noise Source Reduction

For a noise source such as the fixed wing F-35, the abatement strategies include:

- Operational Restrictions
- BRAC Implementation

Operational Restrictions

Operational restrictions are the most effective method of dealing with aircraft noise. The following "avoidance" mitigations were incorporated into the flight operations in JSF Flight Training Alternatives 1 and 2 in this EIS.

- Restricting the number of night flights
- Use of flight simulators for some training
- No afterburner takeoffs on Runway 01
- Termination of afterburner use on takeoff as soon as possible
- Minimize operations on Runway 01/19 and maximize operations on Runway 12/30 by modifying the taxi flow with a new taxiway to Runway 30

The following "noise avoidance" techniques are routinely employed to reduce aircraft noise, but could not be applied to either of the Flight Training alternatives, due to operational limitations of a training environment.

- Reducing aircraft wing flap settings during aircraft landing approaches is not operationally feasible in a training environment.
- Delaying aircraft wing flap and gear extension during aircraft landing approaches is not operationally feasible in a training environment.
- High-speed aircraft landing approach is not operationally feasible in a training environment.
- Reduced thrust or lowering the power settings is not operationally feasible in a training environment.

Additional operational measures that can reduce noise impacts but could not be applied due to specific airspace constraints specific to the area surrounding Eglin AFB are listed below:

- Higher holding and maneuvering altitudes for aircraft, which would result in a conflict with the North-South Corridor and restricted airspace.
- Increasing the aircraft glide angle approach and approaching the runway at a steeper angle, although viable, provides no meaningful noise reduction benefit and conflicts with Duke Field VFR pattern.

- Higher initial approach altitudes, which would result in a conflict with the North-South Corridor and restricted airspace.
- Regulation of thrust reversals for added braking power is not an available capability on the JSF aircraft.

Potential operational mitigations that are not currently applied to JSF Flight Training Alternatives 1 and 2, but that could be adopted over time as the JSF training program at Eglin matures, include:

- Eglin AFB will look programmatically at how best to operate the F-35 aircraft to minimize noise while still maintaining operational feasibility and realism. Some of the potential mitigations that are being considered and may be evaluated are listed below. Each of these mitigations would need to be evaluated for potential noise reduction, environmental impacts, and cost before a final decision is made. As stated previously, these mitigations are a list of potential efforts the Air Force could implement to mitigate noise; however, this list is neither limiting nor exhaustive in nature.
    - Review arrival and departure procedures.
    - Review flight patterns. As more flight characteristics become known for the F-35, perform a complete review of airfield flight operations and procedures to identify additional mitigation measures for the F-35.
    - Periodically monitor and evaluate the JSF syllabus with more mature data to ensure that aircraft numbers and use rates would remain at the timing and frequency currently described in the EIS.
    - Monitor and evaluate use of all low level routes to decrease airspace noise by modifying lowest altitudes to be flown and flight airspeed and avoid noise sensitive areas.
- Use of an aircraft other than the JSF as an adversary or chase aircraft for air-to-air training would reduce average noise levels and noise impacts near airfields and in SUAs/MTRs. The degree to which noise levels would be reduced depends on the adversary or chase aircraft used.
- In the near-term, noise impacts on Valparaiso may be able to be reduced with the construction of an Instrument Landing System (ILS) and Precision Approach Radar (PAR) to Runway 12. With an ILS and PAR, Runway 12 could be used when the range is inactive or closed due to bad weather or when air traffic is light. However, if implemented, this would not be a long-term or permanent measure due to adverse impacts on range activities to the west. Runway 19 would still need to be the primary runway for ILS approaches and emergencies

when the range is active for testing or training missions or when air traffic activity levels are high.

BRAC Implementation

While the BRAC decision identified Eglin AFB as the site for establishing the IJTS, the potential noise impacts associated with the BRAC decision were not assessed. Consequently, this EIS identifies potentially significant impacts to the local communities and personnel on-base that may warrant further consideration of other ways to implement this BRAC decision, outside the currently prescribed BRAC context. The Air Force will use an adaptive management process, EMS, and other processes, to monitor and evaluate the JSF Program to identify ways to address program-related impacts and manage noise issues. The JSF training program at Eglin will be managed in such a way as to allow various alterations as the program matures and new program specifics are learned. New information regarding the F-35 aircraft capabilities, the training syllabus, and the delivery schedule could be used to modify decisions, including those related to operational procedures, source location, and potential noise mitigations.

Typically noise can be reduced at the source (or airfield) by relocating the source away from the receiver. However, the BRAC decision was to establish the JSF IJTS at Eglin AFB. This decision was based on supporting documentation that looked at capacity (airfield, airspace, and other factors) and military value; timing for implementing the BRAC decision by September 2011; arrival of the first aircraft (2010); and costs (see Section 2.5 for additional details). The recently identified adverse noise levels associated with establishing the JSF IJTS at Eglin Main Base raises the possibility of re-evaluating the proposed BRAC implementation strategy in order to reduce noise impacts. An example of an alternative implementation strategy would be the evaluation of the use, modification, upgrade, or new development of additional military and civilian airfields, which was not within the scope Education and Training Joint Cross-Service Group (E&T JCSG) review or BRAC recommendations.

7.3.5.2 Noise Path Modifications

Structural Attenuation

Both action alternatives result in substantial noise-related impacts including annoyance and interruption of activities such as sleeping, conversation, and listening to the television or radio. Impacts to persons while they are indoors could be mitigated somewhat by addition of noise attenuation measures to homes and other structures.

Noise attenuation measures can be incorporated during construction or added to existing structures. Individual building components (doors, windows, walls, etc) are

rated with a sound transmission class (STC) based on how well the product or assembly blocks sound under a standardized set of conditions. Increasing the overall exterior-to-interior noise level reduction (NLR) is accomplished by replacing components with low STC with components with higher STC. For example, single-paned windows normally have an STC rating of between 25 and 28. Window assemblies specifically designed to block sound have STC ratings into the 50s. It is of critical importance to recognize that all building components must work together in a balanced manner to reduce noise intrusion. In other words, installation of windows with high STC will have little effect on the NLR if the doors have a very low STC. Building requirements to achieve a specific NLR include requirements for exterior walls, windows, doors, roof-ceiling assembly, floors, foundations, ventilation, and any other wall penetrations. The average NLR provided by a typical American home located in a warm climate is 24 dB if the windows are closed and 12 dB if the windows are open (USEPA, 1974). Because houses are often insulated better today than they were in 1974 when the USEPA reported the listed NLR values, actual average NLR is likely to be slightly higher. Special noise attenuation measures can provide 30 to 35 dB of NLR.

In areas with mild climates, such as Florida, certain structures may have a lower exterior-interior NLR than in other parts of the country. When the weather is warm, windows are more likely to be left open. Also, construction elements that are designed to improve exterior-to-interior airflow, such as louvered windows, typically have low STC. Ultimately, structural attenuation is only effective in mitigating aircraft overflight noise when people are indoors, which is frequently not the case in the state of Florida.

Planning for a structural noise attenuation project requires consideration of a number of location-specific and structure-specific factors including interior noise level reduction goals, the type of materials used in original construction (for existing structures), and orientation of the structure relative to flight paths (Wyle, 2005). Qualified acoustical professionals should be involved in project design, execution, and testing in order to achieve desired results.

Per DoD recommendations, many noise-sensitive land uses are never considered to be compatible at noise levels greater than 75 dB DNL (DoD, 1977). Also, at extremely high exterior noise levels, reaching the USEPA-designated interior noise level goal of less than 45 dB DNL would typically be prohibitively expensive or would require structural modifications that may detract from the appearance or impede the function of the structure. Nevertheless, reduction of interior noise levels in structures exposed to extremely high aircraft noise would provide some relief from aircraft noise impacts.

All future facilities should be sited in compatible noise zones or should incorporate adequate sound attenuation in the design as needed. The Air Force could request Congressional authority to provide sound attenuation for existing facilities that are incompatible with the land use compatibility guidelines (as stated in Appendix J, *Land Use*). However, this will not address noise impacts on people's outside activities.

7.3.5.3 Noise Receiver Modifications

Potential mitigations where there are developed areas on-installation adversely affected by noise include:

- Relocating the impacted activity and altering the structure to accommodate a less sensitive use.
- Relocating the structure and the activity to a site with acceptable noise environment.
- Abandoning the structure and relocating the activity elsewhere.

Individual sensitive land uses could be relocated on a case-by-case basis if they could not be adequately attenuated. Because it is fiscally unfeasible to relocate the major portion of the cantonment, which lies in a high noise zone, the Air Force would have to rely primarily on operational changes or sound attenuation.

The Air Force could request funds to acquire property interests from willing sellers after more refined noise exposure contours are developed.

Advanced hearing protection for maintainers and aircraft support personnel could be purchased as needed.

7.4 LAND USE

The effects of JSF flight training noise exposures on land use at Eglin AFB and the surrounding community are based on Air Force AICUZ guidelines. The guidelines recommend land uses that are compatible with airfield operations while allowing maximum beneficial use of adjacent properties. Additional detailed information on noise and noise effects is presented in Chapter 3 (Section 3.2, Noise). Additional information on land use, the AICUZ guidelines, and analysis methodology is presented in Chapter 3 (Section 3.3, Land Use).

The AICUZ area of influence includes the area with noise exposures of 65 dB DNL and greater and the area within the clear zone (CZ) and accident potential zones (APZs). For a land use to be considered compatible, it must meet criteria for its category for both noise and accident potential (see the Land Use Compatibility Guidelines table in Appendix J, *Land Use*).

The CZ, the area closest to the runway's end, is the most hazardous and must be clear of any development. Some economic use of the land in the APZ I is allowed, such as light industrial, manufacturing, transportation, communication/utilities, wholesale trade, open space, recreation, and agriculture. However, uses that concentrate people in small areas are not acceptable. Acceptable uses in the APZ II include those of APZ I, as well as low density, single-family residential and personal and business services and commercial/retail trade uses of low intensity or scale of operation. High density functions such as multistory buildings, places of assembly (e.g., theaters, churches, schools, restaurants) and high-density office uses are not considered appropriate (U.S. Air Force, 2006d).

Land use compatibility with noise exposures between 65 and 74 dB DNL depends on the particular use and whether or not noise level reduction measures (i.e., sound insulation) are utilized. Additional information on noise level reduction measures is presented in Section 7.3 (Noise). Land uses that include sensitive noise receptors (e.g., residences, public buildings, schools, churches, hospitals, and certain recreational uses) are generally incompatible when exposed to noise exposures of 75 dB DNL or greater. Almost all land uses except manufacturing, agriculture, and mining are incompatible with noise exposures greater than 80 dB DNL.

7.4.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.4.1.1 Existing Conditions (Land Use – JSF Flight Training Alternative 1)

Military Land Use

Existing military land use at **Eglin Main Base** is described in Chapter 4 (Section 4.3, Land Use) and Chapter 6 (Section 6.3, Land Use). The existing military land use for **Duke Field** and vicinity is described in Chapter 4 (Section 4.3, Land Use).

The existing land use categories at **Choctaw Field** include airfield (runway, taxiway, apron), airfield (primary surface/clear zones), and aircraft operations and maintenance, which includes a control tower, support buildings, and facilities for fire and rescue ground crews. Currently, the field is surrounded by wooded timberland, open fields, and state-owned conservation land; no developed areas are in the vicinity. Property surrounding Choctaw Field, managed by Eglin AFB, is designated as open space. Uses include military training activities and recreation.

The Eglin AFB Land Use Plan component of the Eglin AFB General Plan provides additional information regarding Eglin Main Base and Duke Field and describes existing land uses, a planning analysis of constraints and opportunities, future land use, and implementation guidelines (U.S. Air Force, 2001a).

Noise exposure (depicted with contours) from existing operations at Eglin Main Base along with current land use are shown in Figure 7-10. These contours provide the baseline against which to measure the projected change from the proposed JSF flight training. There are currently no land use compatibility issues associated with noise on Eglin Main Base. A portion of the Capehart and Ben's Lake Housing areas and the unaccompanied housing area on the east side of Eglin Main Base are exposed to noise levels of 65 dB to 70 dB DNL. The Oak Hill Elementary School is exposed to noise levels of 70 dB to 75 dB DNL. Other land uses, within Eglin Main Base, exposed to noise levels of 65 dB DNL or greater are considered to be compatible based on AICUZ guidelines.

Noise exposure (depicted with contours) from existing operations at Duke Field along with current land use are shown in Figure 7-11. There are currently no adverse land use compatibility issues associated with noise at Duke Field. The housing area is not exposed to noise levels of 65 dB DNL and greater. Other land uses at Duke Field exposed to noise levels of 65 dB DNL or greater are considered to be compatible based on AICUZ guidelines. Baseline noise exposures at Choctaw Field and the current land use are shown in Figure 7-12. Existing land uses at Choctaw Field and in the immediate vicinity exposed to noise levels of 65 dB DNL or greater are considered to be compatible based on AICUZ guidelines.

Community Land Use

Activities associated with Eglin Main Base primarily affect nonmilitary land to the northeast of the airfield, including the cities of Valparaiso and Niceville, and unincorporated areas of Okaloosa County. Valparaiso comprises a diverse mix of moderate density land uses. Single family residential uses exist throughout Valparaiso and in the northwest corner of Niceville. Strip commercial uses are prevalent along John Sims Parkway (Florida Highway [Hwy] 20 and Hwy 327), Valparaiso Parkway (Hwy 190), and Government Avenue (Hwy 85). Mixed uses consisting of medium- and high-density residential, public/quasi-public, and commercial uses exist on both sides of South John Sims Parkway and Hwy 85 north of West John Sims Parkway to West College Boulevard. Land uses in the triangle formed by Government Avenue, Valparaiso Parkway, and North John Sims Parkway are also mixed, with large areas of public/quasi public uses including schools and churches (U.S. Air Force, 2006d).

Zoning in the Valparaiso and Niceville area generally reflects existing land use patterns. The majority of land is zoned for various densities of residential uses. Commercially zoned land exists along the major corridors of Government Avenue and John Sims Parkway in Valparaiso and Hwy 85 in Niceville. Land along Boggy Bayou, shoreline east of John Sims Parkway, is zoned as a conservation district. Zoning has also been incorporated to protect the clear zone and APZ, with industrial and commercial designations being the primary zoning classification (U.S. Air Force, 2006d).

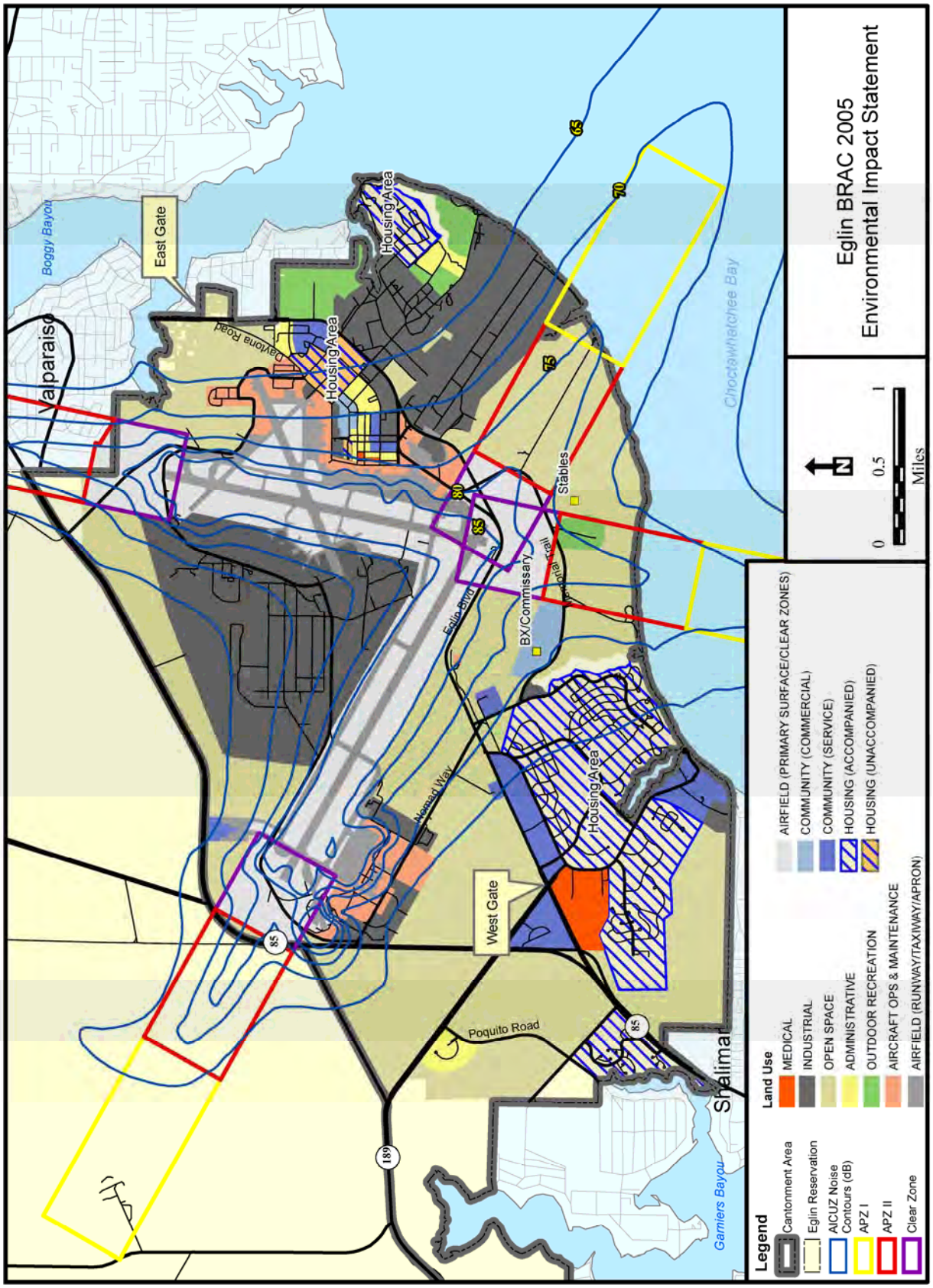

Figure 7-10. JSF Flight Training – Eglin Main Base Land Use and Baseline Noise Contours

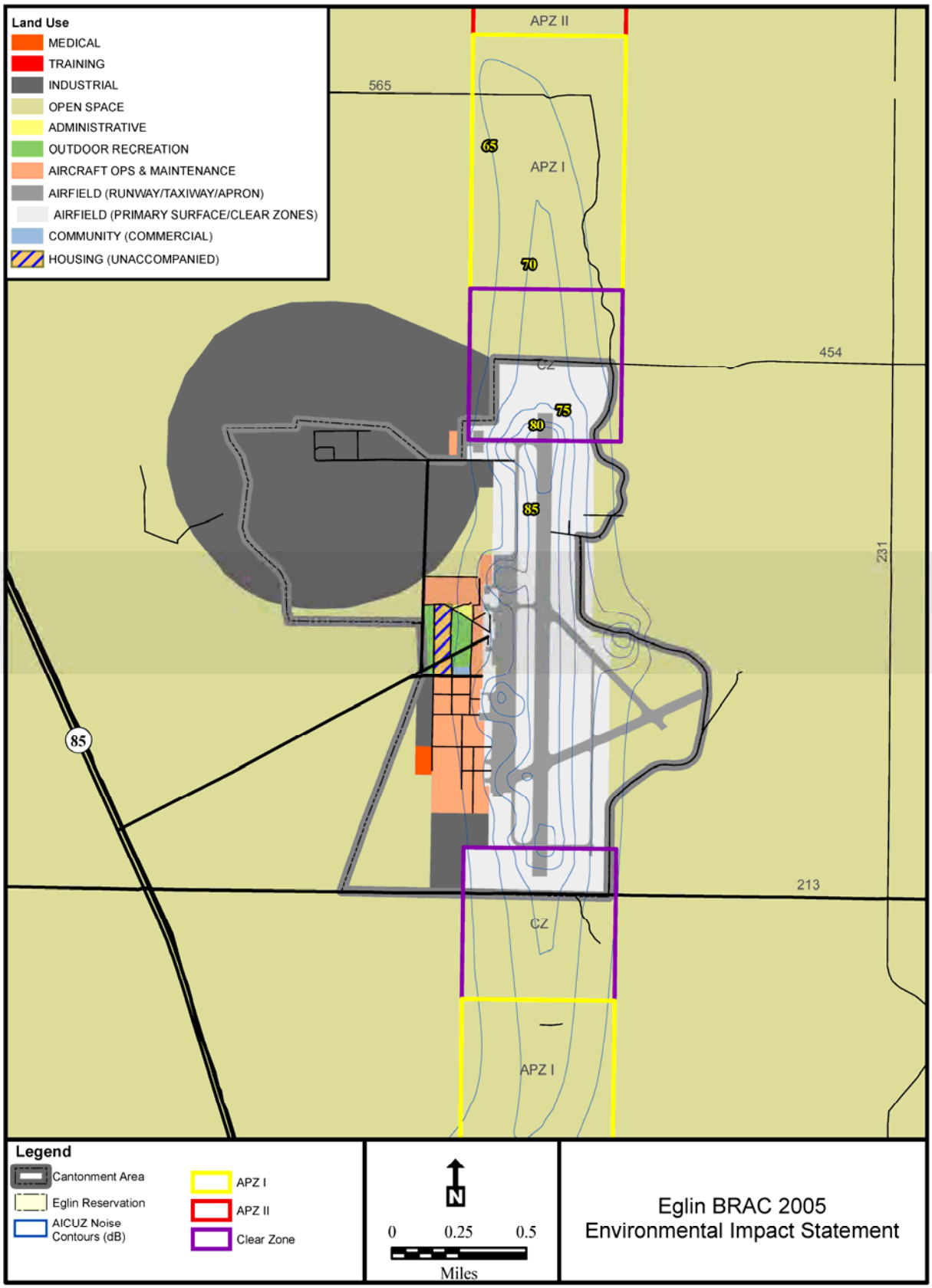

Figure 7-11. JSF Flight Training – Duke Field Land Use and Baseline Noise Contours

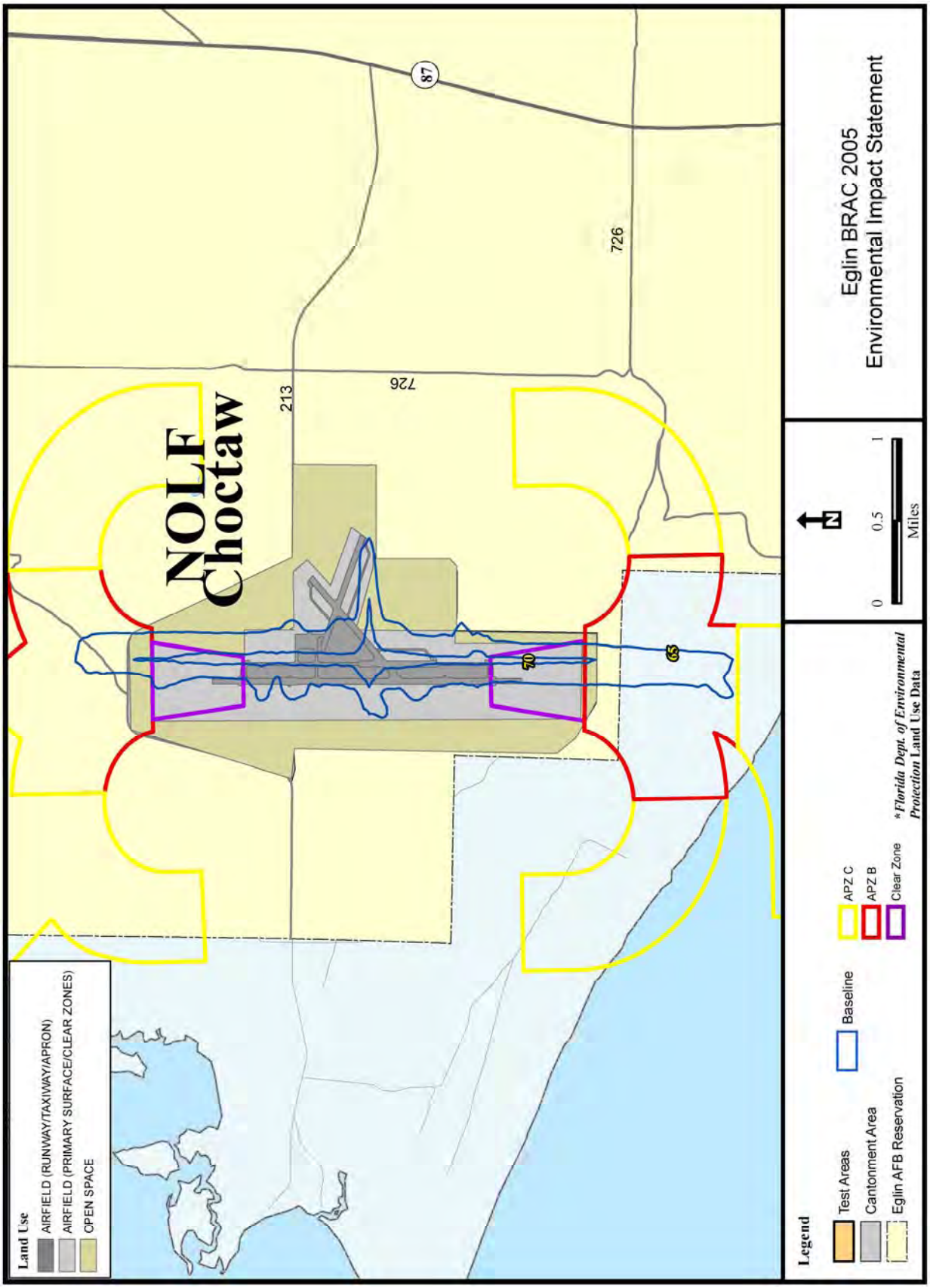

Figure 7-12. JSF Flight Training – Choctaw Field Land Use and Baseline Noise Contours

Land use categories for the area surrounding Eglin AFB are presented in Chapter 3 (Section 3.3, Land Use). Figure 7-13 presents the land uses for the off-base area that surrounds Eglin Main Base and also shows the areas exposed to noise levels of 65 dB DNL or greater, including the areas located within the clear zones and APZs. Presently, two small areas of residential land use occur in the Runway 19 Clear Zone (north of the airfield). The residential land use of these areas is incompatible with the safety criteria established for a clear zone. All remaining land use within the clear zone is open space and is compatible with Air Force planning criteria. Areas of incompatible land use within the Runway 19 APZ I include a large area of medium-density residential development east of Wolverine Avenue and south of Government Avenue. Two churches are also incompatibly located along Valparaiso Parkway. There are no incompatible land uses presently associated with the Runway 19 APZ II (U.S. Air Force, 2006d). At noise levels between 65 dB and 75 dB DNL, the only incompatible land use type is residential without noise level reduction materials.

Duke Field is located near the center of the Eglin Reservation and is surrounded for several miles by federal land. The closest populated area is located 3.5 miles northwest of Duke Field in the city of Crestview. None of the 65 dB DNL or greater baseline noise contours for operations at Duke Field extends off Eglin AFB property (Figure 7-11).

Choctaw Field is located in the western portion of Eglin AFB in Santa Rosa County and, like Duke Field, is surrounded by federal land. The closest populated area is the town of Holley, which is located approximately 4 miles southeast of Choctaw Field. The baseline 65 dB DNL noise contour for Choctaw extends off Eglin AFB to the south over undeveloped land in the open/agricultural/low-density land use category (Figure 7-14).

7.4.1.2 Environmental Consequences (Land Use – JSF Flight Training Alternative 1)

Since the key element of the JSF Flight Training Alternative 1 involves flight activities, land use impacts are associated with increases in noise due to an increase in sorties and change in aircraft types. These activities produce changes in the existing noise environment, which can pose land use compatibility issues, including changes to land management, land use, or land ownership.

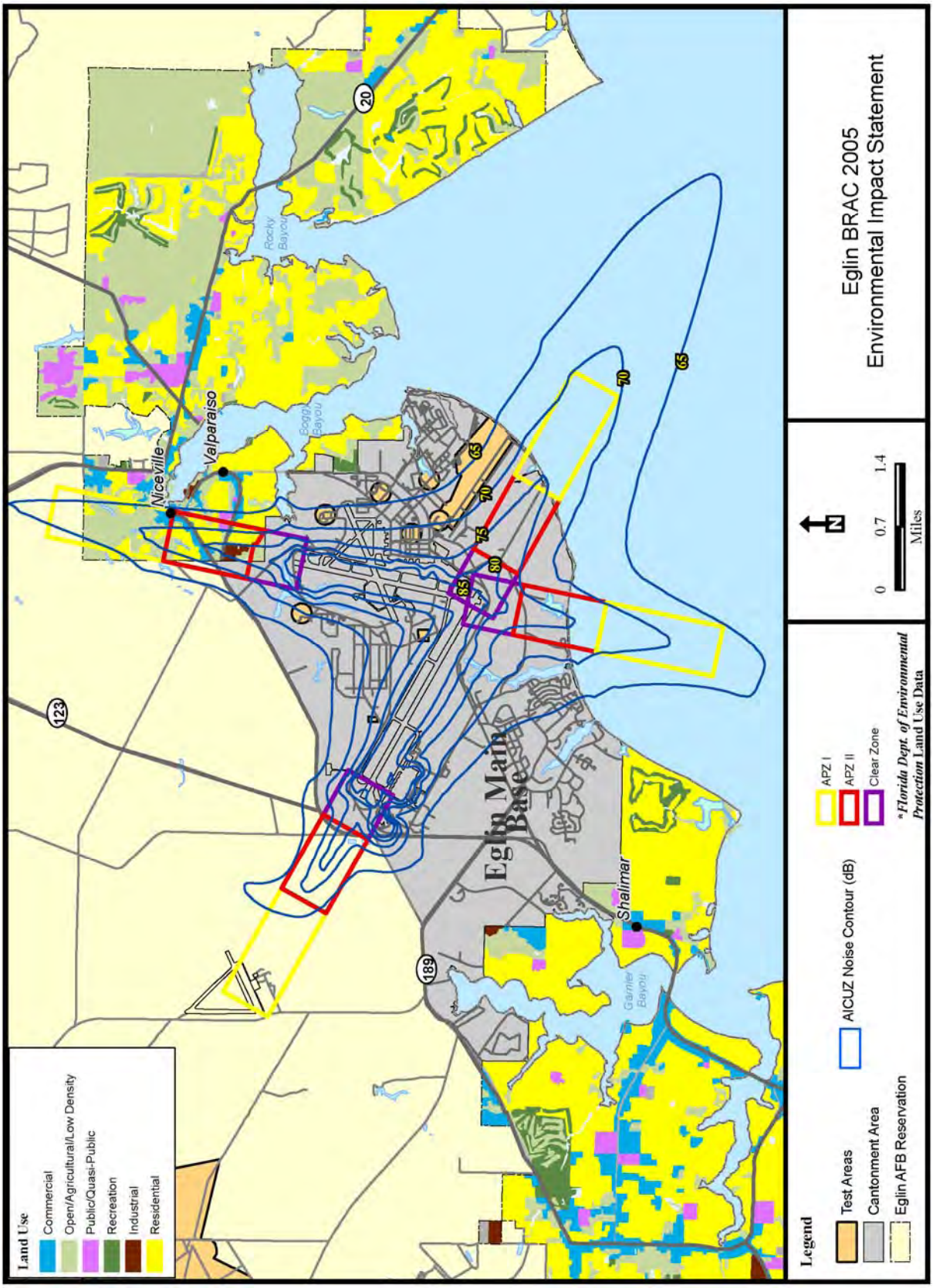

Figure 7-13. JSF Flight Training – Off-Base Land Use and Baseline Noise Contours for Okaloosa County in the Vicinity of Eglin Main Base

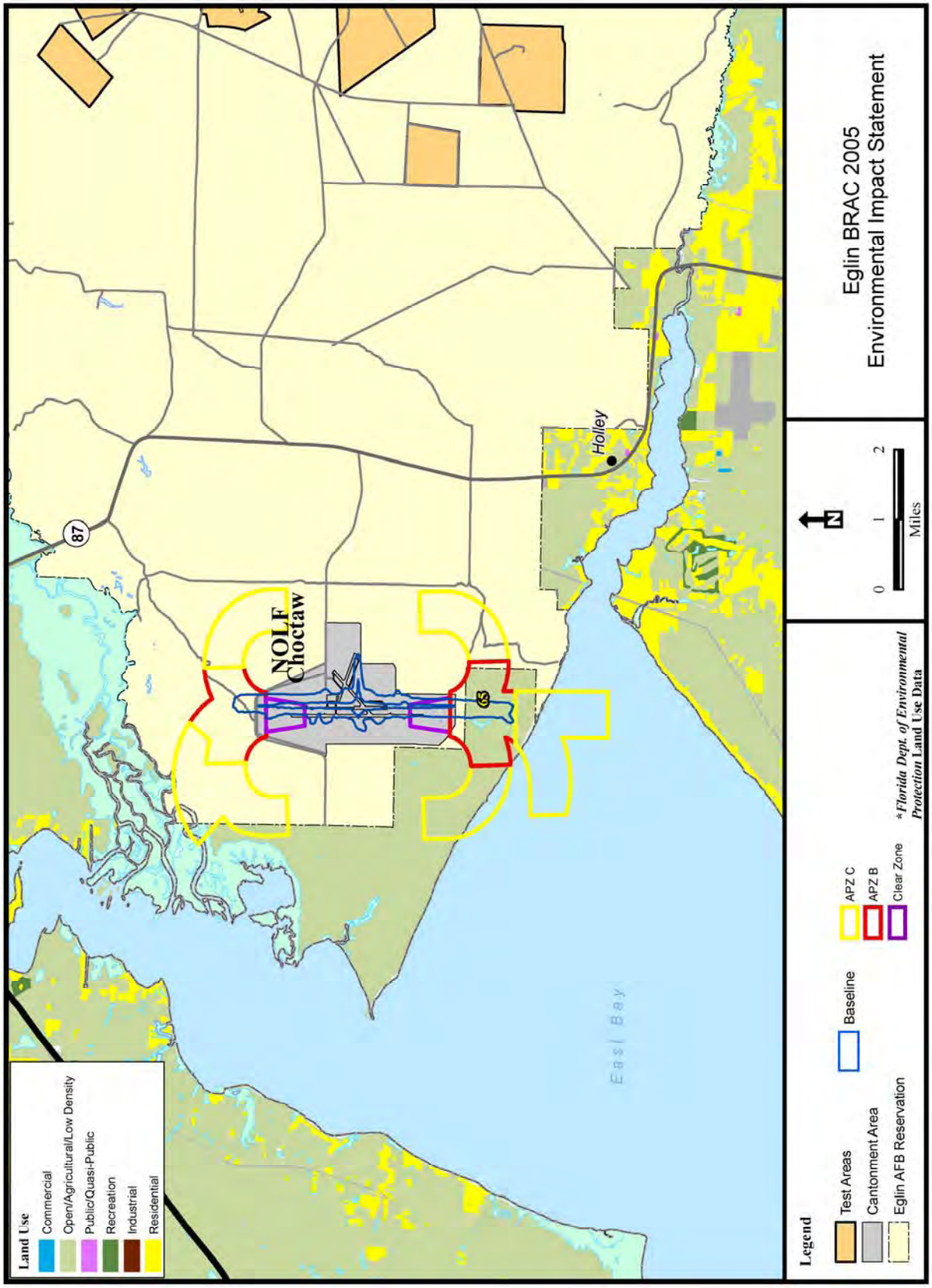

Figure 7-14. JSF Flight Training – Off-Base Land Use and Baseline Noise Contours in the Vicinity of Choctaw Field

Military Land Use

Figure 7-15 shows the existing land use for Eglin Main Base and the JSF noise contours for JSF Flight Training Alternative 1. Approximately 43,213 acres of Eglin AFB property would be exposed to noise levels greater than 65 dB DNL. The affected area includes Eglin Main Base, Duke Field, and the Eglin Range. Sensitive noise receptors at Eglin Main Base that could be impacted from noise exposures greater than 75 dB DNL include portions of the Ben's Lake and Capehart housing areas, Memorial Lake Community Center, Cherokee and Oak Hill Elementary Schools, horse stables, and portions of the Eglin Downtown Area on the east side of the airfield, including the Georgia Avenue accompanied housing area.

The entire developed area of Duke Field would experience increased noise exposure of greater than 85 dB DNL, including the unaccompanied housing area (Figure 7-16).

Approximately 10,822 acres of Eglin AFB property in the vicinity of Choctaw Field would be exposed to noise levels greater than 65 dB DNL (Figure 7-17). However, the increase in noise exposure would not have any adverse impacts on the existing land use compatibility at Choctaw Field.

The impacted on base area surrounding Eglin Main Base and Duke Field is part of the interstitial area of Eglin Range that is used for military training activities and is open to public access for recreational activities. The increase in noise exposure above 65 dB DNL would not result in adverse land use impacts or compatibility issues.

Community Land Use

Implementation of JSF Flight Training Alternative 1 would also have land use compatibility impacts on affected areas off Eglin AFB, resulting from the increased noise from the JSF flight training operations. Noise impacts on the surrounding communities would be greatest northeast of Eglin Main Base in Valparaiso and Niceville. Other impacted areas include unincorporated areas of Okaloosa County, part of Shalimar, property located just east of Destin near the Mid-Bay Bridge, and the area southeast of Crestview along the Shoal River. These areas and the AICUZ noise contours are shown in Figure 7-18 and Figure 7-19.

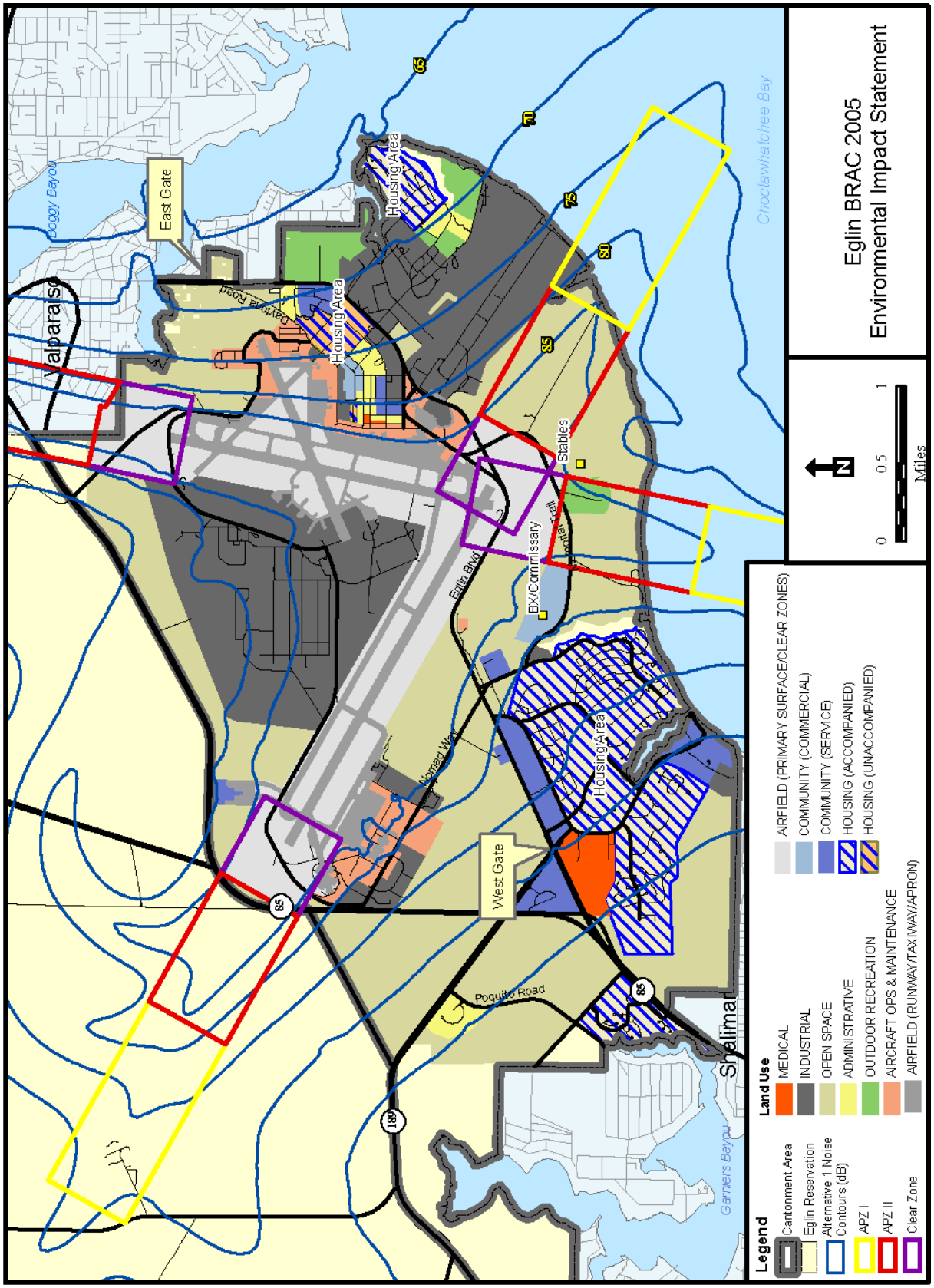

Figure 7-15. JSF Flight Training Alternative 1 – Eglin Main Base Land Use and Alternative 1 Noise Contours

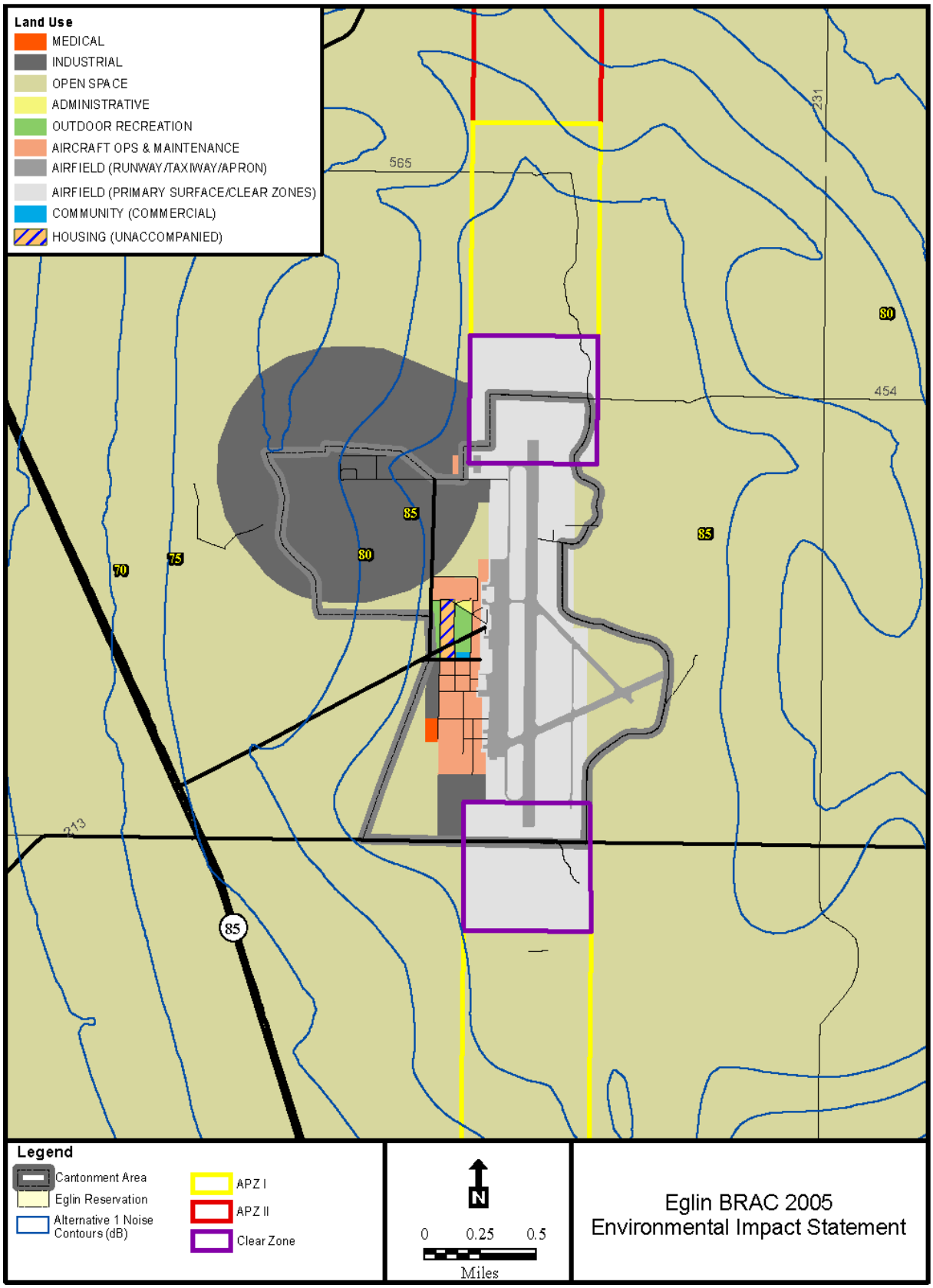

Figure 7-16. JSF Flight Training Alternative 1 – Duke Field Land Use and Alternative 1 Noise Contours

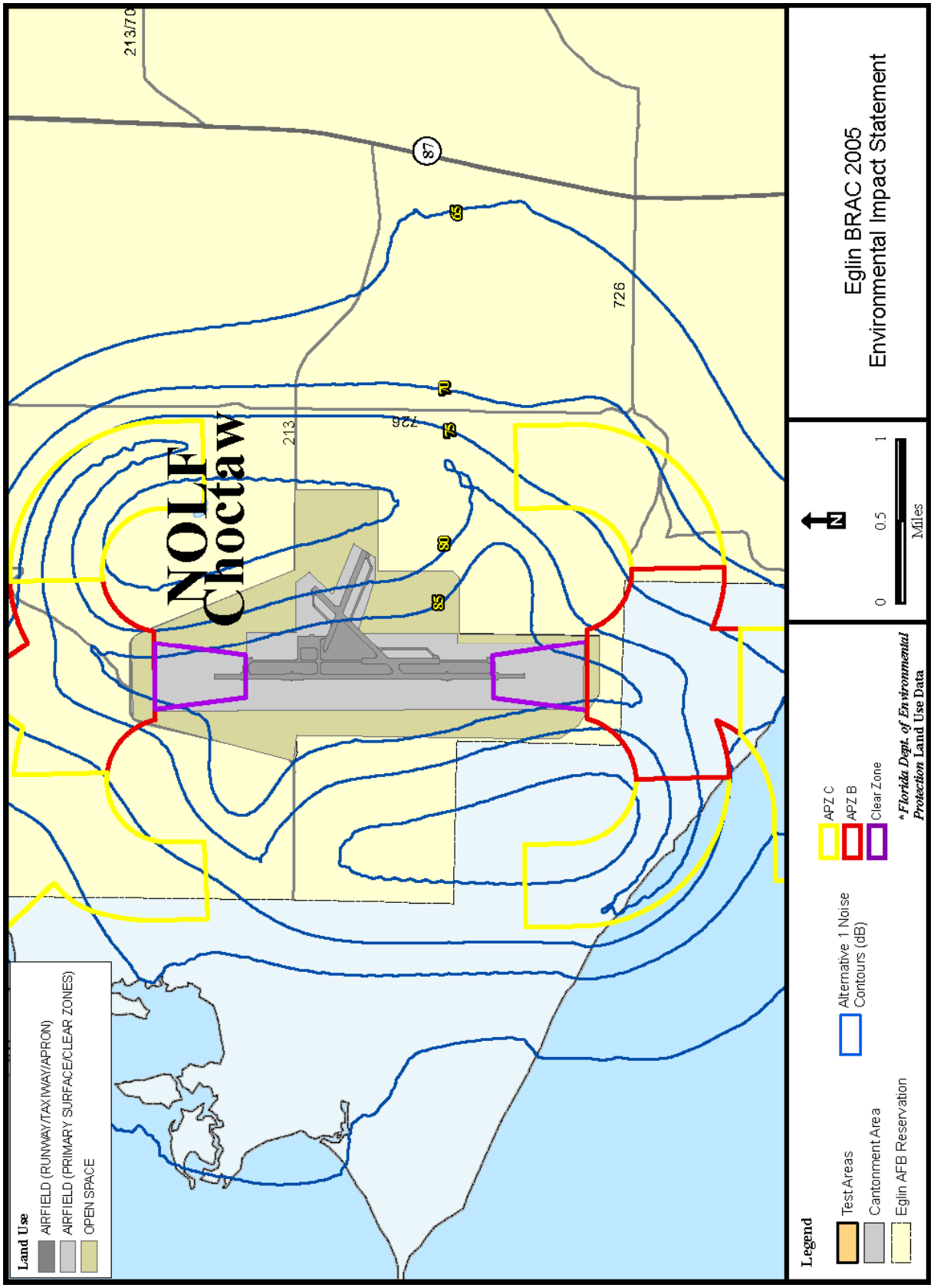

Figure 7-17. JSF Flight Training Alternative 1 – Choctaw Field Land Use and Alternative 1 Noise Contours

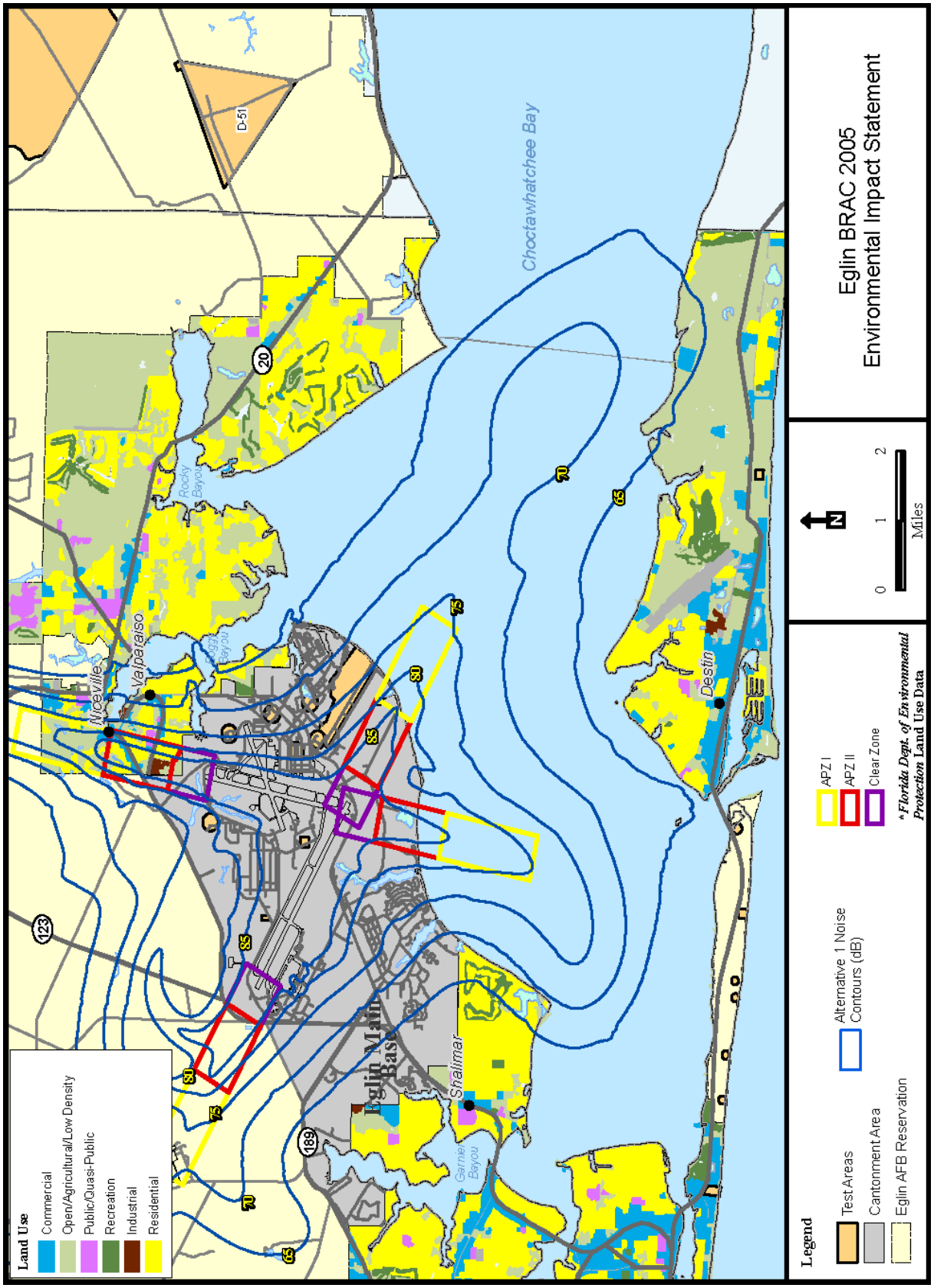

Figure 7-18. JSF Flight Training Alternative 1 – Off-Base Land Use and Alternative 1 Noise Contours in the Vicinity of Eglin Main Base

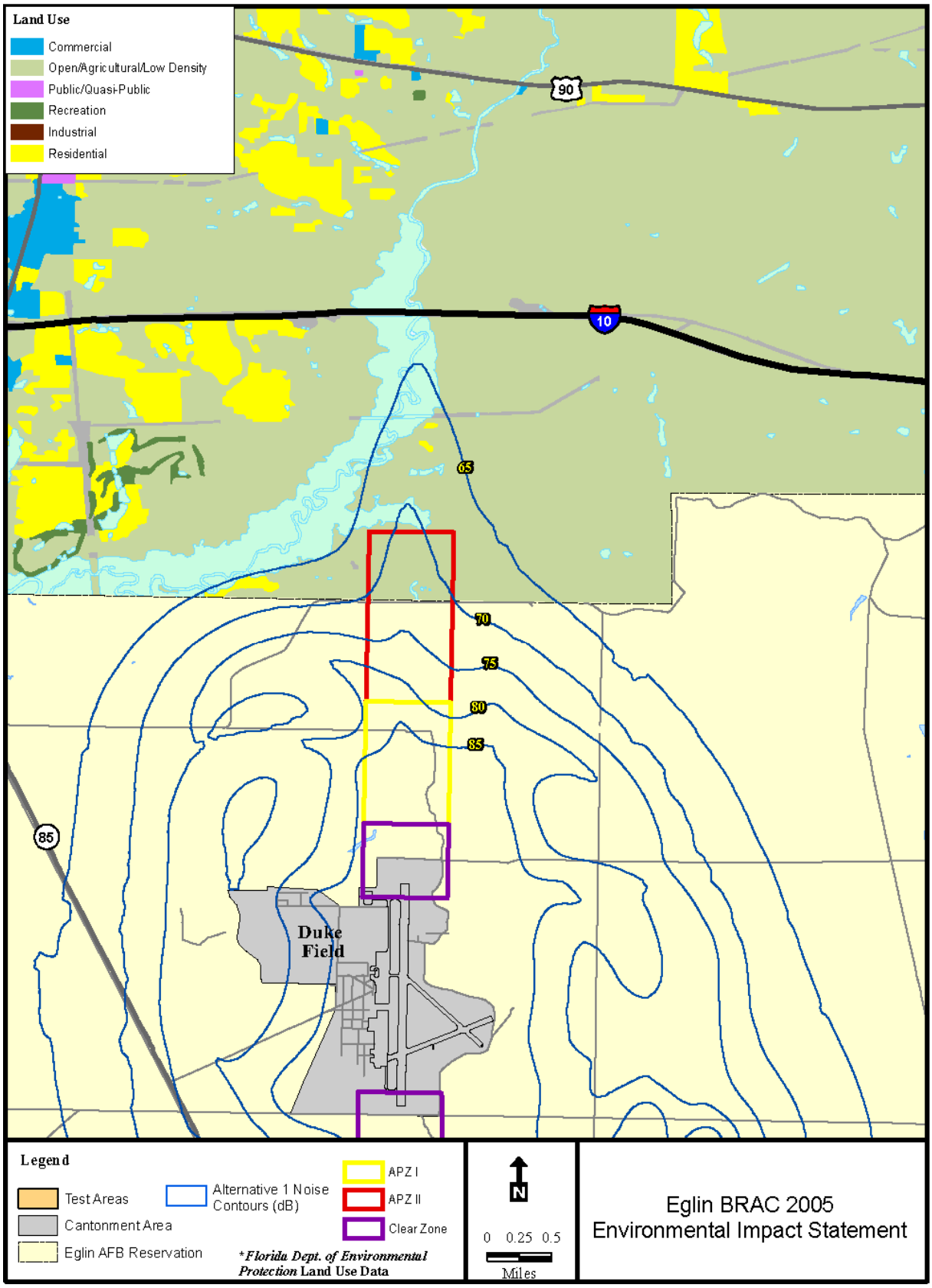

Figure 7-19. JSF Flight Training Alternative 1 – Off-Base Land Use and Alternative 1 Noise Contours in the Vicinity of Duke Field

The total off-base area in the vicinity of Eglin Main Base and Duke Field that would be exposed to aircraft noise greater than 65 dB DNL is about 3,405 acres. This includes the total off-base area on land and over water. Of the total off-base area exposed in the vicinity of Eglin Main Base and Duke Field, approximately 3,165 acres in the following land use categories would be exposed to noise levels greater than 65 dB DNL:

- Residential (914 acres)
- Commercial (277 acres)
- Public/quasi-public (36 acres)
- Industrial (47 acres)
- Recreational (85 acres)
- Open/agricultural/low density (1,806 acres)

Perceived adverse land use compatibility impacts would be greatest within residential areas exposed to noise levels above 75 dB DNL. Noise exposure above 75 dB DNL would impact most uses in the public/quasi-public category and some uses within the commercial category unless measures for noise level reduction were included in the design and construction of the buildings. Existing buildings without noise level reduction measures could be retrofitted to minimize the impact. Land use compatibility in the recreational category could be adversely impacted depending on the specific use. Most uses in the industrial and open/agricultural/low-density categories are compatible without restrictions.

Of the total off-base area exposed in the vicinity of Eglin Main Base and Duke Field, approximately 782 acres in the following land use categories would be exposed to noise levels greater than 75 dB DNL:

- Residential (246 acres)
- Commercial (92 acres)
- Public/quasi-public (15 acres)
- Industrial (28 acres)
- Recreational (1 acres)
- Open/agricultural/low density (400 acres)

Using Choctaw Field for JSF flight training would expose a total of approximately 4,755 acres of off-base property to noise levels greater than 65 dB DNL. Approximately 1,279 acres of off-base property would be exposed to noise levels greater than 75 dB DNL (Figure 7-20). The affected area includes undeveloped land to the north, west, and south of Choctaw Field in Santa Rosa County. The majority of affected property is categorized as open/agricultural/low-density land use but approximately 19 acres of residential land use would be exposed to noise levels around 65 dB DNL. The affected residential area is located along East Bay northwest of Navarre. No adverse impacts on the existing land use compatibility would occur.

In addition to the impacts associated with the AICUZ area of influence, JSF flight training could also impact land use compatibility beneath several SUA units (R-2914, R-2915A, Tyndall MOA C/D/E/F, VR-1082 and VR-1085). The affected airspace associated with Eglin AFB and the JSF is discussed in more detail in Chapter 3 (Section 3.1, Airspace). Noise from the proposed JSF flight training within the SUA units is discussed in more detail in Section 7.3 (Noise).

The noise levels (DNL_{mr}) under the proposed JSF flight training actions for R-2914A and R-2915A would be approximately 71 and 74 dB respectively. Under the Tyndall MOA, the level would be about 64 dB. The highest airspace noise levels under the proposed JSF flight training action would be for the two MTRs (VR-1082 and VR-1085). Noise levels would vary by segment within the MTRs between 57 and 76 dB. The noise level would be greatest where the two routes overlap each other and for those receptors directly under the aircraft as they fly over. However, the aircraft could fly anywhere within the width of the MTR (i.e., they don't always fly down the "center line"). For additional information see the discussion of Special Use Airspace Units in Section 7.3.1.2.

Land use compatibility can be impacted from noise exposures of 65 dB DNL and greater depending on the type of land use that is affected and whether or not noise level reduction measures are used. Because land use under the majority of the MTRs and SUA units appears to be rural with a low population density, it should not be adversely impacted. However, there are small cities and towns that would be impacted at noise levels of greater than 75 dB DNL. Land use compatibility for affected residential areas and other noise-sensitive receptors (e.g., churches, schools, and hospitals) could be adversely impacted. The two MTRs also occur over the Conecuh National Forest in Alabama. Recreational users seeking solitude or a wilderness experience in this National Forest might perceive the increased noise as an adverse impact.

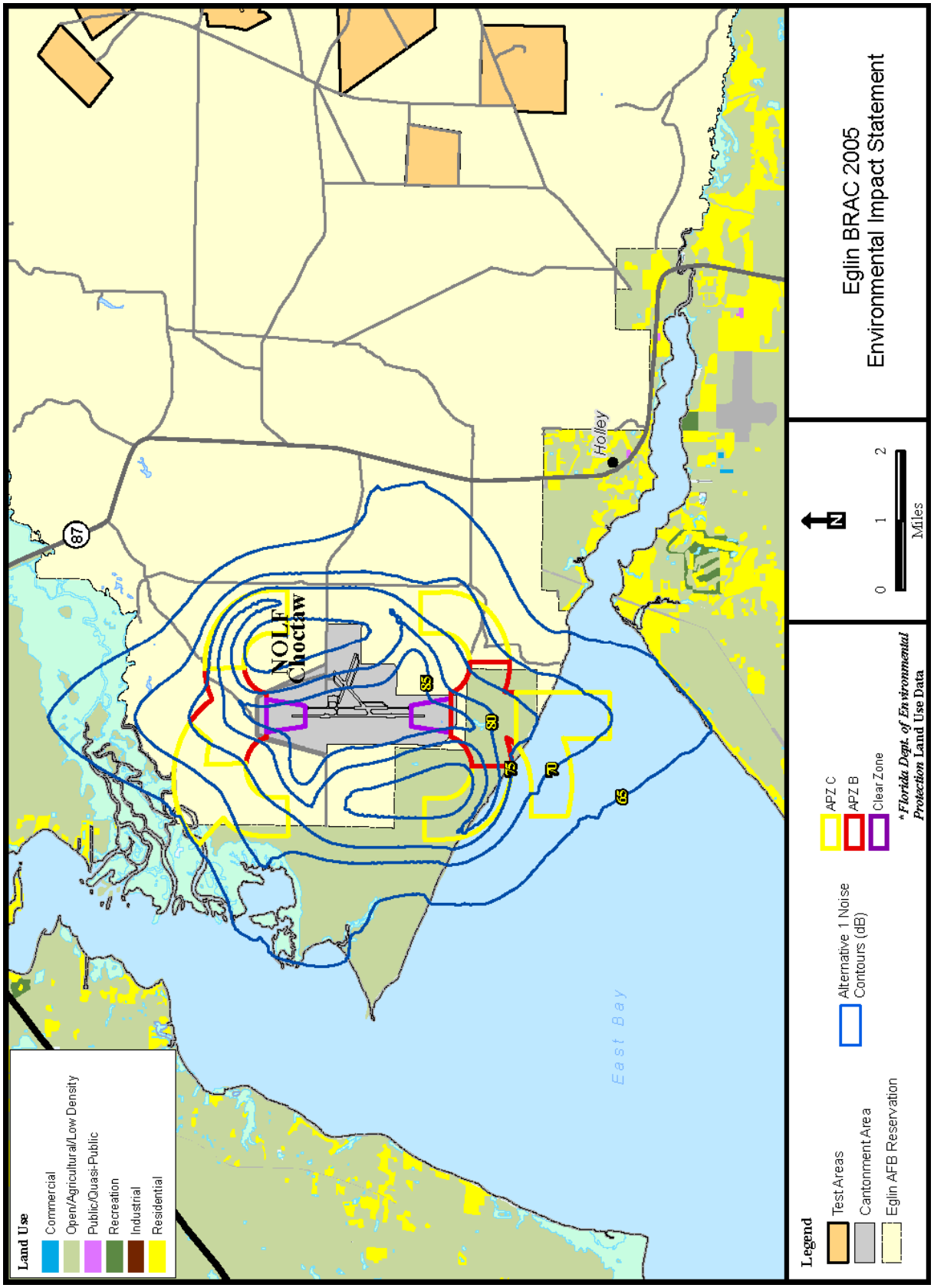

Figure 7-20. JSF Flight Training Alternative 1 – Off-Base Land Use and Alternative 1 Noise Contours in the Vicinity of Choctaw Field

7.4.2 JSF Flight Training Alternative 2

7.4.2.1 Existing Conditions (Land Use – JSF Flight Training Alternative 2)

Military Land Use

Existing military land use at **Eglin Main Base** is described in Chapters 3, 4, and 6 (Sections 3.3, 4.3, and 6.3, Land Use). Military land use for **Duke Field** is described in Chapter 4 (Section 4.3, Land Use). Land use at **Choctaw Field** is described in Section 7.4.1.1, JSF Flight Training Alternative 1.

Community Land Use

The existing off-base community land use for the area surrounding Eglin Main Base, Duke Field, and Choctaw Field is presented in Section 7.4.1.1, JSF Flight Training Alternative 1.

7.4.2.2 Environmental Consequences (Land Use – JSF Flight Training Alternative 2)

Military Land Use

Figure 7-21 shows the existing land use for Eglin Main Base and the JSF noise contours for JSF Flight Training Alternative 2. Approximately 46,345 acres of Eglin AFB property would be exposed to noise levels greater than 65 dB DNL. The affected area includes Eglin Main Base, Duke Field, and the Eglin Range. The affected areas and impacts would be similar to those described for JSF Flight Training Alternative 1, except the affected area is slightly larger than JSF Flight Training Alternative 1, due to the heavier use of the Eglin Main Base airfield. Noise exposures would be greater on the east side of the airfield under JSF Flight Training Alternative 2.

Impacts at Duke Field would be similar to those described for JSF Flight Training Alternative 1, except the area exposed to noise levels greater than 75 dB DNL would be smaller (Figure 7-22). However, the unaccompanied housing area and other buildings adjacent to the runway could still be exposed to noise levels of 80 dB DNL or greater.

Noise exposures at Choctaw Field would be similar to those described for JSF Flight Training Alternative 1 and would not have any adverse impacts on existing on-base land use compatibility.

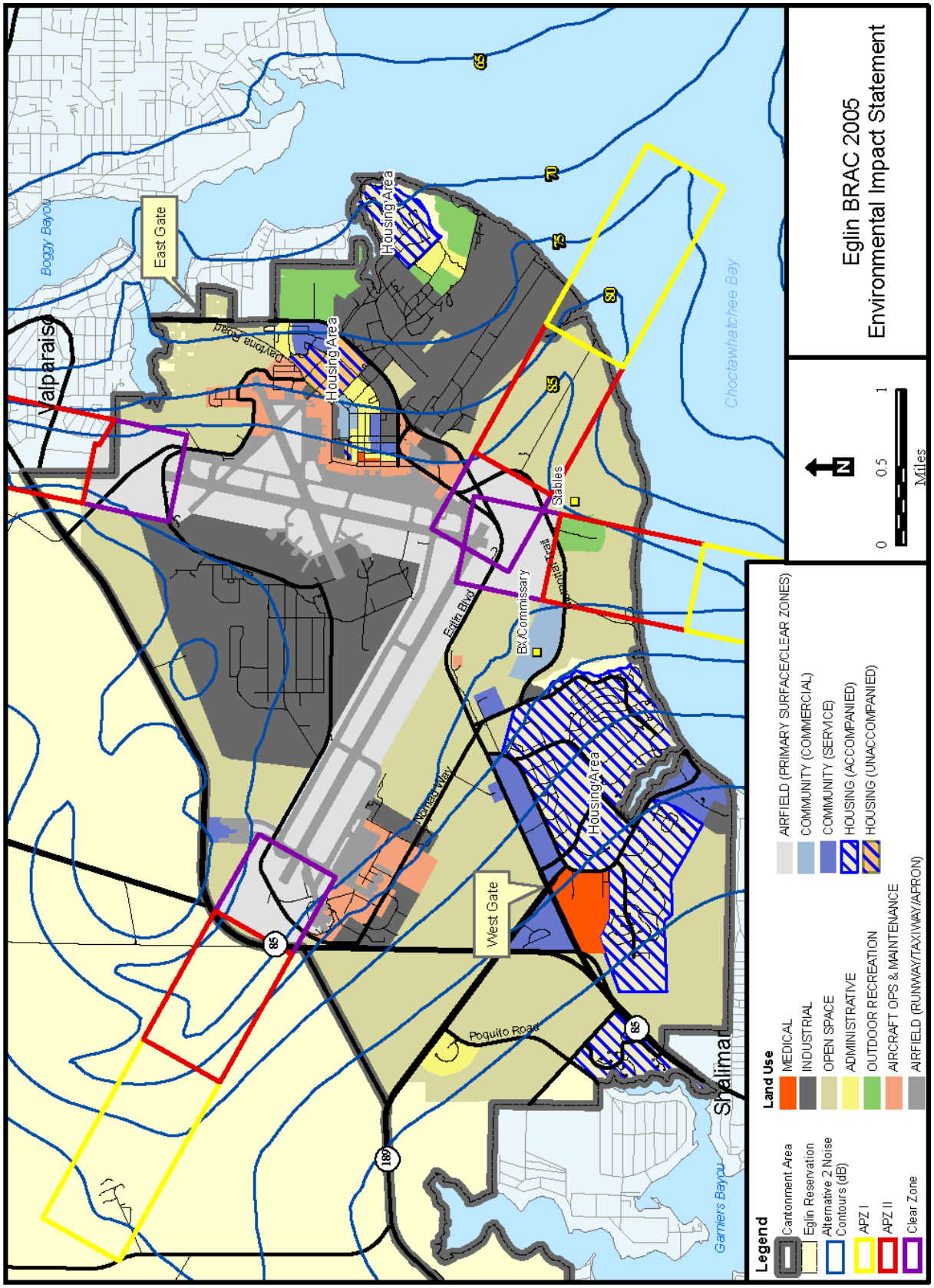

Figure 7-21. JSF Flight Training Alternative 2 – Eglin Main Base Land Use and Alternative 2 Noise Contours

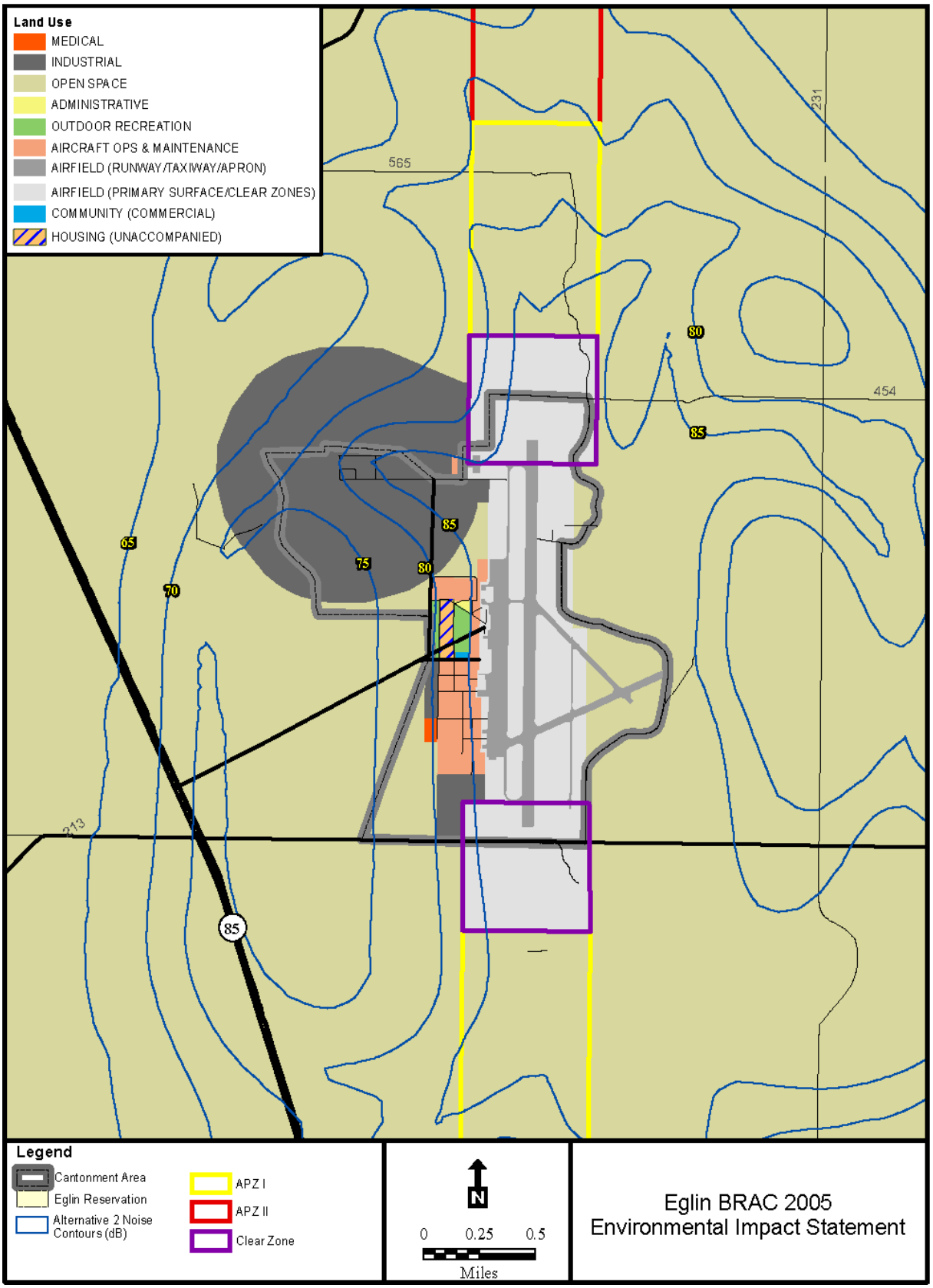

Figure 7-22. JSF Flight Training Alternative 2 – Duke Field Land Use and Alternative 2 Noise Contours

The affected interstitial area of the Eglin Range exposed to noise levels above 65 dB DNL would be similar to JSF Flight Training Alternative 1, and there would be no adverse impacts or compatibility issues with the existing land use.

Community Land Use

Implementation of JSF Flight Training Alternative 2 would also have land use compatibility impacts on affected areas off Eglin AFB resulting from the increased noise from the JSF flight training operations. The affected areas would be similar to those described for JSF Flight Training Alternative 1. However, larger areas of Valparaiso, Niceville, Okaloosa Island, and Destin would be impacted because of the heavier use of the Eglin Main Base airfield. The off-base area north of Duke Field would also be very similar to JSF Flight Training Alternative 1.

The affected areas and the AICUZ noise contours are shown in Figure 7-23 and Figure 7-24. The affected off-base area and impacts associated with the use of Choctaw Field are similar to JSF Flight Training Alternative 1 but less off-base area to the north and west would be exposed to noise levels greater than 65 dB DNL.

The total off base area in the vicinity of Eglin Main and Duke Field that would be exposed to aircraft noise greater than 65 dB DNL is approximately 5,008 acres. This includes the total off-base area on land and over water. Of the total off-base area exposed in the vicinity of Eglin Main and Duke Field, approximately 4,625 acres in the following land use categories would be exposed to noise levels greater than 65 dB DNL:

- Residential (1,592 acres)
- Commercial (611 acres)
- Public/quasi-public (50 acres)
- Industrial (37 acres)
- Recreational (148 acres)
- Open/agricultural/low density (2,187 acres)

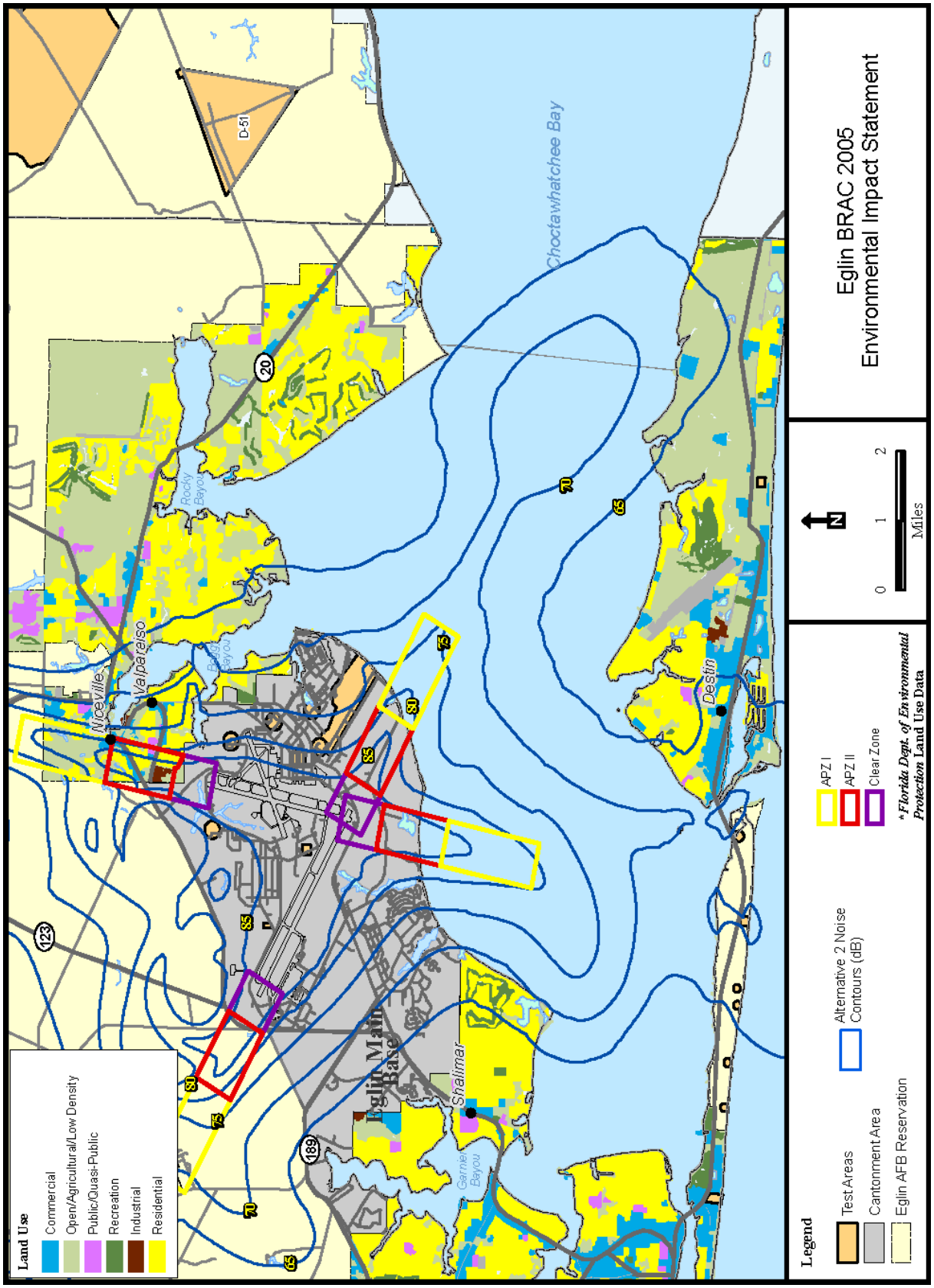

Figure 7-23. JSF Flight Training Alternative 2 – Off-Base Land Use and Alternative 2 Noise Contours in the Vicinity of Eglin Main Base

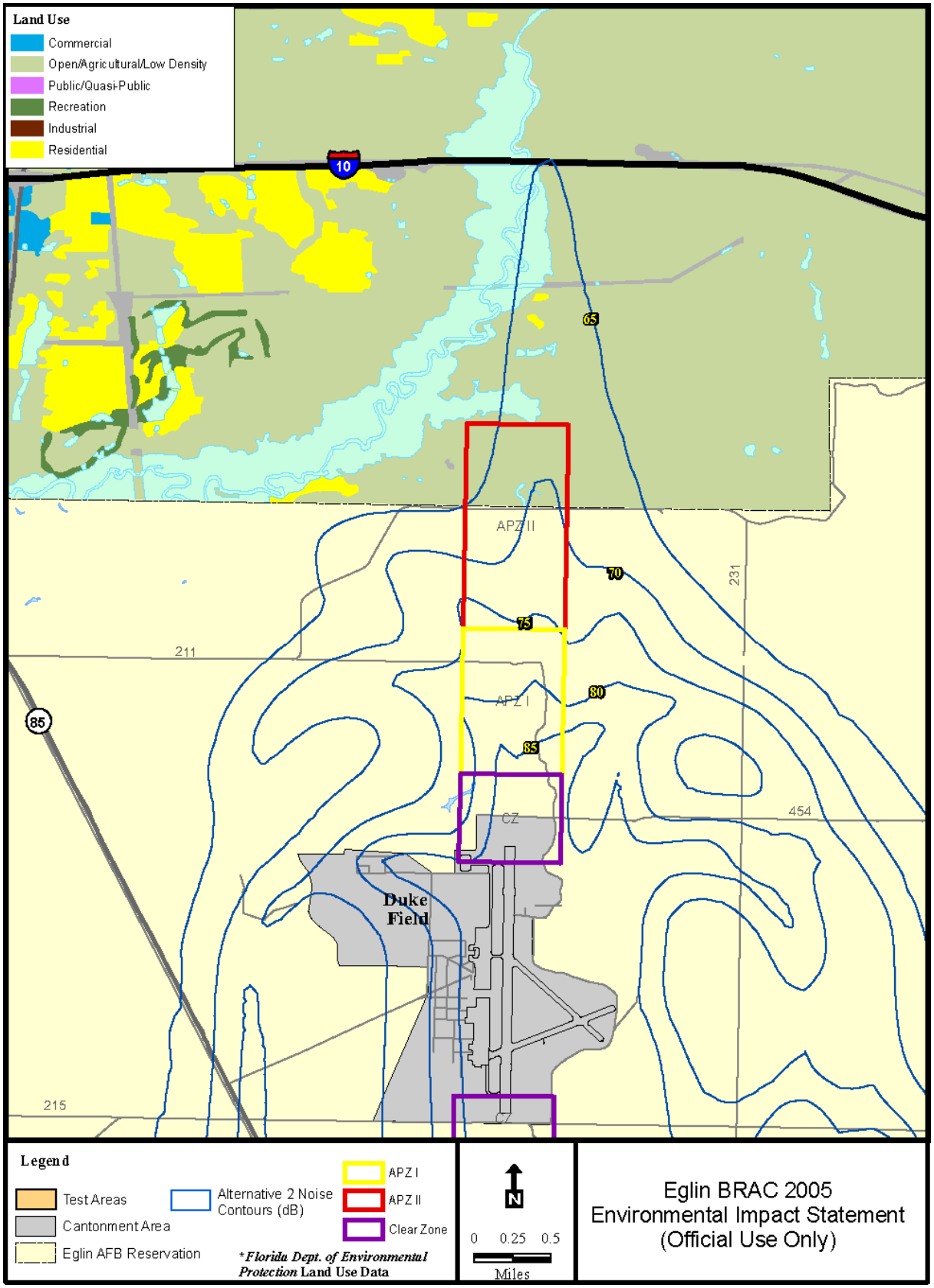

Figure 7-24. JSF Flight Training Alternative 2 – Off-Base Land Use and Alternative 2 Noise Contours in the Vicinity of Duke Field

Land use compatibility impacts would be greatest within residential areas exposed to noise levels above 75 dB DNL. Noise exposure above 75 dB DNL would impact most uses in the public/quasi-public category and some uses within the commercial category unless measures for noise level reduction were included in the design and construction of the buildings. Existing buildings without noise level reduction measures could be retrofitted to minimize the impact. Land use compatibility in the recreational category could be adversely impacted depending on the specific uses. Most uses in the industrial and open/agricultural/low-density categories are compatible without restrictions. Land use compatibility impacts under the SUA units would be the same as described for JSF Flight Training Alternative 1.

Of the total off-base area exposed in the vicinity of Eglin Main Base, approximately 931 acres in the following land use categories would be exposed to noise levels greater than 75 dB DNL:

- Residential (343 acres)
- Commercial (104 acres)
- Public/quasi-public (16 acres)
- Industrial (28 acres)
- Recreational (9 acres)
- Open/agricultural/low density (431 acres)

Using Choctaw Field for JSF flight training would expose a total of approximately 2,296 acres of off-base property to noise levels greater than 65 dB DNL. Approximately 592 acres of off-base property would be exposed to noise levels greater than 75 dB DNL (Figure 7-20). The affected area includes undeveloped land to the north, west, and south of Choctaw Field in Santa Rosa County. All the affected property is categorized as open/agricultural/low-density land use. No adverse impacts on the existing land use compatibility would occur.

7.4.3 No Action Alternative

There would be an overall decrease in flight operations at Eglin Main Base and Duke Field under the No Action Alternative. Greater than 65 dB DNL noise exposures on- and off-base would be less than the baseline noise contours and the overall affected area would decrease. Noise exposures for Choctaw Field would remain the same as the baseline. As a result there would be no adverse land use compatibility issues for any areas beyond those that currently exist under baseline conditions.

7.5 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

7.5.1 JSF Flight Training Alternative 1 (Preferred Alternative)

JSF Flight Training Alternative 1 utilizes Eglin Main Base, Duke Field, and Choctaw Field for airfield operations associated with training requirements while TAs B-75, B-82, C-52E, and C-62 are used for munitions expenditures and strafing (air-to-ground machine-gun fire) activities.

7.5.1.1 Existing Conditions (Socioeconomics and Environmental Justice – JSF Flight Training Alternative 1)

Existing socioeconomic and environmental justice conditions are discussed in Chapter 3 (Sections 3.4.2 and 3.4.6, Region of Influence and Existing Conditions: Socioeconomics and Environmental Justice, respectively). In addition to impacts that would occur in the vicinity of airfields proposed to be used for JSF flight training, there would also be impacts in several units of military airspace.

7.5.1.2 Environmental Consequences (Socioeconomics and Environmental Justice – JSF Flight Training Alternative 1)

The noise analysis has determined that aircraft noise associated with JSF Flight Training Alternative 1 would generate increases in noise levels in certain off-base areas. Therefore, an analysis was conducted to determine whether there would be disproportionately high and adverse noise impacts on minority and low-income populations, and whether elevated noise levels would create special risk factors for children. There is little to suggest that airspace modifications under the Proposed Action would impact land values in the affected area. The complex nature of property valuation factors makes any estimation of the potential effects of airspace modifications on land values highly speculative. Other socioeconomic factors, such as business activity, employment, interest rates, and land scarcity (or availability) are much more likely to affect property values than a change in aircraft or flight operations.

According to DoD Instruction 4165.57, *Air Installations Compatible Use Zones*, noise levels of 65 dB DNL or greater are not compatible with residential land uses without noise attenuation measures. According to a study conducted by the Federal Interagency Committee on Urban Noise (FICUN), noise levels between 65 and 70 dB DNL are compatible with educational services, such as schools, provided that measures are taken to provide noise level reduction in the buildings of 25 dB (FICUN, 1980). Noise levels between 70 and 75 dB DNL are also compatible with educational services, with noise level reduction of 30 dB. Noise levels of 75 dB DNL and above are not considered compatible with educational services.

As identified in Section 7.3, Noise, aircraft noise contours were developed based on the proposed JSF activities. Aircraft noise is generally considered to be of concern at levels of 65 dB DNL or greater. Noise impacts would occur in locations where a

noise-sensitive area is at average noise levels of less than 65 dB DNL under baseline conditions and is at average noise levels of greater than 65 dB DNL after action implementation. Under JSF Flight Training Alternative 1, the population affected by noise levels of 65 dB DNL and above in the immediate vicinity of Eglin AFB would increase 225 percent over existing conditions to include an additional 4,758 affected persons (Figure 7-25) for a total of 6,871 affected persons over the existing noise levels. Of the total number of people affected, 1,381 (20.1 percent) would be minorities and 693 (10.1 percent) would be low-income persons.

In the communities of comparison established in Chapter 3 (Section 3.4, Socioeconomics and Environmental Justice), minorities represent 19 percent of the population in Okaloosa County and 8.8 percent are low-income for noise levels associated with use at Eglin Main and Duke Field. For noise levels associated with Choctaw Field, the community of comparison is Santa Rosa County where minorities represent 10.9 percent of the population and low-income persons represent 9.8 percent. Demographic analysis of census data indicates that of the areas impacted by noise levels of greater than 65 dB DNL minority and/or low-income populations do not represent a disproportionately high percentage of the affected population as compared to the community of comparison established in Section 3.4 (Figure 7-25).

Operations proposed to occur in military airspace would be the same under all action alternatives. The F-35s would conduct approximately 122 sorties per day in SUA for a total of 30,000 sorties per year—a net increase of 80 sorties per day and 20,000 per year as compared to the current operations flown by the F-15s. Under implementation of any of the action alternatives, noise levels would increase under several military airspace units (Section 7.3, Noise).

There are two MTRs proposed for use in JSF flight training, VR-1082 and VR-1085, where JSF training would increase noise levels. The MTRs overlie 10 counties in Florida and Alabama. Of the 10 counties, the populations under the MTRs by census tracts in three of the counties have minority and/or low income populations that are disproportionate to the respective populations in the county overall (Table 7-20). All three counties (Clarke, Monroe, and Wilcox) are located in Alabama. In total, beneath the MTRs, 21,323 persons could potentially be affected by noise levels of between 57 and 76 dB DNL. Of the total population to be affected, over 18,000 would be minority and/or low income persons and over 5,000 would be persons under the age of 18. Aircraft sortie-operations on the MTRs would continue to be relatively infrequent (less than 2 per day). However, individual overflights could be alarming to people overflown and would be expected to cause significant annoyance to between 6 to 40 percent of the population affected (Section 7.3, Noise). Table 7-20 illustrates the overflown areas that have minority and/or low-income populations that are disproportionate to the counties overall.

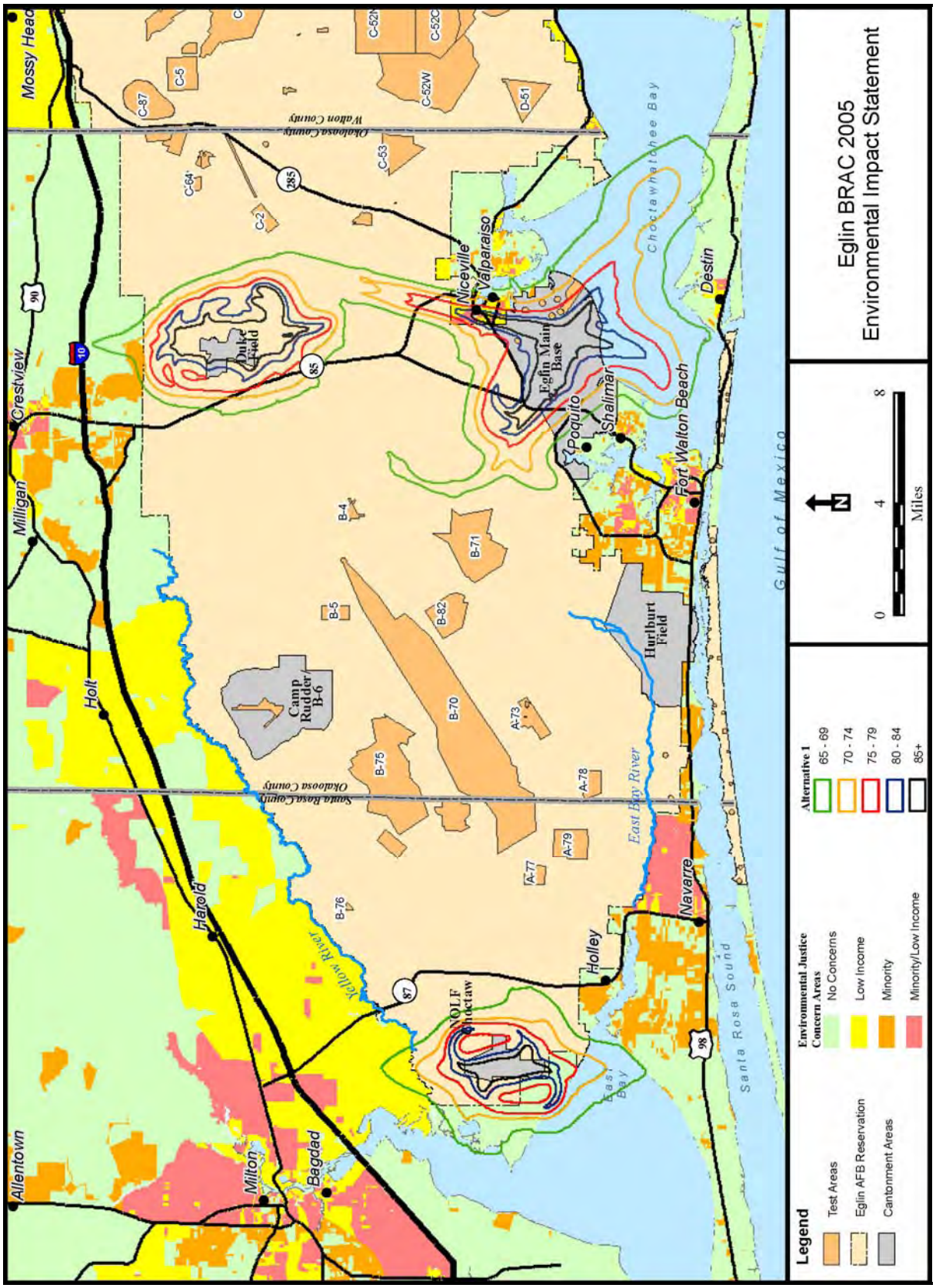

Figure 7-25. JSF Flight Training Alternative 1 – Environmental Justice Concerns Within Proposed Noise Contours

Table 7-20. Disproportionate Populations of Concern Under Special Use Airspace

Airspace Segment	Florida County	Affected Land Area (mi²)	Total Disproportionate Population	Disproportionate Minority Population	% Minority	County CoC % Minority	Disproportionate Low Income Population	% Low Income	County CoC % Low Income
VR-1082 C - D	Clarke, AL	11.41	60	59	98.33	44.31	18	30.00	22.59
VR-1082 C - D	Wilcox, AL	28.34	170	156	91.76	72.61	73	42.94	39.94
VR-1082 D - E	Monroe, AL	72.58	1,615	1,324	81.98	42.60	567	35.11	21.32
VR-1082 DA - E	Monroe, AL	121.70	1,898	1,555	81.93	42.60	656	34.56	21.32
VR-1082 DA - E	Wilcox, AL	13.50	56	54	96.43	72.61	21	37.50	39.94
VR-1085 C - D	Clarke, AL	128.19	1,629	1,325	81.34	44.31	621	38.12	22.59
VR-1085 D - E	Clarke, AL	81.34	981	691	70.44	44.31	290	29.56	22.59
VR-1085 D - E	Monroe, AL	170.30	1,476	1,020	69.11	42.60	372	25.20	21.32
Eglin MOA A EAST	Santa Rosa	19.69	35	0	0.00	10.89	7	20.00	9.83
Tyndall MOA C/H	Bay	70.38	3166	199	6.29	17.21	845	26.69	13.04
Tyndall MOA D	Calhoun	128.51	854	138	16.16	22.37	262	30.68	20.00
Tyndall MOA D	Gulf	50.42	1,905	740	38.85	21.30	345	18.11	16.68
Tyndall MOA F	Franklin	40.57	72	21	29.17	20.21	17	23.61	17.73
R-2914A	Washington	5.17	3	0	0.00	19.53	1	33.33	19.18
R-2915A	Okaloosa	28.35	1,039	47	4.52	19.03	214	20.60	8.84
R-2915B	Okaloosa	10.47	30,001	7764	25.88	19.03	2,137	7.12	8.84
R-2915B	Santa Rosa	2.46	2,588	510	19.71	10.89	212	8.19	9.83

COC = Community of Concern; MOA = Military Operating Area

The Eglin MOA is located immediately north of the Eglin Reservation spanning east to west from Walton County to Santa Rosa County to Walton County. The area underneath the Eglin MOA is also a fairly rural area. However, homes would be overflown, potentially alarming people and animals. An estimated 8,776 people could be affected by the increased noise levels. Approximately 7 percent of the affected population would be minorities, and 16 percent would be low-income populations. In Santa Rosa County, the area that underlies Eglin MOA A East has a low-income population that is disproportionate to the low-income population in the county (Table 7-20).

The noise levels in the MOA would increase under the proposed JSF flight training from a current noise level of less than 45 dB DNL to noise levels between 49 and 61 dB DNL. This increase in the level of noise would be expected to cause annoyance to residents. Of the population affected by operations in the Eglin MOA, it is expected that 1 to 7 percent would be highly annoyed (Section 7.3, Noise).

The JSF flight training would also conduct sorties in the Tyndall MOA, located over seven counties east and southeast of Eglin AFB. Similar to the Eglin MOA, much of the

area underneath the MOA is rural with a large portion of the land being used for agriculture and timber. The nearest large population center is Panama City, which is not included underneath the airspace. Noise levels in the Tyndall MOA would increase from JSF operations from less than 45 dB DNL to 64 dB DNL. Approximately 46,300 people could be affected by the increased noise levels, of which 18 percent (8,300) would be minorities and 19 percent (8,700) would be low-income persons. Tyndall MOA C, D, F, and H overlie portions of Bay, Calhoun, Franklin, and Gulf Counties that have minority and/or low-income populations that are disproportionate to the respective populations for each county (Table 7-20).

The increase in the noise levels and the disproportionate effect on minorities and low-income persons would be expected to cause annoyance to residents where approximately 11 percent of the affected population would be annoyed.

There is also restricted airspace over the Eglin Reservation and the beachside communities in Okaloosa, Santa Rosa, and Walton Counties as well as portions of Washington and Bay Counties. These areas are designated as R-2914, R-2915, and R-2919. As many of the larger communities in these counties are located on the beaches underlying the restricted airspace, the estimated population affected would be nearly 60,750, of which 17 percent would be minority populations and 10 percent would be low-income populations. Under R-2914A, a portion of Washington County has low-income populations disproportionate to the county overall and in Okaloosa and Santa Rosa counties, R-2915A and R2915B overlie areas that have disproportionate minority and/or low-income populations county (Table 7-20).

Underneath these restricted airspaces, noise levels are expected to increase from less than 45 dB DNL up to a maximum of 71 dB DNL. This increase in the noise levels would be expected to cause annoyance. Between 1 and 33 percent of the affected population are expected to be highly annoyed, with noise levels in R-2915A expected to cause the highest level of annoyance.

The Federal Interagency for Aviation Noise (FICAN) has conducted studies that correlate high noise levels from aircraft to disruptions of learning (FICAN, 2000). Given that children have physiological and behavioral characteristics that make them more vulnerable than adults to negative effects of noise, special consideration was given to analysis of noise effects on children.

Under implementation of JSF Flight Training Alternative 1, special risks to children are anticipated in the form of increased difficulty in learning at several schools impacted by high noise levels (Figure 7-26). There are five schools in the Okaloosa County School District that would potentially be affected by noise levels of 65 dB DNL and above, as well as four daycares.

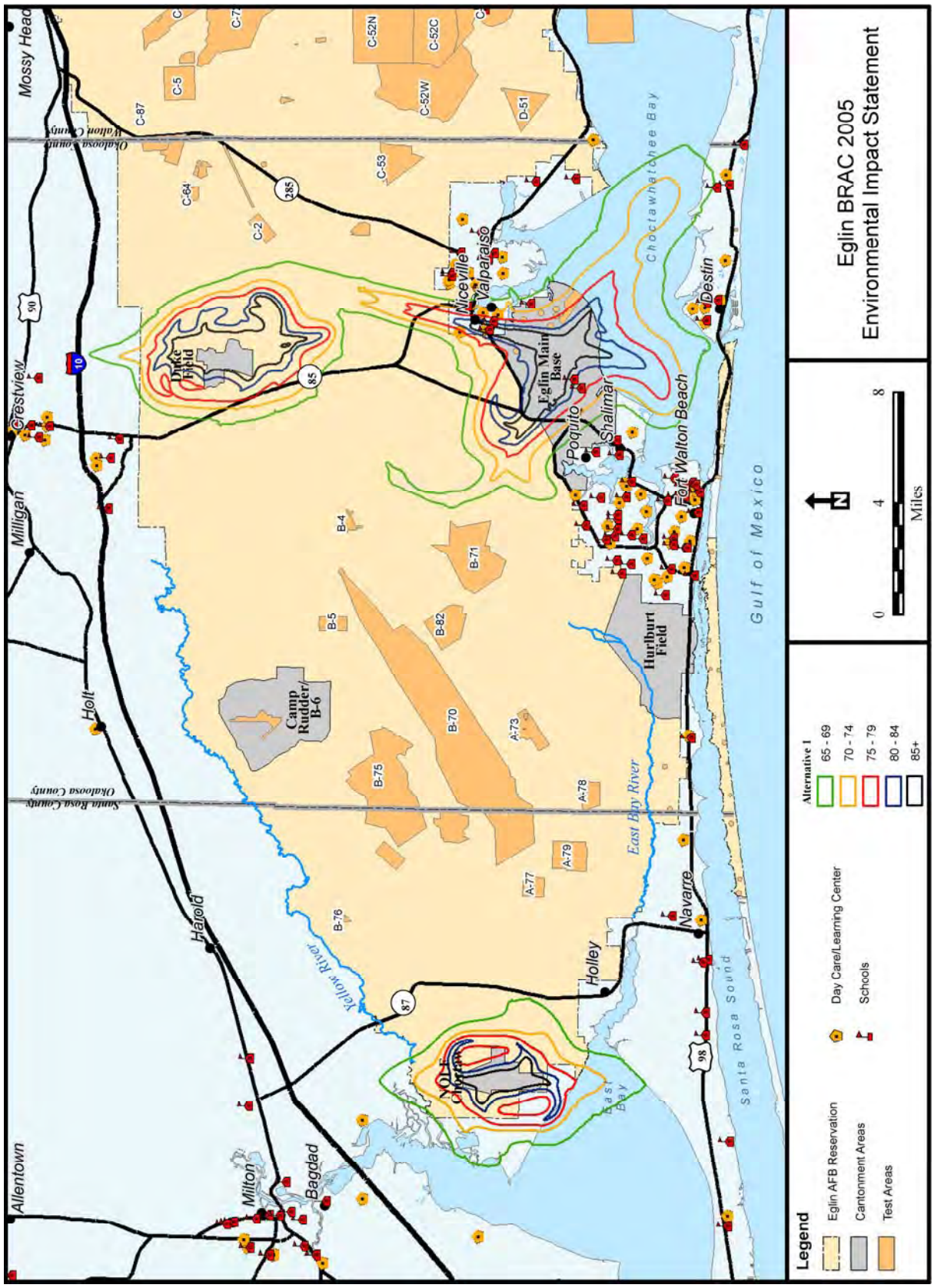

Figure 7-26. JSF Flight Training Alternative 1 – Schools and Childcare Centers Within Proposed Noise Contours

Addie R. Lewis Middle School and Lula J. Edge Elementary School would be subject to 65 dB DNL noise levels, Cherokee and Valparaiso Elementary Schools would be subject to 75 dB DNL noise levels, and Oak Hill Elementary School would be subject to noise levels of 80 dB DNL and greater. First Valparaiso Child Care, Angels Are Us Learning Center, and Miss Karen's Home Daycare would be subject to noise levels of 70 dB DNL. The Child Care Network, Inc. daycare and preschool would be subject to noise levels of 80 dB DNL and above. Under the existing conditions, Valparaiso Elementary School and Oak Hill Elementary School, as well as the Child Care Network, Inc. daycare and preschool have previously been subject to noise levels of 65 dB DNL. These noise levels under the proposed JSF flight training reflect an increase in the noise levels currently experienced and have the potential to interrupt speech and hinder the learning process in the classrooms. For any schools or daycares under the MTRs or the MOAs, the potential for disruptions in learning due to the aircraft noise would result in special risks to children.

Property values are determined by a combination of neighborhood characteristics (e.g., the quality of local schools, local property taxes, access to transportation, and the crime rate) and individual housing characteristics (e.g., age of the house, number of rooms, and amenities such as garages). There are no definitive federal standards for quantifying the impact of aircraft noise on property values. However, HUD, FHA, and VA mortgage policies generally prohibit guaranteeing mortgage loans for new homes located within noise zones of 75 dB Ldn or greater or within clear zones. These same mortgage policies make availability of federally guaranteed mortgage loans discretionary for new homes located within noise zones of 65 to 75 dB Ldn. The term "new home" includes new construction, existing homes that are less than one year old, and existing homes that have been substantially remodeled. HUD, FHA, or VA mortgage policies may also impose conditions on mortgage loan guarantees (such as written acknowledgement of noise conditions) for existing homes located in the 75 dB Ldn or greater noise zone or within clear zones. However, these policies do not necessarily affect property values.

Noise mitigation measures included in the alternatives are discussed in Section 7.3.5 Mitigation. Additional mitigation measures will be considered through the adaptive management process. Developments regarding the F-35 aircraft, the training syllabus, and the delivery schedule or other new information could warrant changes to operational procedures, source location, and/or provide additional noise mitigation measures. Should the adaptive management process demonstrate that changes outside what has been analyzed in the EIS are warranted, additional environmental analysis in accordance with the National Environmental Policy Act (NEPA) would occur.

The tourism industry contributes over $1 billion per year to the Okaloosa County economy. Tourism includes a variety of outdoor activities. Whether part-time residents or tourists are annoyed by noise from the F-35 would vary per individual. Some residents or tourists may choose to avoid areas that experience noise; however, the magnitude, diversity, and strength of the tourism industry in Okaloosa County is such that it is not expected that the F-35 would have an adverse effect on the tourism industry.

7.5.2 JSF Flight Training Alternative 2

JSF Flight Training Alternative 2 is similar to JSF Flight Training Alternative 1 with the exception that training activities would focus on Eglin Main Base with Choctaw Field and Duke Field utilized as auxiliary fields.

7.5.2.1 Existing Conditions (Socioeconomics and Environmental Justice – JSF Flight Training Alternative 2)

Refer to Section 3.4.2 in Chapter 3 for the socioeconomic existing conditions and Section 3.4.6 in Chapter 3 for the environmental justice existing conditions.

7.5.2.2 Environmental Consequences (Socioeconomics and Environmental Justice – JSF Flight Training Alternative 2)

Socioeconomic and Environmental Justice effects were analyzed for all sections of SUA. The socioeconomic effects of JSF training operations in the MOAs and MTRs are the same for each alternative and are discussed in more detail in Section 7.5.1.2, JSF Flight Training Alternative 1. The following discussion focuses on the environmental justice effects of the JSF training operations related to the airfields located on the Eglin Range.

Training activities under JSF Flight Training Alternative 2 would increase the number of people potentially affected by aircraft noise levels of 65 and greater by 428 percent. This increased area would result in approximately 9,048 additional people within the high noise level area as compared to the existing conditions for a total of 11,161 affected persons. Minority and low-income populations are identified in the vicinity of Eglin Main Base and Duke Field (Figure 7-27). Of the affected population, 1,458 persons (13 percent) would be minority, and 1,032 persons (9 percent) would be low-income.

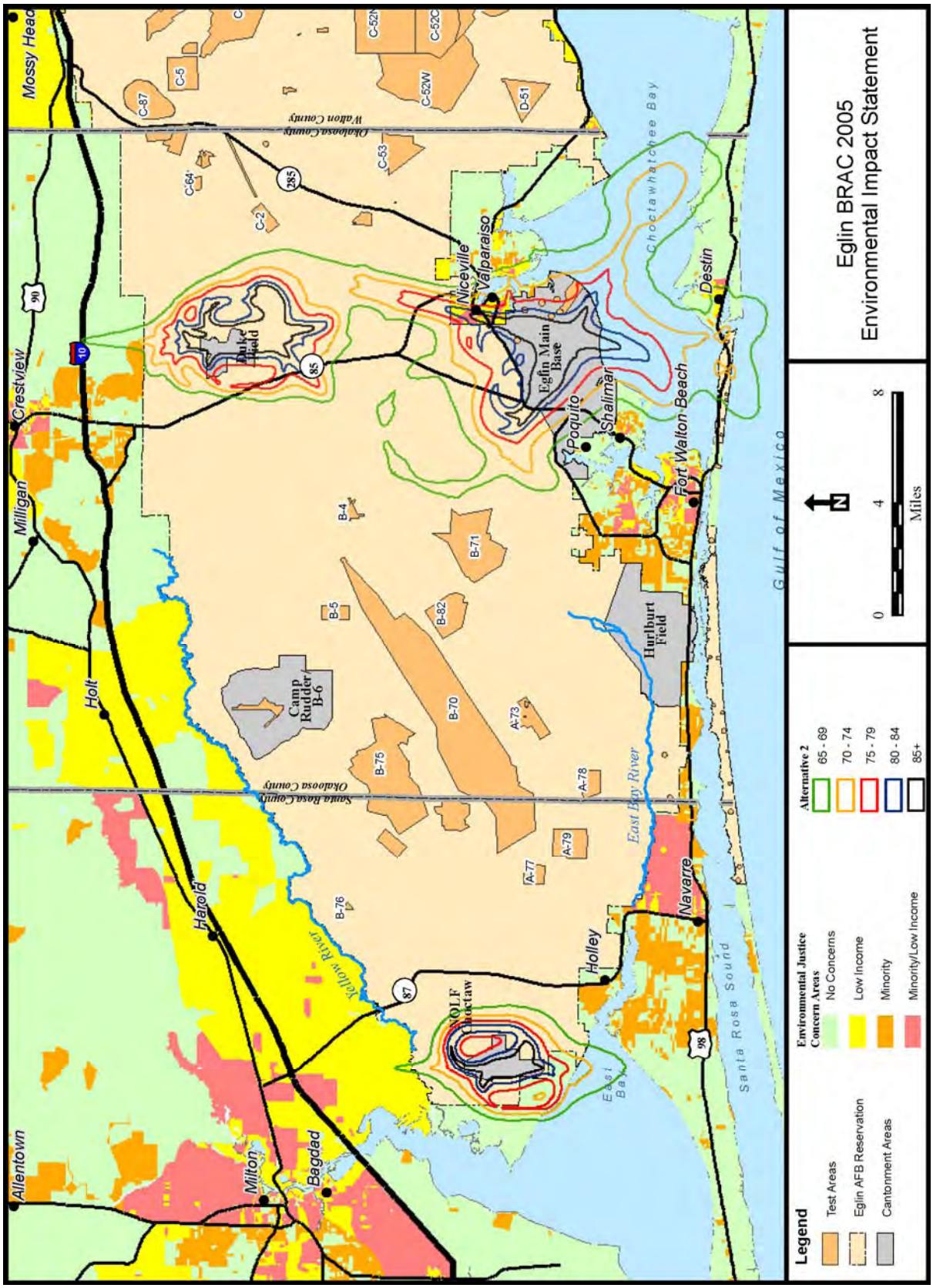

Figure 7-27. JSF Flight Training Alternative 2 – Environmental Justice Concerns Within Proposed Noise Contours

Schools and childcare facilities are also identified to analyze effects of aircraft noise on children (Figure 7-28). According to a study conducted by the FICUN, noise levels between 65 dB DNL and 70 dB DNL are compatible with educational services, such as schools, provided that measures are taken to provide noise level reduction in the buildings of 25 dB (FICUN, 1980). Noise levels between 70 and 75 dB DNL are also compatible with educational services with noise level reduction of 30 dB. Noise levels of 75 dB DNL and above are not considered compatible with educational services. The FICAN has conducted studies that correlate high noise levels from aircraft to disruptions of learning (FICAN, 2000). Eight schools from the Okaloosa County School District would be subject to aircraft noise levels of 65 dB DNL and above as well as five daycares.

Destin Middle School, First Baptist Academy, C.W. Ruckel Middle School, and Lula J. Edge Elementary School would be subject to noise levels at 65 dB DNL. Addie R. Lewis Middle School would be subject to 70 dB DNL noise levels while Cherokee and Valparaiso Elementary Schools would be subject to 75 dB DNL noise levels. Oak Hill Elementary School could be affected by noise levels of 80 dB DNL and greater. The First Baptist Church of Destin Child Development Center, First Valparaiso Child Care, and the Angels Are Us Learning Center would be subject to 65 dB DNL noise levels. The Child Care Network, Inc. daycare and preschool and Miss Karen's Home Daycare would be subject to noise levels of 75 dB DNL. Under the existing conditions, Valparaiso Elementary School, Oak Hill Elementary School, the Child Care Network, Inc., and Miss Karen's Home Daycare previously have been subject to noise levels of 65 dB DNL. The noise levels under the proposed JSF flight training would then increase the noise levels currently experienced and would have the potential to interrupt speech and impede the learning process in the classroom, resulting in special risks to children.

The potential for impacts associated with noise levels in the MTRs, Eglin MOA, and restricted airspace are analyzed in the section for JSF Flight Training Alternative 1. The effects of the noise levels would be identical under JSF Flight Training Alternative 2.

7.5.3 No Action Alternative

Under the No Action Alternative, other actions, including the decrease in personnel associated with the 33 FW because of the departure of the F-15s and the FY 2007 President's budget, would continue. The drawdown of the 33 FW would decrease by 9.5 percent the population affected by the noise levels currently experienced, affecting 200 fewer people. Of the total population that would no longer be affected by the high noise levels, 33 persons would be minority and 23 persons would be low-income, representing a disproportionate share of the community of comparison.

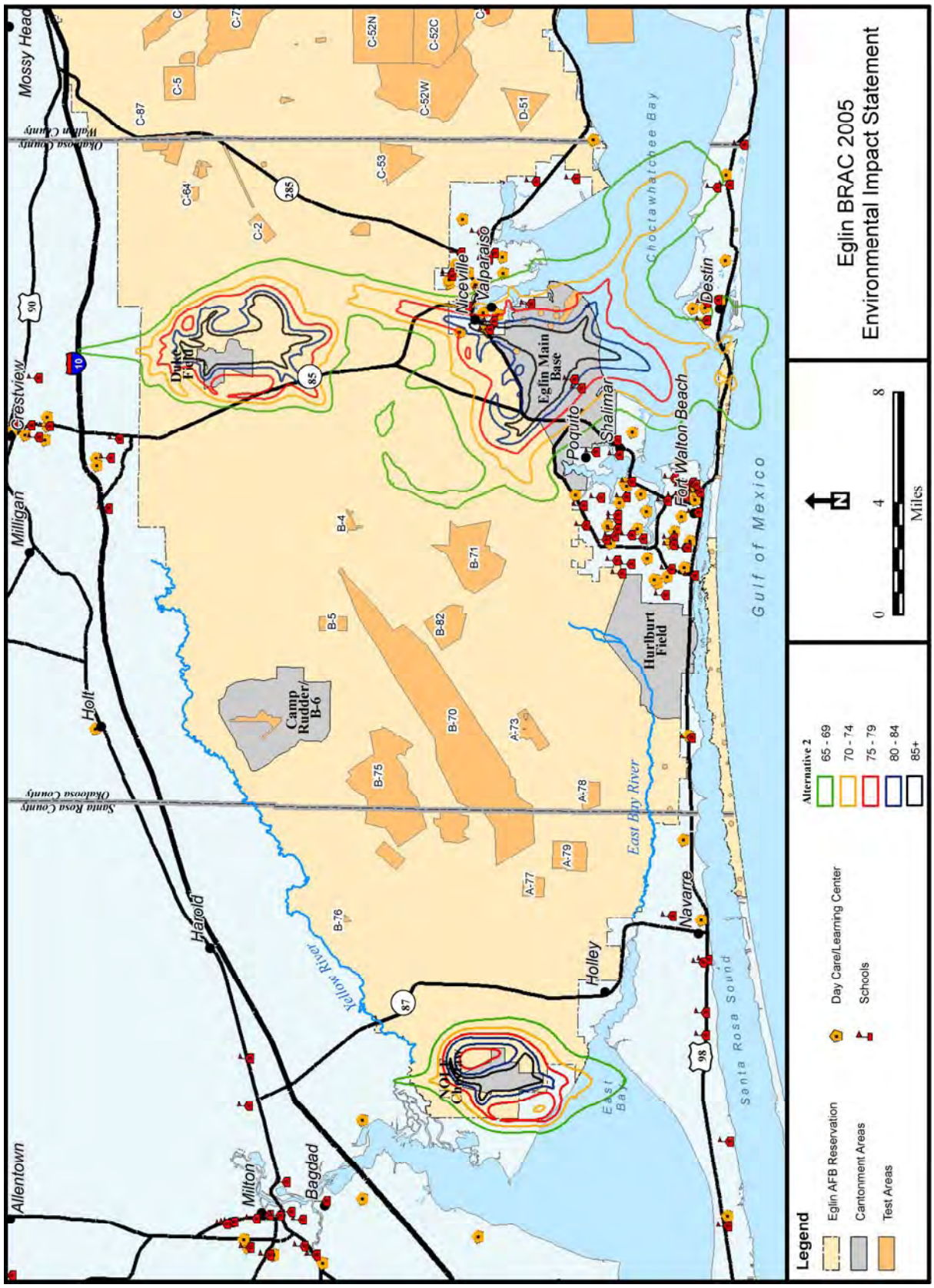

Figure 7-28. JSF Flight Training Alternative 2 – Schools and Childcare Centers Within Proposed Noise Contours

7.6 UTILITIES

The proposed airfields for JSF flight training must provide basic services in support of JSF operations regardless of how much training takes place at each airfield. These services are supported by utilities and generally include ATC, an ILS, fire protection, and crash crews. The airfields must have air traffic control, which generally involves a tower, radar or ATC radar feed in the tower, and support facilities including bathrooms. These features require electricity, potable water, and wastewater treatment. Lastly, to have fire protection and crash crews at each airfield requires electricity, water, and wastewater treatment.

7.6.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.6.1.1 Existing Conditions (Utilities – JSF Flight Training Alternative 1)

The utilities described and analyzed in this section include potable water, wastewater, and electricity. Natural gas is not currently required but is briefly discussed. The description and analyses focus on the capability of each utility to accommodate JSF training.

Potable Water

Two aquifers supply the water needs of Eglin AFB. The Floridan Aquifer is used primarily for potable water. The Sand and Gravel (S&G) Aquifer can be used for both potable water and for irrigation purposes. If used for potable water, the water drawn from the S&G Aquifer may require treatment before it is consumed to meet state and federal drinking water standards. The Floridan Aquifer generally does not require treatment, since it is a deeper aquifer and has better water quality than the shallower S&G Aquifer. Eglin Main Base potable water is supplied by two water systems. Duke Field has its own water system (Table 7-21).

Table 7-21. Eglin Main Base, Duke Field, and Choctaw Field Potable Water Systems

Water Systems	Aquifer	Water Use	Number of Wells
Main Base and Ammunition Area Water System	Floridan	Potable	9
Housing Area Water System	Floridan	Potable	10
Duke Field (Auxiliary Field 3) Community Water System	Floridan	Potable	3[a]
Choctaw Field Well	S&G	Potable	1

S&G = Sand and Gravel

a. One of the three wells is classified as limited use public supply.

Choctaw Field has one well that satisfies its potable water requirements (Table 7-21). The Northwest Florida Water Management District (NWFWMD) regulates the quantity of water drawn from the aquifers by issuing consumptive use permits (CUPs). The

three most important measures for adhering to the CUP authorizations are the average daily amount used, the maximum daily amount used, and the maximum monthly amount of water used by the entire water system.

Wastewater

Each proposed airfield site is supported by a wastewater treatment plant (WWTP) or septic systems. Two WWTPs service Eglin Main Base: the Plew Treatment Facility and Main Base Treatment Facility (Table 7-22). Plew WWTP serves the Eglin Main Base housing areas, the 33 FW, and the munitions storage areas. The Main Base WWTP serves all of Eglin Main Base east of the runway (U.S. Air Force, 2006o). One WWTP services Duke Field (Table 7-22). Wastewater at Choctaw Field is handled by septic tank systems (Joyner, 2006). Since all of the proposed airfields are well-established and utilized, the supporting wastewater infrastructure is already in place.

Table 7-22. Annual Average and Capacity of WWTPs

WWTP Location	Capacity in mgd	Annual Average in mgd (including July '06)	Percent Capacity Used	Areas Served by WWTP
Main Base Treatment Facility	1.0	0.469	46.9	Eglin Main Base east of the runway
Plew Heights Treatment Facility	1.5	0.549	36.6	Eglin Main Base housing, 33 FW, Munitions Storage Area
Duke Field	0.125	.015	12	Duke Field

Source: Brown, 2006b; U.S. Air Force, 2006o
mgd = million gallons per day; WWTP = wastewater treatment plant

Electricity

Electricity usage on Eglin AFB has been steady from fiscal year (FY) 2000 through FY 2007. The electrical infrastructure on Eglin Main Base, Duke Field, and Choctaw Field is extensive. Gulf Power supplies transmission-voltage electricity to Eglin Main Base via a primary meter. Two substations on Eglin track usage, regulate flow, and distribute electricity to Eglin Main Base, Duke Field, and portions of the Eglin Range. Gulf Power supplies electricity to Choctaw Field via a separate transmission system (Fleming, 2006; McBay, 2007).

Natural Gas

Natural gas consumption by Eglin Main Base has generally been steady over the last seven years, with a slow decline in usage between 2004 and 2006. The total base demand for natural gas in 2006 was approximately 234,734 million cubic feet (MCF) or

643 MCF per day. Infrastructure currently exists only at Eglin Main Base, the Duke Field cantonment, and the Navy Explosive Ordnance Disposal (EOD) School at D-51 on the Eglin Range. Propane tanks are used to supply gas at Choctaw Field. As the propane is depleted, additional supplies are delivered (Joyner, 2006).

7.6.1.2 Environmental Consequences (Utilities – JSF Flight Training Alternative 1)

Potable Water

Potable water infrastructure is currently in place at each of the proposed airfields. For this reason, no effects on the potable water infrastructure would occur as a result of the JSF flight training. Eglin Main Base is supplied by two water systems that collectively have enough excess capacity to handle the additional air traffic controllers and fire- and crash-protection crews (Table 7-23). The predicted water needs for the additional students, instructors, and maintainers associated with JSF at Eglin Main Base are included in Chapter 6 (Section 6.6.1, JSF IJTS Alternative 1: 33rd Fighter Wing Area and Section 6.6.2, JSF IJTS Alternative 2: East Side of Eglin Runway). The use of Eglin Main Base for JSF flight training would not have an adverse effect on potable water.

Duke Field is supplied by one water system, which is currently near its permitted capacities (Table 7-23); see Chapter 4 for details (Section 4.6.2, 7SFG(A) Cantonment Alternative 2: Near Duke Field). With the additional need of water for increased fire protection, crash crews, and students/instructors passing though Duke Field, the potable water system at Duke Field has the potential to come close to, if not exceed, permitted limits. An additional water system or water wells may be needed at Duke Field to support the new mission. Assuming that Duke's fire protection is adequate to handle the increase in operations and that the students and instructors would be transient, thus would have little affect on the water usage at Duke, no adverse effect is expected on potable water.

The amount of potable water currently drawn from the S&G Aquifer at Choctaw Field is well under the levels permitted by the CUP authorization for Choctaw Field (Table 7-23). The average daily use of the potable water well at Choctaw Field consumes approximately 10 percent of the permitted average daily limit, leaving approximately 90 percent before the CUP level is reached. Any additional water expected to be used by the JSF mission at Choctaw Field would be accommodated under the current CUP levels and would not result in adverse effects on the Choctaw Field potable water system.

Table 7-23. Permitted and Actual Potable Water Usage Eglin Main Base, Duke Field and Choctaw Field

Water Supply System	Permitted Average Daily Limit (gal/day)	Permitted Maximum Daily Limit (gal/day)	Permitted Maximum Monthly Limit (gal/month)	2005 Average Daily Rate (gal/day)	2005 Average Monthly Rate (gal/month)
Eglin Main Base/Ammo	1.9 million	4.0 million	91.0 million	847,222	25.7 million
Housing Area	3.39 million	6.08 million	120 million	1.1 million	34.6 million
Duke Field	82,300	335,800	3.13 million	75,460	2.3 million
Choctaw Field	13,500	20,000	600,000	1,395	42,425

Sources: 96 CEG/CEVC, 2006; Joyner, 2006
gal = gallons

Wastewater

Wastewater infrastructure is currently in place at each of the proposed airfields. Enough additional capacity exists at the wastewater treatment facilities for Eglin Main Base and Duke Field to handle the increase in wastewater resulting from fire protection, crash crews, and students/instructors passing though the airfields. These personnel are transient in nature and as a result, are expected to result in only minor increases in wastewater flow. The existing septic tanks at Choctaw Field would also be able to handle the increase in wastewater production that would result from the JSF mission. For these reasons, no adverse effects on the wastewater systems would occur as a result of the JSF training.

Electricity

Electricity consumption in support of the JSF was analyzed as part of the JSF Integrated Joint Training Site (IJTS) cantonment alternatives (Chapter 6, Section 6.6.1, JSF IJTS Alternative 1: 33rd Fighter Wing Area). The level of electricity needed for the ATC tower, ILS, fire protection, and crash crews would not substantially change from the current levels of use, since these support activities already take place at each of the airfields. For this reason, the JSF training would not cause adverse effects on electrical consumption. If an increase in electrical supply became necessary to support the JSF flight training, Gulf Power would be able to accommodate the increase (Erickson, 2007). Electrical infrastructure is currently in place at the proposed airfields. Since increases in electricity consumption is not expected to be substantial and as needs increase Gulf Power would be capable of meeting the needs there would be no adverse effects.

Natural Gas

Natural gas is currently not anticipated as being required to support JSF flight training. However, if such a requirement is identified, an increase in natural gas use would be

within the current capacity of Okaloosa Gas District (Shue, 2007). Natural gas infrastructure is currently in place at Eglin Main Base and Duke Field if it becomes necessary for the JSF mission. Since Choctaw Field uses propane tanks, natural gas infrastructure and supply would be required if propane would not meet mission needs.

7.6.2 JSF Flight Training Alternative 2

7.6.2.1 Existing Conditions (Utilities – JSF Flight Training Alternative 2)

The airfields included in this alternative are the same as those for JSF Flight Training Alternative 1. For this reason, the existing conditions of utilities for this alternative are the same as those described in Section 7.6.1.1, JSF Flight Training Alternative 1.

7.6.2.2 Environmental Consequences (Utilities – JSF Flight Training Alternative 2)

Since the use of utilities is required regardless of how much training takes place at each airfield, the environmental consequences for this alternative would be the same as those for JSF Flight Training Alternative 1. See Section 7.6.1.2 for the analysis of utilities at Eglin Main Base, Duke Field, and Choctaw Field.

7.6.3 No Action Alternative

Under the No Action Alternative, JSF flight training would not occur and, therefore, would not require the use of utilities on Eglin Main Base, Duke Field, or Choctaw Field. Therefore, overall consumption of utilities required to support the ATC tower, ILS, fire protection, and crash crews would not increase. However, these support services would continue to operate since other aircraft would continue to use Eglin Main Base, Duke Field and Choctaw Field. Section 7.6.1.1, JSF Flight Training Alternative 1, describes utilities as they currently are on Eglin Main Base, Duke Field and Choctaw Field.

Several actions unrelated to BRAC are expected to impact the current baseline status of utilities on Eglin. Some of the actions represent minor fluctuations in personnel (described in Chapter 2, Section 2.7, No Action Alternative). Generally, the minor changes in usage levels are easily absorbed by the existing utility systems because none of the utilities are at their maximum permitted levels or capabilities. These types of fluctuations would not impact utilities on Eglin Main Base, Duke Field, or Choctaw Field.

Two of these actions would result in major changes to numbers of personnel and aircraft on Eglin Main Base. The departure of the 33 FW aircraft and the reduction in overall numbers of DoD personnel, as specified in the President's FY 2007 Budget, would result in 2,207 fewer people on Eglin Main Base by 2018. The reduction in

personnel would reduce the amounts of potable water consumed and wastewater produced by roughly 509,817 gallons per day based the average per capita use coefficient for Eglin AFB (see Chapter 3, Section 3.6, Utilities, for more details). The loss of the 33 FW aircraft would also reduce the overall consumption of water and production of wastewater. Overall, the reduction in water consumption and wastewater production would have a positive impact on utilities. Fewer people and aircraft on Eglin Main Base, Duke Field, and Choctaw Field would also reduce the overall consumption of electricity and natural gas.

7.7 AIR QUALITY

7.7.1 JSF Flight Training Alternative 1 (Preferred Alternative)

Identifying the affected area for an air quality assessment requires knowledge of sources of air emissions, pollutant types, emission rates and release parameters, proximity to other emissions sources, and local conditions. Refer to Appendix D, *Air Quality*, for review of air quality and associated methodologies used for emissions calculations.

7.7.1.1 Existing Conditions (Air Quality – JSF Flight Training Alternative 1)

The existing conditions associated with air quality and the region of influence (ROI) (Okaloosa, Santa Rosa, and Walton Counties) are provided in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

The munitions used in JSF training strafing runs would utilize TA C-62 on the east side and B-75 on the west side. For all other munitions (both and live and inert), TA C-52E would be used on the east side and TA B-82 on the west side. Flares may be used over the Eglin Reservation. Table 7-24, Table 7-25, and Table 7-26 summarize the existing conditions at the test areas where data was available.

Table 7-24. Baseline Emissions from Mission Activities for Test Area C-62 1998–2004

Source	Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOC
Total County Emissions	33,893	4,681	7,785	246	4,890
Test Area C-62 Emissions[1]	2.56	0.40	16.45	0.02	0.25
% of County Emissions	0.01%	0.01%	0.21%	0.01%	0.01%

Source: U.S. Air Force, 2006r

CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal to 10 Microns in Diameter; SO_2 = Sulfur dioxides; VOC = Volatile Organic Compound

1. Emissions are based on the year exhibiting the highest emissions during the baseline period (1998–2004) giving a conservative annual baseline.

Table 7-25. Comparison of Test Area B-75 Emissions to the ROI (Okaloosa and Santa Rosa Counties - 2002)

Area	2002 Emissions (tons/year)				
	CO	NO_x	PM	SO_x	VOCs
Total Okaloosa County	63,273.74	7,132.435	8,735.849	838.6539	10,332.94
Total Santa Rosa County	53,052.13	11,094.85	14,308.25	3,012.233	8,519.052
Test Area B-75 Emissions	2.228321	0.278216	2.506642	0.013094	0.248611
% Okaloosa County Emissions	0.001761	0.00195	0.014347	0.000781	0.001203
% Santa Rosa County Emissions	0.0021	0.001254	0.008759	0.000217	0.001459

Source: USEPA, 2002b
CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM = Particulate Matter; SO_x = Sulfur Oxides; VOCs = Volatile Organic Compounds

Table 7-26. Baseline Emissions from Mission Activities on Test Area C-52 Complex

Area	tons/year				
	CO	SO_x	NO_x	PM	VOC
Total Walton County Emissions	79,326	490	4,815	9,680	6,573
Test Area C-52 Emissions	16.660	0.101	2.105	23.954	1.847
% of Walton County Emissions	0.0210	0.0205	0.0437	0.2475	0.0281

Source: U.S. Air Force, 2005f
CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM = Particulate Matter; SO_x = Sulfur Oxides; VOCs = Volatile Organic Compounds
Note: C-52E does not have expenditures on it currently therefore C-52 emissions are from the other ranges part of the C-52 Complex.

7.7.1.2 Environmental Consequences (Air Quality – JSF Flight Training Alternative 1)

JSF Operations

The alternatives considered for the range analysis for JSF include locations at Eglin Main, Duke Field and Choctaw Field. Eglin Main and Duke Field are located in Okaloosa County, and Choctaw Field is located on the far western edge of Eglin AFB in Santa Rosa County. This section focuses on the emissions generated from aircraft operations and the use of munitions during training operations.

Aircraft Emissions

The establishment of the JSF IJTS will bring the F-35 aircraft to Eglin AFB. By 2016, Eglin is expected to have 72 conventional take-off and landing (CTOL), 20 short take-off vertical landing (STOVL), and 15 carrier-based variant (CV) F-35 aircraft. Included in this analysis is the use of F-16 and F/A-18 aircraft that will be used as "Red Air," or aircraft flown as the opposing force to mimic enemy aircraft. The analysis assumed the same number of sorties per year with emissions for both the main runway and the auxiliary field operations. Emissions were obtained for each variant of F-35 and are summarized in Table 7-27. Emissions represented are for aircraft flight; the emissions do not include aircraft maintenance, test cell, or ground support equipment associated with the F-35 aircraft. Table 7-28 summarizes the emissions expected from ground

support equipment. Since emission factors for the F-35 are not available, F-22 emissions were utilized as a surrogate.

Table 7-27. Aircraft Emissions by F-35 Configuration

Type A/C	# A/C	Total Fuel	Emissions/Aircraft (tons/yr)					Total Emissions (tons/yr)				
		tons/yr	CO	NO_x	PM_{10}	SO_2	VOC	CO	NO_x	PM_{10}	SO_2	VOC
Eglin Main Base – Red Aircraft Emissions												
Red Air CTOL F-16	4	2,475.18	9.97	8.09	1.12	0.56	2.82	39.9	32.37	4.48	2.23	11.29
Red Air F-18 for CV JSF	4	274.02	4.72	0.45	0.54	0.06	1.82	18.90	1.80	2.15	0.25	7.27
Red Air F-18 for STOVL JSF	4	3,163.26	7.01	0.66	0.81	0.09	2.70	28.05	2.63	3.25	0.37	10.81
Total Red Air Aircraft Emissions		5,912.46						86.85	36.80	9.88	2.85	29.37
Eglin Main Base - Training Aircraft												
CTOL Training JSF	72	37,730.13	3.84	8.74	2.78	2.78	0.32	276.62	629.25	200.50	33.96	23.28
CV Training JSF	15	6,650.92	3.09	7.61	2.34	2.34	0.26	46.34	114.21	35.12	5.99	3.96
STOVL Training JSF	20	11,009.87	3.68	12.56	2.78	2.78	0.32	73.56	251.22	55.61	9.91	6.40
Total Training Aircraft Emissions		55,390.92						396.50	994.68	291.23	49.86	33.64
Eglin Outlying Field - Training Aircraft												
CTOL Training JSF	72	11,857.87	0.16	3.66	0.76	0.76	0.03	11.84	263.88	54.61	10.67	2.35
CV Training JSF	15	4,620.72	0.31	6.88	1.42	1.42	0.06	4.61	103.14	21.27	4.16	0.92
STOVL Training JSF	20	7,465.64	0.37	11.5	1.54	1.54	0.07	7.41	230.09	30.78	6.72	1.46
Total Training Aircraft Emissions		23,944.23						23.86	597.11	106.66	21.55	4.73

A/C = Aircraft; CO = Carbon Monoxide; HC = Hydrocarbons; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal To 10 Microns in Diameter; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound; yr = Year

Table 7-28. Aircraft Maintenance and Auxiliary Ground Equipment

Source Category	Emissions (tons/yr)				
	CO	NO_x	PM_{10}	SO_2	VOC
A/C Engine Test Cells - Approach	1.57	1.31	0.40	0.20	0.07
A/C Engine Test Cells - Taxi/Idle-in	2.13	0.13	0.11	0.04	0.30
A/C Engine Test Cells - Intermediate	0.52	3.01	0.34	0.24	0.13
A/C Engine Test Cells - Military	0.34	8.89	0.56	0.45	0.00
Auxiliary Ground Equipment	300.43	152.84	8.12	11.66	25.00
Total Annual Emissions	304.98	166.18	9.54	12.59	25.50
ROI Emissions	150,218.62	22,908.61	30,828.92	4,096.62	23,741.74

A/C = Aircraft; CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal To 10 Microns in Diameter; ROI = Region of Influence; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound; yr = Year
Note: Emissions are based on the F-22A

The aircraft emissions are driven primarily by the 72 CTOL-variant F-35 aircraft. By comparing the aircraft emission data to the 2002 National Emissions Inventory (NEI) data for Okaloosa, Santa Rosa, and Walton Counties, the potential impacts can be assessed using the conformity analysis approach previously described.

The 33 FW has maintained and operated the two-engine F-15 with an operation tempo of 758 sorties per month (U.S. Air Force, 2006q). The 33 FW is expected to leave Eglin AFB; therefore, the aircraft and associated emissions were subtracted from the emissions expected on Eglin AFB (Table 7-29). The highest pollutant percentage is for nitrogen oxides (NO_x), at 6.75 percent of the ROI's annual emissions. This increase is below the 10 percent criterion; thus, no air quality issues are anticipated with the addition of the F-35 aircraft to Eglin AFB.

Table 7-29. Aircraft Emissions Associated With JSF Compared to the ROI

Emission Activities	Emissions (tons/year)				
	CO	NO_X	PM_{10}	SO_2	VOC
Red Air	86.85	36.8	9.88	2.85	29.37
Eglin Main Base	396.52	994.68	291.23	49.86	33.64
Outlying Field	23.86	597.11	106.66	21.55	4.73
AGE	304.98	166.18	9.54	12.59	25.50
Total	1,319.44	1794.77	417.31	86.85	93.24
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percentage of County Emissions	0.88%	7.83%	1.35%	2.12%	0.39%

AGE = aerospace ground equipment; CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal to 10 Microns in Diameter; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound

Munitions Use

Several types of munitions are expected to be used on the F-35 training operations. Bombing training missions would involve the carry and/or release of live/inert GBU-12 at TAs C-52E on the east side and B-82 on the west side. F-35 training will also involve strafing runs associated with basic air-to-ground and close air support training events using live 25-millimeter (mm) ammunition at TA C-62 and B-75 for east and west side training, respectively.

Bombs

It is estimated that 635 live and 219 inert GBU-12 would be expended at TAs B-82 and C-52E. Based on information included in the *Test Areas B-71 and B-82 Final Environmental Baseline Document, Revision 1* (U.S. Air Force, 2007) and *Test Area C-52 Complex Environmental Baseline Document* (U.S. Air Force, 2005f) the proposed JSF munitions have not been expended at either of these ranges in the past. TA B-82 has been used for testing of live MK-82s and MK-84s, flares, and small arms use. The range is authorized for an increase from baseline activity for air-to-surface test and training up

to 2,400 percent. TA C-52E is a gunnery impact area used as an impact safety zone. No expenditures have been dropped on TA C-52E in the past. The JSF munitions would be new to both test areas. Baseline emissions from operations occurring on TAs B-82 and C-52E are summarized in Table 7-30.

Current activities at this site have minimal impact to regional air quality. Since air emission calculations are based on net explosive weight (NEW), and the inert munitions have a NEW of zero. The live GBU-12 emissions are summarized in Table 7-30. An increase in the use of these munitions would be noticed in annual air and munitions use reports once training begins at these test areas since these are new mission types occurring at these test areas. Emissions released from these bombs are expected to be minimal. The primary change would be a slight increase in particulate matter from the impact of the bomb to the ground.

Table 7-30. JSF Flight Training Munition Emissions

Source	Calculated Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOC
GBU-12 Live	0.44	1.05	0.00	0.01	0.00
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percent ROI Emissions	0.0003%	0.004%	0.0000%	0.0002%	0.0000%

CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal to 10 Microns in Diameter; SO_2 = Sulfur Dioxides; VOC = Volatile Organic Compound

Strafing Runs Training

The completion of basic air-to-ground and close air support training will involve the use of 208,518 25-mm training projectile (TP) ammunition annually. It is anticipated that these training events will occur at TA C-62 and B-75. Therefore, test area emissions were compared with those from the ROI in this analysis.

Current Range Utilization Report data show the use of live 25-mm ammunition on TA C-62 amounting to approximately 177 rounds per year over the 1998–2004 period (U.S. Air Force, 2006r). Baseline emissions for TA C-62 are summarized previously in Table 7-24. The addition of the JSF strafing requirements would increase the use of 25-mm ammunition on this range, but emissions are not expected to increase significantly (Table 7-31). Strafing activities would be a new type of mission on TA B-75. Currently TA B-75 is primarily used for testing and training with bombs, stinger missiles, and Alabama Army National Guard tank training. The introduction of the JSF training operations would increase 25-mm TP expenditures to the range. Live ammunition was evaluated in the event that JSF training would need to utilize live munitions. JSF training would also include the use of flares, which would cause slight increases primarily in particulate matter (PM) emissions. The largest increase is seen in PM, 3.13 tons per year, which is less than 0.1 percent of the ROI total.

Table 7-31. Estimated Emissions from 25-mm Ammunition and Flares for JSF Strafing Run Training

Source	Calculated Emissions (tons/year				
	CO	NO_x	PM_{10}	SO_2	VOC
25-mm Rounds[1]	0.38	0.08	1.04	0.00	0.00
Flares[1]	0.01	0.00	2.09	0.01	0.00
Total	0.39	0.08	3.13	0.01	0.00
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percent of ROI Emissions	0.0003%	0.0003%	0.010%	0.0002%	0.000%

CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal to 10 Microns in Diameter; SO_2 = Sulfur Dioxides; VOC = Volatile Organic Compound

1. Due to lack of emissions data for 25-mm rounds, a surrogate was used for analysis purposes.

Summary

Currently, TA C-62 is used for the types of munitions proposed. The rest of the test areas previously have not been used for the type of proposed activity or munitions. The use of GBU-12 bombs on TA C-52E and B-82 is expected to result in an increase in particulate matter. The use of various bombs for air-to-surface training is not expected to cause any adverse effects to regional air quality based on the established impact criteria.

The use of live 25-mm rounds on TA C-62 and B-75 for strafing runs will increase the air quality emissions minimally in the ROI. Flares would contribute to minor increases in particulate matter emissions in the ROI. Adverse affects to the regional air quality is not expected from the addition of these training activities (Table 7-32). Overall the use of munitions would have minimal impact on regional air quality.

Table 7-32. Summary of JSF Flight Training Commonalities Air Emissions

Emission Activities	Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOC
Total Aircraft Emissions	328.23	1,546.99	390.07	72.36	15.14
Total Support Emissions	304.98	166.18	9.54	12.59	25.50
Total Munition Emissions	0.83	1.13	3.13	0.01	0.01
Total Emissions	634.04	1548.12	402.74	84.96	40.20
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percent of ROI Emissions	0.422	7.483	1.306	2.074	0.169

CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal to 10 Microns in Diameter; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound

7.7.2 JSF Flight Training Alternative 2

7.7.2.1 Existing Conditions (Air Quality – JSF Flight Training Alternative 2)

The existing conditions associated with air quality are described in Chapter 3 (Section 3.7.2, Region of Influence and Existing Conditions).

7.7.2.2 Environmental Consequences (Air Quality – JSF Flight Training Alternative 2)

Air quality is analyzed throughout a region. Under JSF Flight Training Alternative 2, the ROI of Okaloosa, Santa Rosa, and Walton Counties was used to evaluate changes to air quality from the JSF flight training. This ROI encompasses all of the Eglin Range thus the impacts discussed in JSF Flight Training Alternative 1 (Section 7.7.1.2) apply to this alternative. No air quality issues are anticipated under this alternative.

7.7.3 No Action Alternative

Under the No Action Alternative, the loss of the 33 FW would decrease the aircraft training, thus resulting in a net decrease in air emissions from flight training activities (Table 7-33). The No Action Alternative analysis also included an evaluation of the emissions expected from known projects expected to occur on Eglin AFB, such as the Veterans Administration Community-Based Outpatient Clinic (VA CBOC) and Joint Reprogramming Facility. Short-term and minor increases in emissions would occur from the construction projects but are not considered adverse. The No Action Alternative analysis for air quality is detailed in Chapter 4 (Section 4.7.6, No Action Alternative).

Table 7-33. No Action Alternative Aircraft Emissions

Emission Activities	Emissions (tons/year)				
	CO	NO_X	PM_{10}	SO_2	VOC
33 FW F-15[a]	-179.00	-81.60	-17.70	-1.90	-52.60
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percentage decrease in ROI Emissions	0.11%	0.36%	0.06%	0.05%	0.22%

CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal to 10 Microns in Diameter; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound

a. Emissions listed for the 33 FW are listed as negative representing the loss of these aircraft by CY 2016 (U.S. Air Force, 2006q)

7.8 SAFETY

7.8.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.8.1.1 Existing Conditions (Safety – JSF Flight Training Alternative 1)

A number of standard safety procedures exist to ensure limited public access to affected test areas during testing or training activities. These procedures require every practical effort is made to keep the designated test areas clear of all nonparticipating aircraft, vehicles, and personnel. For example, the Eglin AFB Public Affairs Office (AAC/PA) provides local media with advance information regarding upcoming activities by issuing releases for publication in local newspapers and/or recorded messages for radio stations (U.S. Air Force, 2002b).

Prior to each activity, the designated test area supervisor clears the area by closing range gates and blocking all passable trails. In the case of aircraft-related missions, the airspace to be utilized is also surveyed visually and electronically to ensure that unauthorized aircraft are not in the test area at the time of the scheduled activity. Participating aircraft conduct a visual and/or electronic search of the test area by initiating a practice or "cold" pass over the area. After verifying the test area is clear, the scheduled activity is allowed to proceed. If any unauthorized personnel, vehicles, or aircraft are detected within the test area following these procedures, their location is relayed to the Central Control Facility (CCF) (building 380). The test or training activity is then temporarily halted until the area is again cleared and secured (U.S. Air Force, 2002b).

Eglin AFB employs weapon safety footprints on the range to ensure that training is as safe as possible. Weapon safety footprints are hazard areas associated with the use of a particular weapon system. These footprints define the minimum land requirements needed to safely employ the weapon under a variety of ground conditions and target types. In general, for aircraft-launched weapons, as the distance from the weapons release to the target increases, so does the footprint. The same is true for altitude and speed at launch or release; as the launch altitude and/or aircraft speed increases, so does the size of the footprint (U.S. Air Force, 2002b).

The methodology for footprint formulation combines munitions system science, computer modeling, and best management practices. These footprints include safety zones for initial impacts as well as ricochets. A buffer zone is typically built into the footprint to further minimize the risk to the public or other resources from the testing of hazardous items on the range. Safety footprints are also employed for land-based training where live ordnance is used. Weapons safety footprints act as overlays that restrict activities that could normally occur within and adjacent to test areas (U.S. Air Force, 2002b).

Ground Safety

Air Force standards also specify fire and crash emergency service requirements associated with the type of fire, as well as crash response equipment and the number of personnel necessary to handle an aircraft mishap. These standards are based on the number and type of aircraft, type of flying missions, and size of the buildings at the installation. Eglin AFB's fire and crash emergency services meet these standards. In addition, the Eglin AFB fire department has mutual support agreements with nearby communities, including the cities of Fort Walton Beach, Wright, Crestview, Shalimar, and Ocean City, and with Okaloosa County, in case an exceptionally severe aircraft mishap occurs (Talbert, 2006).

Eglin AFB's fire and crash emergency response services meet required Air Force standards. Technical Order (TO) 00-105E-9, *Aircraft (Fire Protection)*, *Revision 11*, dated 1 February 2006, provides detailed fire response information for Air Force, Army, Navy, North Atlantic Treaty Organization (NATO), and selected commercial aircraft. The TO details fire response procedures and personal protection equipment (PPE) requirements associated with each aircraft (U.S. Air Force, 2006s).

Specific procedures are also implemented for minimizing the risk of fire from range operations. When a high fire potential has been declared, the Range Control Officer (RCO) notifies scheduled range users of the hazard and resultant operational limitations (i.e., cold spots required, no pyrotechnic materials allowed). During dry periods, specific targets and ranges with a high fire risk are continuously evaluated for the safety of planned operations. In the event of a large fire on the range, the RCO will close the range and notify all appropriate organizations. Any pilot observing a fire on or near the range complex is required to notify the RCO immediately (U.S. Air Force, 2002s).

Aircraft Mishaps

The Air Force defines four categories of aircraft mishaps: Classes A, B, C, and High Accident Potential. Class A mishaps result in loss of life, permanent total disability, a total cost in excess of $1 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Class B mishaps result in total costs of more than $200,000, but less than $1 million, or result in permanent partial disability, but they do not result in fatalities. Class C mishaps involve costs of more than $10,000, but less than $200,000, or a loss of worker productivity of more than 8 hours. High Accident Potential represents minor incidents not meeting any of the criteria for Classes A, B, or C (U.S. Air Force, 2006t). This section focuses on Class A mishaps because of their potential to affect private property or the public.

Since the F-35 is still in the System Development and Demonstration (SDD) phase, information involving mishaps is not yet available. Historical data associated with previous aircraft models (F-15, F-16, and F/A-18) are the best available data to utilize

for mishap analysis. While the Air Force cannot predict future F-35 performance, given advances in single engine technology and enhanced safety systems, the F-35 should deliver an even better safety record than previous single engine aircraft. As such, the Air Force would not expect the F-35 destroyed aircraft rates to exceed the initial rates of the F-16.

Based on historical data on mishaps at all installations and under all conditions of flight, the military services calculate Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory. It should be noted that these mishap rates do not consider combat losses due to enemy action. The Class A mishap rate per 100,000 flying hours, along with an estimation of the flying hours per aircraft associated with current conditions, can be used to compute a statistical projection of anticipated time between Class A mishaps. In evaluating this information, it should be emphasized that the data presented are only statistically predictive.

Actual mishaps are caused by many factors, not simply the amount of flying time of the aircraft. Table 7-34 summarizes this information for Eglin AFB. Shown are the two jet aircraft primarily employed at the base, the mishap rate for each aircraft, the flying time that aircraft spends on the range, and the statistically predicted time between Class A mishaps.

Table 7-34. Eglin AFB Projected Frequency of Class A Mishaps (Current Conditions)

Aircraft	Air Force-wide Total Class A Mishaps[a]	Air Force-wide Mishap Rate[a]	2005 Sorties at Eglin AFB	Total Flight Time in 2005 (Hours)[b]	Time Between Mishaps (in Years)
F-15	126	2.44	10,620[c]	14,468	2.8
F-16	312	3.88	2,340[d]	3,276	7.9

a. U.S. Air Force, 2006t
b. Computed by multiplying total sorties in baseline year by the length of each sortie – assumed to be 1.4 hours per sortie (Yelverton, 2006; Seda, 2006)
c. Total 2005 sorties by F-15s from the 33 FW (Yelverton, 2006) , and 46 Test Wing and 53rd Wing (Seda, 2006)
d. Total 2005 sorties by F-16s from the 46 Test Wing and 53rd Wing (Seda, 2006)

Actual Class A mishaps that have occurred near Eglin AFB over the last 10 years are summarized in Table 7-35. It is impossible to predict the precise location of an aircraft accident. Major considerations in any accident are loss of life and damage to property. The probability of an aircraft crashing into a populated area is extremely low, but it cannot be totally discounted. Several factors are relevant to Eglin AFB: the region around the base is composed for the most part of rural or natural areas; pilots of aircraft are instructed to avoid direct overflight of population centers at very low altitudes; and, finally, the limited amount of time the aircraft is over any specific geographic area limits the probability that a disabled aircraft would crash into a populated area.

Table 7-35. Class A Mishaps at or Near Eglin AFB (1995 to 2006)

Date	Aircraft	Cause	Fatalities
8 Aug 1995	Two F-15Cs	Mid-Air Collision	0 (Successful Ground Egress)
10 Jan 1997	F-15C	Engine Failure	0 (Successful Ground Egress)
22 August 1997	F-16B	Engine Failure	0 (Successful Eject)
28 Jan 1999	Two F-15Cs	Mid-Air Collision	0 (Successful Eject)
21 Mar 2001	F-16B	Bird Strike Severed Fuel Line	0 (Successful Ground Egress)
30 Apr 2002	F-15C	Stabilizer Separated in Flight	1
3 Jul 2002	F-15E	Engine Malfunction	0 (Successful Ground Egress)
3 Sep 2002	F-15C	Aircraft Undershot Runway	0 (Successful Ground Egress)
8 Mar 2003	T-38A	Aircraft Struck House	0 (Successful Eject)
27 Apr 2006	F-15C	Engine Malfunction	0 (Successful Ground Egress)

Source: Monteith, 2006

There are well-established procedures for responding to aircraft mishaps on non-Air Force property. When normal, scheduled flying is in progress, Eglin AFB maintains highly trained emergency response teams, which are available to respond to aircraft crashes off-site. As previously indicated, Eglin AFB maintains mutual aid agreements with local fire departments that detail each party's responsibility when responding to a mishap. The base also conducts regular aircraft mishap training exercises.

Additionally, the collision avoidance program is designed to educate the local flying public on the military aircraft operations in the skies surrounding the installation. This program involves visiting local airports (i.e., Fort Walton Beach, Destin, and Crestview) on an annual or more frequent basis and providing an informational brochure on military flying activity, restricted airspaces, and so on. This brochure depicts local flight restrictions as well as primary arrival and departure routes and training areas for Eglin AFB, Hurlburt Field, and the most widely used local airports, Crestview and Destin (Okaloosa Airport, 2001).

While the likelihood of accidents is low, the Air Force has long recognized that accidents are possible and manages the risk through its AICUZ program's APZs. The purpose of this long-standing program is to promote compatible land development in areas subject to aircraft noise and accident potential.

Bird/Wildlife Aircraft Strike Hazard (BASH)

Bird-aircraft strikes constitute a safety concern because of the potential for damage to aircraft or injury to aircrews or local populations if an aircraft crash should occur. During the years 1985 to 2005, the Air Force BASH (Bird/Wildlife Aircraft Strike Hazard) Team documented 66,642 bird strikes. Of these, 27 resulted in Class A mishaps where the aircraft was destroyed. These occurrences constituted approximately 0.04 percent of all reported bird-aircraft strikes (U.S. Air Force, 2006u).

Although aircraft may encounter birds at altitudes of 30,000 feet above mean sea level (MSL) or higher, most birds fly close to the ground. Over 97 percent of reported bird

strikes occur below 3,000 feet AGL. Approximately 30 percent of bird strikes happen in the airport environment, and almost 55 percent occur during low-altitude flight training (U.S. Air Force, 2006u). In addition, aircraft face collision dangers from other wildlife, such as deer, during takeoff or landing.

A BASH exists at Eglin AFB and in its vicinity due to resident birds and migratory bird species. Eglin AFB lies on the fringes of two major bird flyways; the Mississippi Flyway and the Atlantic Flyway. The Mississippi Flyway follows along the Mississippi River Valley and the Atlantic Flyway follows the eastern coastline. Fall migration accounts for a substantial amount of bird activity in Northwest Florida and is dispersed over several months. Peak periods usually follow the passage of cold fronts from September through March. During migration, most birds fly at altitudes less than 6,000 feet AGL. Land birds usually fly at 1,000 to 2,000 feet AGL. Most Canadian geese fly at approximately 2,000 feet, and shore birds and snow geese usually fly at 8,000 to 10,000 feet AGL. Additionally, there is evidence many birds accumulate along the coast and move through the area in east-west and west-east directions, selecting the circum-gulf rather than trans-gulf route. The fully integrated *Eglin Air Force Base Bird/Wildlife Aircraft Strike Hazard (BASH) Plan* is designed to reduce the potential of wildlife damage to the airfield and minimize aircraft exposure to potentially hazardous bird strikes (U.S. Air Force, 2006u).

Over the last 11 years, there have been a total of 294 reported incidents of bird-aircraft strikes around Eglin AFB, or an average of approximately 27 bird strikes per year. Of these, 21 resulted in some level of damage to the aircraft. Table 7-36 summarizes bird strikes at the installation for all aircraft and lists the damage incurred as a result of these strikes. Table 7-37 summarizes bird strikes for the most common aircraft flown at Eglin AFB.

Table 7-36. Impacts of Bird Strikes at Eglin AFB (1995 to 2005)

Year	Number of Bird Strikes	Damaging Bird Strikes	Total Cost of Damage ($)
1995	6	2	333
1996	13	1	51,603
1997	59	7	49,405
1998	19	1	413
1999	27	1	64
2000	24	2	82,068
2001	12	0	0
2002	36	1	1,000
2003	43	2	224,026
2004	12	3	23,712
2005	43	1	1,692
Total	**294**	**21**	**$434,316**

Source: Daniel, 2006

Table 7-37. Bird Strikes for Selected Aircraft at Eglin (2000 to 2005)

Aircraft	Number of Bird Strikes
F-15 (All Models)	67
F-16 (All Models)	18
MC/C-130 (All Models)	65
Total	**150**

Source: Daniel, 2006

In the immediate vicinity of Eglin AFB, bird populations are controlled through aggressive habitat management procedures. Eglin AFB has contracted with U.S. Department of Agriculture (USDA) Wildlife Services to gather data concerning species composition and associated attractants. Additionally, the USDA makes recommendations to mitigate strike risks as well as to provide direct control of wildlife. When birds congregate, various bio-acoustic and pyrotechnic dispersal techniques are employed to reduce the bird density, with physical means employed to remove any deer, coyote, and red fox from the airfield. If required, other control measures that could be used are detailed in the unit BASH plan. Additionally, the presence of birds and the size and density of flocks are monitored by USDA Wildlife Services, aircrew using Eglin AFB, and airfield management personnel. As the presence of birds increases, thereby creating an elevated safety risk, flight operations may be limited, modified, or even completely curtailed until the risk is reduced (U.S. Air Force, 2006u).

7.8.1.2 Environmental Consequences (Safety – JSF Flight Training Alternative 1)

Explosives Safety

Ordnance such as GBUs and gun-fired ammunition are proposed to be used as part of JSF flight training. Because the types of ammunition, bombs, and munitions to be used are the same or similar to the types currently used at Eglin AFB, implementation of the JSF flight training would not be expected to prevent or significantly limit the ability of range managers to conduct EOD and range maintenance activities. All ordnance would be handled by trained and qualified personnel in accordance with all explosive safety standards and detailed published technical data.

Aircraft-delivered ordnance (e.g., GBUs) would require generation/implementation of weapon safety footprints to define personnel evacuation areas during training activities. On the aircraft, there are several electromechanical safeguards specifically designed to prevent the accidental, inadvertent, or uncommanded release of ordnance. Because the aircraft's bombing system is a man-made, electromechanical system, it is impossible to state categorically that an accidental release of ordnance could never occur; however, safety risk analyses show that the risk of accidental releases that could have serious consequences is so small that it can be essentially discounted (Air Combat Command,

1999). There is the potential for a commanded release to be ineffective, resulting in "hung" ordnance. In such an event, JSF personnel would act in accordance with AACI 11-201, Section 9.12 through 9.15 and the corresponding attachments 36 to 40 which is summarized below.

During development of the safety annex to the test directive, the AAC Range Safety Office (AAC/SEU) assigns an appropriate category number (I through VI) to munitions (ordnance)/external stores as outlined in Table 7-38. The assigned category is then reviewed by the Risk Management Board (RMB) and any disagreements are resolved by coordination between the RMB and AAC/SEU. The munitions category is used to determine the correct takeoff runway and the decision tree/crash response to be used for landing with hung/unexpended ordnance. The type of ordnance and number loaded on the aircraft must be reported during aircraft emergencies.

Table 7-38. Munitions (Ordnance)/External Stores Categories

Category	Definition
1 (Cat I)	All live ordnance containing primary explosive such as: - Rockets and missiles with live motors - Live bombs regardless of type of fuse - Live CBU munitions - LUU-series flare/ground markers
2 (Cat II)	Ordnance with initiating explosive only, or with an incomplete explosive, such as: - Inert bombs with live fuses or boosters - Inert CBU munitions with live detonators - MJU-2/7/10 flares, RR-170/180 chaff
3 (Cat III)	Jettisonable nonexplosives such as: -Inert munitions - Training shapes - Instrumentation or pods (fuel tanks are excluded) - All confirmed empty dispensers
4 (Cat IV)	BDU-33, MK-106, or similar training ordnance.
5 (Cat V)	Any gun loaded with live rounds of any type.
6 (Cat VI)	Non-jettisonable, non-explosive stores, that have the appearance of ordnance. These are stores that are completely inert and secured to aircraft with no method of release, such as pods, training shapes, training missiles, and baggage pods.

Source: AACI 11-201, 2006

Student pilots and instructors will be briefed prior to any mission involving live ordnance including specific hung ordnance procedures, to include recovery routes. Pilots will reattempt ordnance release only as long as they remain in the bounds of the applicable test directive. Pilots will notify the Supervisor of Flying and Eglin Mission Control as soon as possible to coordinate recovery, and aircraft with hung Category I munitions or unsecured Category II though IV will declare an emergency. The Supervisor of Flying will coordinate closing the appropriate roads with the tower and

security forces personnel will be dispatched to appropriate locations. Roads must be closed prior to aircraft landing and will remain closed until reopened by the emergency on-scene commander.

Pilots will follow the specific procedures applicable to the type of hung ordnance their aircraft is carrying, which would have been briefed per the discussion above. Whenever possible, pilots with hung ordnance will fly a straight-in approach avoiding populated areas to Eglin Main Base. Fire department, weapons, and EOD teams will "safe" the munitions and determine status. AACI 11-201, Section 9.12.10.9, outlines specific procedures if a hung ordnance recovery is required at Duke Field.

Pilots are required to notify Eglin Mission Control at least 5 minutes prior to departing the test area, if possible, including ordnance category, type and number, and whether it is hung or unexpended. Eglin Mission Control will make sure aircraft are provided a clear route, and will advise Eglin Approach Control and the tower of the situation. Eglin Mission Control will also notify Range Operations Control Center (ROCC) and request personnel for de-arming. ROCC will notify the appropriate Maintenance Operations Center who will inform crash rescue, via the hot line, of the specific type and location of ordnance that was loaded on the aircraft. Crash rescue will respond according to Table 7-39.

Table 7-39. In-Flight Emergency (IFE) Crash Rescue Response

Category	Hung	Unexpended
I	Emergency	Advisory
II, III	Advisory	Advisory
IV, V, VI	No Response	No Response

After receiving permission from the tower to enter the runway, EOD personnel shall make a runway inspection. After clearing the runway, aircraft bearing munitions items will taxi to the appropriate de-arm area to have safety pins/devices installed prior to taxiing near other aircraft. EOD personnel will inspect hung ordnance in the de-arm area and determine if the aircraft can proceed to the parking area, proceed to the hot gun area, or if it must be shut down. If the aircraft must be shut down, EOD personnel will safe the hung ordnance and have the arm/de-arm crew pin all remaining munitions. EOD personnel will take other necessary emergency actions as required. After the ordnance is safe, EOD and de-arm crews will notify the pilot of action taken to safe hung/unexpended ordnance.

Current Eglin Flying Operations maintain these precautionary procedures for all takeoffs and landings with ordnance. Live munitions have been carried and released on Eglin ranges for many years by pilots of all experience levels. AACI 11-201, Chapter 9, details the extensive live ordnance procedures that these pilots have employed for

takeoffs, landings, and hung weapons. Every JSF student sortie with planned ordnance release will fly in formation with an instructor who will direct the student's actions and be responsible for the safe conduct of the mission. The F-35 is unique and will normally carry ordnance in its internal weapons bays. If ordnance does not release properly (resulting in hung ordnance), the standard procedure will be to close the doors and return to base. AACI 11-201, Section 9.12.6, states: "Aircraft with closed bomb bay doors…are not categorized as 'hung ordnance.' However, de-arm personnel must be notified." JSF pilots will operate in accordance with established procedures to the extent possible, but because this aircraft is a new platform, safety procedures may be modified to provide the highest level of safety for this aircraft specifically.

Ground Safety

Eglin AFB maintains mutual aid agreements with local fire departments in the surrounding area. Should an F-35 crash occur in one of these areas, community firefighters may attempt to extinguish any resulting fire. Any unique training associated with F-35 crash response would also have to be extended to personnel at local fire departments. Specific procedures are also implemented for minimizing the risk of fire from range operations; therefore, implementation of the JSF flight training would not result in heightened ground safety concerns.

Aircraft Mishaps

The Air Force calculates Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory. Combat losses due to enemy action are excluded from these statistics. The Class A mishap rate per 100,000 flying can be used to compute a statistical projection of anticipated time between mishaps. Data presented are only statistically predictive, since the actual causes of mishaps are due to many factors, not simply the amount of flying time of the aircraft.

Since the F-35 is a new aircraft, mishap rates have not been established. Historically, mishap rates for new military aircraft are highest during the initial phase of its operational life and decrease steadily throughout the aircraft's lifetime. In order to avoid skewing the analyses with highly fluctuating data that occur in the very early stages of an aircraft's operational life, it was assumed that the F-35A and F-35C variants would have a mishap rate equal to that of the F-16. This assumption was based on the fact that these are single-seat, single-engine, air-to-air superiority fighters with an attack role, which would be employed in a similar operational manner. Similarly, the AV-8B Harrier (STOVL) was used to predict mishaps rates for the F-35B, based on performance, structural, and operational similarities of both aircraft. Though the performance of the F-35 can not be predicted, given the expected improvements in single engine technology and system safety, the F-35 should deliver an even better

safety record than previous single engine aircraft. As such, the Air Force would not expect the F-35 destroyed aircraft rates to exceed the initial rates of the F-16.

Table 7-40 presents the statistically predicted time between Class A mishaps for all three of the variants of the JSF flight training conditions. As previously stated, this analysis makes only a statistical prediction regarding the frequency of mishaps and may not represent real-world conditions. Current safety policies and procedures at Eglin are designed to ensure that the potential for aircraft mishaps is reduced to the lowest possible level. These safety policies and procedures would continue under the JSF flight training.

Table 7-40. Eglin AFB Projected Frequency of Class A Mishaps Associated With JSF Training

Aircraft	Air Force-wide Mishap Rate	Annual Sorties Proposed Action	Total Flight Time per Year (Hours)[c]	Time Between Mishaps (In Years)
F-16 (F-35 A& C)	3.88[a]	18,486	25,880	1.00
AV-8B (F-35B)	4.24[b]	3,852	5,393	4.37

a. U.S. Air Force, 2006t
b. U.S. Navy, 2006
c. Computed by multiplying total sorties per airspace segment in baseline year times the time spent in each airspace segment. (Note: An airspace segment is a section of an Air Traffic Service (ATS) Route, such as a Military Training Route (MTR), within which aircraft may be subjected to air traffic control, and which is identified by two electronic navigation aids (NAVAIDs) at the extremities and/or reporting points.)

Bird/Wildlife Aircraft Strike Hazards

Over the last 11 years there have been a total of 294 reported incidents of bird-aircraft strikes around Eglin AFB, with 150 strikes associated with the F-15, F-16, and C-130 aircraft. Under the JSF flight training, the number of total annual sorties for all aircraft at the base would increase. It would be expected that the number of bird strikes per year would similarly increase. The overall risk associated with bird-aircraft strikes is expected to remain low; none of the bird-aircraft strikes occurring at Eglin AFB have resulted in a Class A mishap, although some resulted in significant damage to aircraft (Table 7-36).

7.8.2 JSF Flight Training Alternative 2

7.8.2.1 Existing Conditions (Safety – JSF Flight Training Alternative 2)

The existing conditions associated with JSF Flight Training Alternative 2 are the same as those discussed above for JSF Flight Training Alternative 1, Section 7.8.1.1. The same standard procedures and policies for safety would be in place under all alternatives.

7.8.2.2 Environmental Consequences (Safety – JSF Flight Training Alternative 2)

The environmental consequences under JSF Flight Training Alternative 2 linked to safety would be the same as the consequences under JSF Flight Training Alternative 1, Section 7.8.1.2. The activities associated with JSF Flight Training Alternative 2 would not result in heightened safety concerns.

7.8.3 No Action Alternative

Under the No Action Alternative, operations would continue under current conditions and incorporate the activities mentioned in Chapter 2 (Section 2.7, No Action Alternative). There would be a decrease in aircraft operations due to the cessation of the 33 FW, which would lessen the likelihood of aircraft mishaps and BASH, resulting in a positive effect on safety. With the continuation of policies and procedures in place to ensure the safety of the public as well as military personnel, there would be no adverse impacts associated with the No Action Alternative.

7.9 SOLID WASTE

Potential impacts associated with solid waste generation would be common to all JSF flight training alternatives.

7.9.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.9.1.1 Existing Conditions (Solid Waste – JSF Flight Training Alternative 1)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

7.9.1.2 Environmental Consequences (Solid Waste – JSF Flight Training Alternative 1)

The impacts of the JSF Flight Training Alternative 1 include the solid waste generated by the JSF flight training activities, including debris from training ordnance. Training activities for the JSF would include munitions expenditures at TA C-52E and B-82 and close air support (strafing activities) at TA C-62 and TA B-75. Debris generated from aircraft servicing operations (e.g., replaced parts and components) is discussed in Chapter 6 (Section 6.9.1.2, Environmental Consequences) and was already addressed in the waste analysis associated with the JSF IJTS cantonment alternatives.

Training activities conducted would produce waste and debris. Munitions that would be used during training operations at the test areas include live/inert GBU, 25-mm ammunition, and flares as described in Chapter 2 (Section 2.6.1.3, Ordnance Use). The

number of live and inert GBU munitions expended is estimated at 854 units annually. The expenditure of 25-mm ammunition during close support training runs is an estimated 208,518 rounds.

As discussed in Chapter 2 (Section 2.6.1, JSF Flight Training Elements of the Proposed Action), flight training would require the use of an estimated 635 inert GBU-12 and 219 live GBU-12 munitions. The live GBU-12 has a weight of approximately 800 pounds. The weight of the GBU-12 without the explosive component is approximately 602 pounds. Therefore, for the GBU-12 munition, an annual total of 514,108 pounds (about 257 tons) of debris may be generated based upon an estimated usage of 854 units per year and weight of 602 pounds, which excludes the explosive component that reacts upon impact.

Training activities would also involve the expenditure of live 25-mm ammunition for basic air-to-ground and close air support training. It is estimated that approximately 208,518 rounds of 25-mm ammunition would be expended annually by the 109 pilot students during training sorties. The ammunition uses a projectile that weighs from 6.5 to 7.6 ounces. Expended casings would also be generated but are assumed to be one-third of the projectile weight. Based upon these estimates, a total weight of approximately 122,198 pounds, or 61 tons, of projectile and casings would be generated annually from JSF training activities that use 25-mm ammunition. The 25–mm GBU-12 cannon returns spent casings to the magazine. All such debris is subsequently collected during the post-mission servicing of the aircraft, and the debris is not released to the range. Although the spent casings are not released to the range, this material is included in this debris calculation associated with range utilization since it is generated during range operations.

The total quantity of debris generated during range operations from munitions is estimated to be 318 tons. In 2005, a total of 16,800 tons of municipal solid waste (including debris) was generated at Eglin AFB. The quantity of waste generated during range training operations would result in an increase of approximately 2 percent. Therefore, based upon projected training needs, it is not anticipated that training activities would result in the generation of sufficient waste quantities to affect current waste forecasts at Eglin AFB.

Munitions debris generated from training activities would be recovered and/or removed from the ranges for the purpose of storage, reclamation, treatment, and disposal as solid waste. These activities are ongoing at Eglin AFB since range operations are currently being conducted at the installation. The practices of recovery and removal of range debris are necessary for compliance with Air Force Instruction (AFI) 13-212, which requires the range to be cleared of munitions debris on a regular basis. It is anticipated that the bulk of the debris generated would be in the form of scrap metal, which would either be reclaimed or remain on the range (as discussed in

Section 7.10, Hazardous Materials). It is anticipated that most of the large debris associated with inert or active bombs would be recovered during range clearing operations while the small-sized debris associated with gun-fired ammunition or some types of ordnance (e.g., flares) would be too small to collect and would likely remain on the range.

7.9.2 JSF Flight Training Alternative 2

7.9.2.1 Existing Conditions (Solid Waste – JSF Flight Training Alternative 2)

The existing solid waste conditions are discussed in Chapter 3 (Section 3.9.2, Region of Influence and Existing Conditions).

7.9.2.2 Environmental Consequences (Solid Waste – JSF Flight Training Alternative 2)

The environmental consequences for JSF Flight Training Alternative 2 would be the same as those described for JSF Flight Training Alternative 1, Section 7.9.1.2.

7.9.3 No Action Alternative

The existing conditions of solid waste resources for the No Action Alternative are described in Chapter 3, under Section 3.9.2. The environmental consequences for the No Action Alternative are the same as those discussed in Chapter 4 (Section 4.9.6, No Action Alternative).

7.10 HAZARDOUS MATERIALS

Eglin AFB is responsible for the management of hazardous materials throughout the installation. Practices described herein for the management of hazardous materials would be the same for all of the JSF flight training alternatives.

7.10.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.10.1.1 Existing Conditions (Hazardous Materials – JSF Flight Training Alternative 1)

Munitions-Related Wastes

Range residue, such as practice bombs, are generated on a recurring basis as a result of the range training missions. Under the Emergency Planning and Community Right-to-Know Act (EPCRA) Toxic Release Inventory (TRI) program, federal facilities are required to report annual releases and off-site transfers (transfer of wastes for treatment or disposal) of residue associated with munitions training activities.

Munition training falls under "Intended Use" of munitions, which covers live fire, propellant bag burning at firing ranges, aerial bombing, obscurant and smoke training, and demolition training. Training is subject to a reporting threshold of 10,000 pounds per year for most common chemicals, with lower reporting thresholds for chemicals classified as persistent bioaccumulative toxic (PBT). These chemicals include mercury, with a reporting threshold of 10 pounds, and lead, with a threshold of 100 pounds. In cases when a threshold is exceeded, the installation must report on a "Form R" report to the USEPA the quantity of munitions-related waste released to the environment or recovered and recycled.

Table 7-41 summarizes the quantity of metallic waste (i.e., range residue) generated from munitions training activities at Eglin AFB during 2005. These estimates are based on the number and type of ordnance used in 2005, combined with chemical composition data obtained from the Toxic Release Inventory-Data Delivery System (TRI-DDS). The TRI-DDS database, which is a product of the Joint Service EPCRA Workgroup, is intended to provide a consistent method to assess chemical constituent data that may be used by DoD installations when reporting chemical releases and waste management practices.

Table 7-41. Baseline Munitions-related Wastes from Training Activities at Eglin (2005)

TRI Chemical	Quantity Generated (pounds)[1]	TRI Threshold Exceeded[2]
Antimony	251	No
Asbestos (friable)	115	No
Chromium	199	No
Cobalt	42	No
Copper	103,154	**Yes (Form R filed)**
Lead	14,418	**Yes (Form R filed)**
Manganese	1,195	No
Nickel	94	No

1. Source: DoD, 2006; TRI = Toxic Release Inventory
2. Annual reporting thresholds are 10,000 pounds for "Otherwise Used" chemicals and 25,000 pounds for "Manufactured" chemicals, except in the case of lead, which is subject to an overall reporting threshold of 100 pounds.

As the table indicates, training activities generated quantities of copper and lead, which exceeded their respective TRI reporting threshold. As required, Eglin AFB prepared a Form R report documenting releases associated with these two chemicals.

Under current practice, munitions debris is recovered and/or removed from the ranges for the purpose of storage, reclamation, treatment, and disposal as solid waste. These practices are necessary for compliance with AFI 13-212, which requires the range to be cleared of munitions debris on a regular basis. Trained EOD personnel inspect all munitions debris. Occasionally, the small spotting charge in the training munitions fails to detonate, or bomb casings on larger bombs do not fragment. If necessary, EOD

personnel treat hazardous munition debris in place, rendering it safe, and then supervise the collection and ultimate disposal of the debris (U.S. Air Force, 2001b).

Fuel Releases

Fuel release events may occur within JSF Flight Training airspace during air-to-air refueling or in-flight emergencies (IFE) in which fuel stores are jettisoned from the aircraft. However, this is not normal Air Force practice and is not done in the base airspace environment. In emergency situations, procedures require that fuel dumping be coordinated with ATC and be conducted, to the extent possible, over water or unpopulated land areas at an altitude at least 5,000 feet above the highest obstacle (AACI 11-201, 28 July 2006).

Due to the immaturity of the JSF Program and aircraft variants, accurate information on in-air fuel dumps as a result of an IFE or refueling operation are not yet available. Historical data associated with previous aircraft models (F-15, F-16, and F/A-18) are the best available data to utilize for analysis. While the Air Force cannot predict future F-35 performance, given the advances in technology and enhanced safety systems, the Air Force would not expect the F-35 IFE rates to exceed the initial rates of the F-15.

The *Eglin Gulf Test and Training Range (EGTTR) Final Programmatic Environmental Assessment* (U.S. Air Force, 2003f) analyzed the release of fuels within the EGTTR as a result of air operations. Table 7-42 reports the estimated average number of IFEs for aircraft operating in the EGTTR, as well as estimated quantities of jet fuel released into the ROI.

Table 7-42. Estimated Fuel Release From In-Flight Emergencies (IFEs)

Aircraft Type[1]	IFE Sorties that Released Fuel[2]	Average Released Fuel (gallons/sortie)[3]	Total Fuel Released (gallons)	Fuel (gallons) Reaching Surface
F-15/F-15E	220	735	161,700	1,620
F-18	4	735	2,940	30
F-111[5]	2	735	1,470	20
F-117	0.2	735	150	2
AC/MC/C-130[4]	0.5	1,470	700	10
		Total	**166,960**	**1,682**

Source: U.S. Air Force, 1996, 1998, 1998b, 2000, 2000a

1. F-16s were also utilized, but do not have fuel jettisoning capability.
2. IFE sorties estimated based on 1) 4% of total F-15 sorties underwent IFE; 0.3% of total AC/MC/C-130 sorties and 2) only 5% of IFE sorties released fuel.
3. Modeled conditions for F-15—5,000 feet altitude (minimum for IFE), speed of 400 knots, wind speeds of 2.51 knots, ejected fuel load of 735 gallons—would result in only approximately 1% of fuel load landing on the surface, with 99% evaporation before fuel hits the ground (Fuel Jettison Simulation FJSIM 1.01, Continuum Dynamics, Inc).
4. Average volume of fuel potentially released during an IFE is twice that of the F-15 or about 1,470 gallons.
5. This aircraft has been retired and is no longer in Eglin AFB inventory.

Air-to-air refueling operations are typically conducted at higher altitudes ranging from 16,000 to 26,000 feet for receiving aircraft. Fuel dispensing aircraft are of three types (KC-135s, KC-10s, or C-130s) that are fitted with instantaneous, automatic closure devices (poppet valves) to reduce fuel loss during transfers. Estimates of fuel losses during refueling events are on the order of 1 quart during normal transfers and 1 to 2 gallons or less during unplanned, emergency breakaways.

During IFEs, pilots release fuel to lighten the aircraft, facilitating aircraft maneuverability and increasing chances for a safe return. Fuel is never released at altitudes below 5,000 feet during IFEs and pilots typically release fuel gradually (i.e., 1,000 to 2,000 pounds of fuel per minute). Jet pilots do not track or collect data on jettison frequencies or volumes of fuel discarded; the number of IFE occurrences for F-15s was estimated to be approximately 2 to 4 percent of all sorties flown. Assuming that 4 percent of all F-15/F-15E/F-18/F-111 sorties released an average amount of 735 gallons of fuel during an IFE, an estimated 167,000 gallons of fuel were deposited into the ROI environment from F-15s. Estimates of fuel ejected from IFEs for the AC/MC/C-130s were significantly lower due to a lower frequency of sorties and lower occurrence of IFEs (0.3 percent occurrence for all sorties), although the average volume of fuel potentially released during an IFE is twice that of the F-15. This resulted in an estimate of 700 gallons of fuel deposited into the environment from AC/MC/C-130 IFEs.

7.10.1.2 Environmental Consequences (Hazardous Materials – JSF Flight Training Alternative 1)

Munition fragments and residues would be generated as a result of training missions. Ordnance, such as GBUs, are proposed to be used as part of the JSF flight training. It is estimated that 635 live and 219 inert GBU-12 would be expended annually. Additionally, training would involve the use of 208,518 live 25-mm ammunition rounds annually.

Releases to the environment from munitions utilized in proficiency and qualification training require reporting to the USEPA under the EPCRA TRI program. Eglin AFB has developed procedures to comply with TRI reporting requirements and would track ordnance use associated with the proposed alternatives. Eglin AFB has reported for copper (reporting threshold of 10,000 pounds) and lead (reporting threshold of 100 pounds) in prior years, including 2005. Table 7-43 compares chemical releases associated with JSF flight training operations with those of the baseline year. As the table indicates, proposed JSF training activities would have a negligible impact on overall releases and would not result in a threshold being exceeded for any new chemicals.

Large metallic residue resulting from aircraft delivery of live/inert/practice ordnance or other ordnance would be removed from test areas on a scheduled basis. In most cases, debris associated with gun-fired ammunition or some types of ordnance (e.g., flares) would be too small to collect and would likely remain on the range. In accordance with AFI 13-212, Class A range procedures, as implemented by Eglin AFB, the range is cleared of munition debris on a regular basis (U.S. Air Force, 2001b). Because the proposed JSF training activities are similar to activities already being conducted by other units at Eglin AFB, range clearance procedures would be conducted in the same manner at the same time. The addition of the JSF Flight Training would not be expected to limit Eglin AFB's capacity or ability to conduct these procedures. No adverse impacts are associated with munition-related debris generated as a result of the JSF flight training.

Table 7-43. Munitions-related Wastes from Proposed JSF Flight Training

Chemical	Estimated Quantity from JSF Training (pounds)[1]	2005 Quantity at Eglin AFB (Baseline) (pounds)[2]	Total Estimated Quantity (pounds)	New EPCRA TRI Reporting Required
Antimony	13	251	264	No
Chromium	27	199	226	No
Copper	645	**103,154**	**103,799**	No
Lead	20	**14,418**	**14,438**	No
Manganese	164	1,195	1,359	No
Nickel	13	94	107	No

1. Source: DoD, 2006
2. Annual reporting thresholds are 10,000 pounds for "Otherwise Used" chemicals and 25,000 pounds for "Manufactured" chemicals, except in the case of lead, which is subject to an overall reporting threshold of 100 pounds. Quantities highlighted and **bold** exceeded, or would exceed, the applicable TRI reporting threshold. (Release estimates were generated using the TRI-DDS database)

As previously stated in Section 7.10.1.1, fuel dumping shall be conducted in accordance with the AACI 11-201.

Fuel releases from IFEs may potentially impact air quality and water quality within the ROI. However, the descent of fuel through the atmosphere will cause a significant portion of fuel to evaporate into the air, while the remaining liquidized fuel will be deposited onto the surface of marine waters. Fuel evaporation may compromise air quality temporarily, but should quickly dissipate with atmospheric circulation. Air criteria for evaporated petroleum products are not presented as part of the NAAQS criteria; consequently, a threshold level for air contamination is not discussed. The primary contamination concern for fuel spills over Gulf of Mexico waters is the impact of residual petroleum products on biological resources within the water column.

The EGGTR analysis assumed that the surface area underneath the EGTTR airspace (350 billion square meters) was a confined box with a depth extending down to 0.5 meter, creating a liquid volume of 170 trillion liters, which would not interact with other Gulf of Mexico waters. For the maximum baseline year, where estimated amounts of fuel were released as described in Table 7-43, 167,000 gallons of fuel were released from EGTTR aircraft operations. For the "closed box" illustration, this amounts to approximately 3 micrograms per liter.

In reality, a significantly lesser fraction of fuel actually reaches the water, such that 167,000 gallons is a large overestimate. This is because a large fraction of the fuel is evaporated in the atmosphere as it descends to the surface. A computer simulation model indicates that at 5,000 feet altitude (minimum for IFE), an airplane speed of 400 knots with wind speeds of 2.51 knots, a fuel load of 735 gallons ejected from an F-15 would result in only approximately 1 percent of fuel load landing on the surface, with 99 percent evaporation before fuel hits the ground (Fuel Jettison Simulation FJSIM 1.01, Continuum Dynamics, Inc.). Thus for a total of 167,000 gallons released, the concentration would be 0.03 micrograms per liter of petroleum product. Additionally, these petroleum products have short half-lives, and consequently do not persist in the marine environment for very long.

Physical Resources

Temporary localized effects to air and water quality may result from fuel releases. Compromised air quality due to fuel contamination may occur temporarily, but should quickly dissipate with the evaporation and dispersion of the release. Naturally occurring air currents, wind velocity, and fast moving storm systems should minimize any potential long-term adverse impacts to air quality. Because fuel dumps are required to be conducted over open water whenever possible, Gulf diurnal tidal cycles, and high wave action caused by wind and storms should minimize the potential for adverse impacts. The physical characteristics of the fuel (e.g., volatility and solubility) should also help to minimize impacts to air and water quality. Adverse impacts from fuel releases to physical resources are not anticipated.

Biological Resources

Preliminary research describing the physiological effects of JP-8 (jet fuel) and other petroleum distillates on biological species including invertebrates (soft shell clams), fish (salmon), and human subjects suggests that some liver, renal, neurological, and pulmonary toxicological effects may occur (Pfaff et al., 1995; Davison et al., 1993; Stafford, 1989; Spain and Somerville, 1985). However, the exact toxicological mechanism for these effects remains unknown and would benefit from further research. No evidence of mutagenic risk as a result of exposure has been documented to date.

Data indicate that JP-8 is relatively nontoxic to humans through direct exposure (i.e., nonirritating to the eyes and only slightly irritating to the skin).

Following a fuel release, fuel concentrations evaporate or are diluted through wave action, currents, and tides, resulting in minimal impacts to plankton communities. Fuel releases would not significantly impact invertebrate populations within the ROI. The volatile nature of JP-8, in conjunction with the location of the test ranges over deep, open waters and the weather and topography of the region tends to minimize any potential low-level adverse impacts that may occur to invertebrates as a result of fuel releases. Further, it has been suggested that exposure to JP-8 is not likely to result in adverse bioaccumulative effects (USDH &HS, 1993).

Habitat degradation within the water column that might adversely affect feeding, breeding, and spawning of fish is not anticipated from fuel releases. The releases would be localized and the fuel's fate in the water column would be short-term based on its volatility and nonpersistent behavior. Additionally, JP-8 fuel's localized impacts to fish would be further reduced by the mobility of the fish species and their ability to move away from regions of degraded water quality.

Long-term bioaccumulation of petroleum contaminants in fish tissue, and in prey tissues, has potentially adverse impacts depending on the location, frequency, and historical record of fuel release events. Bioaccumulation of JP-8 is not expected to occur within marine fish species following extended exposures (USDH&HS, 1993). Due to the volatile nature of fuels, releases are likely to impact only a small area. Wind, wave action, and ocean currents further facilitate fuel dilution and dispersion, reducing the potential for adverse effects. In addition, fuel releases occur sporadically, triggered either by accident or aircraft emergency and do not result in large concentrations of fuel being released in one specific area. These factors minimize the potential adverse effects from fuel releases to fish populations and the Gulf fish community at large. In general, fuel releases should not significantly impact healthy stocks of widely-dispersed pelagic and benthic fish.

Fuel releases are not expected to directly impact marine birds and neotropical species. Indirect effects, such as toxic contamination of prey species, is not likely to occur as JP-8 fuel does not bioconcentrate up the food chain. Additionally, fuel releases are not expected to adversely affect marine mammal populations within the Gulf. The tendency for marine mammals to avoid regions of reduced water quality, particularly waters having reduced visibility (Dohl et al., 1983), lessens the opportunity for direct exposure.

Indirect impacts to marine mammals from feeding are also expected to be negligible. Although marine mammals feed primarily on fish or planktonic species of the region, the limited exposure of prey species to fuel releases (see previous discussion of plankton communities and fishes) reduces the potential for contaminant bioaccumulation within marine mammal fatty tissues. Furthermore, because many JP-8 contaminants are volatile, their bioaccumulation potential within marine mammal species is not expected to be high (USDH&HS, 1993). Despite the negligible probability of adverse effects, preventative measures may be warranted to reduce the chance of any potentially damaging interactions. Avoiding migrating pods and areas known to have a high density of marine mammals will minimize the potential for adverse impacts.

Threatened and Endangered Species

Due to their limited numbers, species that are federally or state-protected or identified as having special status warrant particular attention when assessing the potential for adverse effects created by a specific action. Because species abundances are already diminished, adverse impacts to one or more individuals may result in significant adverse effects to the remaining population at large. The mechanisms by which these impacts may potentially occur are similar to those previously described for fishes and marine mammals (i.e., degradation of habitat, direct exposure and toxicity, and increased potential for bioaccumulation of contaminants).

In general, fuel release impacts are expected to have minimal or no effect on most resources within physical, biological, anthropogenic, or socioeconomic environments due to the extremely low incidence of recorded fuel release events and high rate of evaporation for JP-8. Localized degradations in water quality may temporarily affect the distribution of threatened and endangered species and fish populations. Cumulative effects are not expected for threatened and endangered species, fish populations, or commercial fisheries.

7.10.2 JSF Flight Training Alternative 2

7.10.2.1 Existing Conditions (Hazardous Materials – JSF Flight Training Alternative 2)

The existing conditions regarding hazardous materials associated with JSF Flight Training Alternative 2 are the same as those discussed in Section 7.10.1.1, JSF Flight Training Alternative 1.

7.10.2.2 Environmental Consequences (Hazardous Materials – JSF Flight Training Alternative 2)

The environmental consequences associated with hazardous materials under JSF Flight Training Alternative 2 are the same as those stated above for JSF Flight Training Alternative 1, Section 7.10.1.2. There would be no adverse impacts related to hazardous materials as a result of JSF Flight Training Alternative 2.

7.10.3 No Action Alternative

Under the No Action Alternative, operations on the base would continue under current conditions and would incorporate activities listed in Chapter 2 (Section 2.7, No Action Alternative). The types of hazardous materials used/stored or hazardous waste generated would continue under this alternative. Although, with the cessation of 33 FW operations, the total quantity of hazardous materials used and/or hazardous waste generated would decrease from current amounts. Existing procedures for hazardous materials would remain unchanged.

7.11 PHYSICAL RESOURCES

7.11.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.11.1.1 Existing Conditions (Physical Resources – JSF Flight Training Alternative 1)

Soils

Soils within TA B-82 (Figure 7-29) and TA C-62 (Figure 7-30) generally belong to the Lakeland Association (Table 7-44). Soil types occurring within TA B-75 include predominantly Lakeland, with lesser percentages of Chipley and Hurricane, Foxworth, Rutledge and Troup. TA C-52E consists mostly of Lakeland soils with some Bonifay-Troup-Dothan association soils along the northern edge of this test area. Dorovan-Pamlico mucks comprise soils at the southeast corner of C-52E.

Detailed descriptions of these soil types can be found in Appendix G, *Physical Resources*. The 2007 *Test Area B-75 Environmental Baseline Document* determined that aluminum, barium, copper, lead, and zinc from chaff, flares and explosives were the primary chemical materials of concern in soils at this test area (U.S. Air Force, 2007i).

Table 7-44. JSF Flight Training Alternative 1 – Soil Types and Attributes

Soil Name	Erosion Risk	Attributes	Soil Type	Acres (% of TA)			
				TA B-75	TA B-82	TA C-62	TA C-52E
Lakeland Sand Slope 0-5%, 5-12%	Moderate	Yellowish brown to grayish brown	Sand	3,491 (98%)	968 (100%)	606 (47%)	5,425 (90%)
Chipley/Hurricane Series	Moderate	Highly acidic, dark gray	Medium sand	24 (.67%)	0	0	0
Foxworth	Moderate	Marine or eolian sediments, very dark brown	Sand	35 (.98%)	0	0	0
Dorovan Muck	Low	Clay-like	Organic Muck	0	0	0	0
Leon Sand	Low	Poorly drained, light gray to dark reddish brown sand	Sand	0	0	0	0
Pactolus Loamy Sand	Low	Dark grayish brown loamy sand, moderately acidic	Loamy sand	0	0	0	0
Udorthents	Low	Ponding, very acidic, clayey	Loamy sand	0	0	0	0
Troup Sand	Moderate	Dark brown, fine sand	Sandy	3 (.08%)	0	387 (30%)	0
Bonifay	Low	Dark grayish brown to yellowish	Loamy sand	0	0	129 (10%)	300 (5%)
Dorovan-Pamlico	Low	Dark brown, organic	Clay	0	0	129 (10%)	300 (5%)
Rutledge	Low	Black to gray	Fine sand	4 (.11%)	0	26 2%	0
Bonneau-Norfolk-Angie Complex	Low	Yellowish-brown	Clayey sediments	0	0	<13 (<1%)	0

TA = Test Area

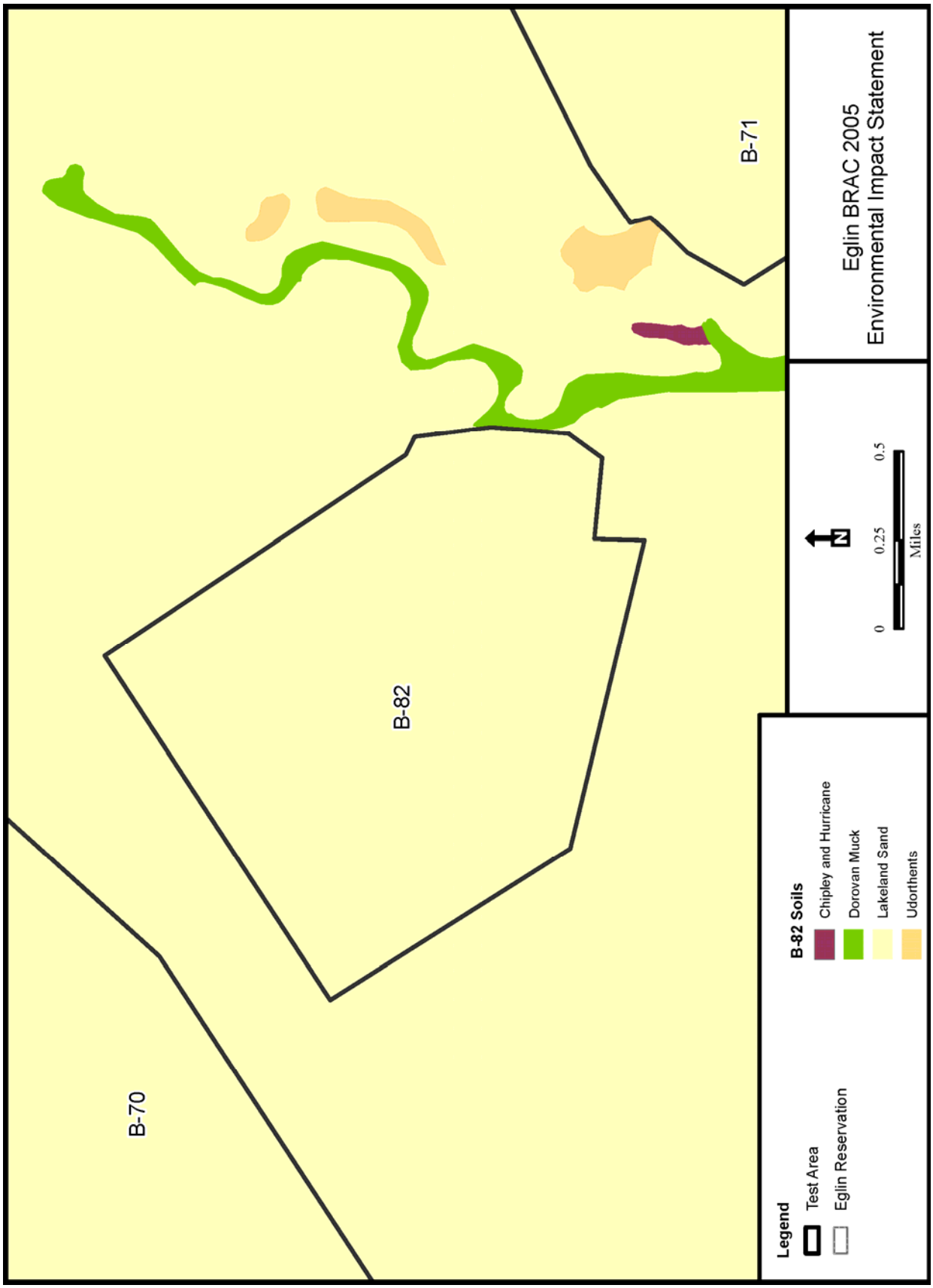

Figure 7-29. JSF Flight Training – Soils for TA B-82

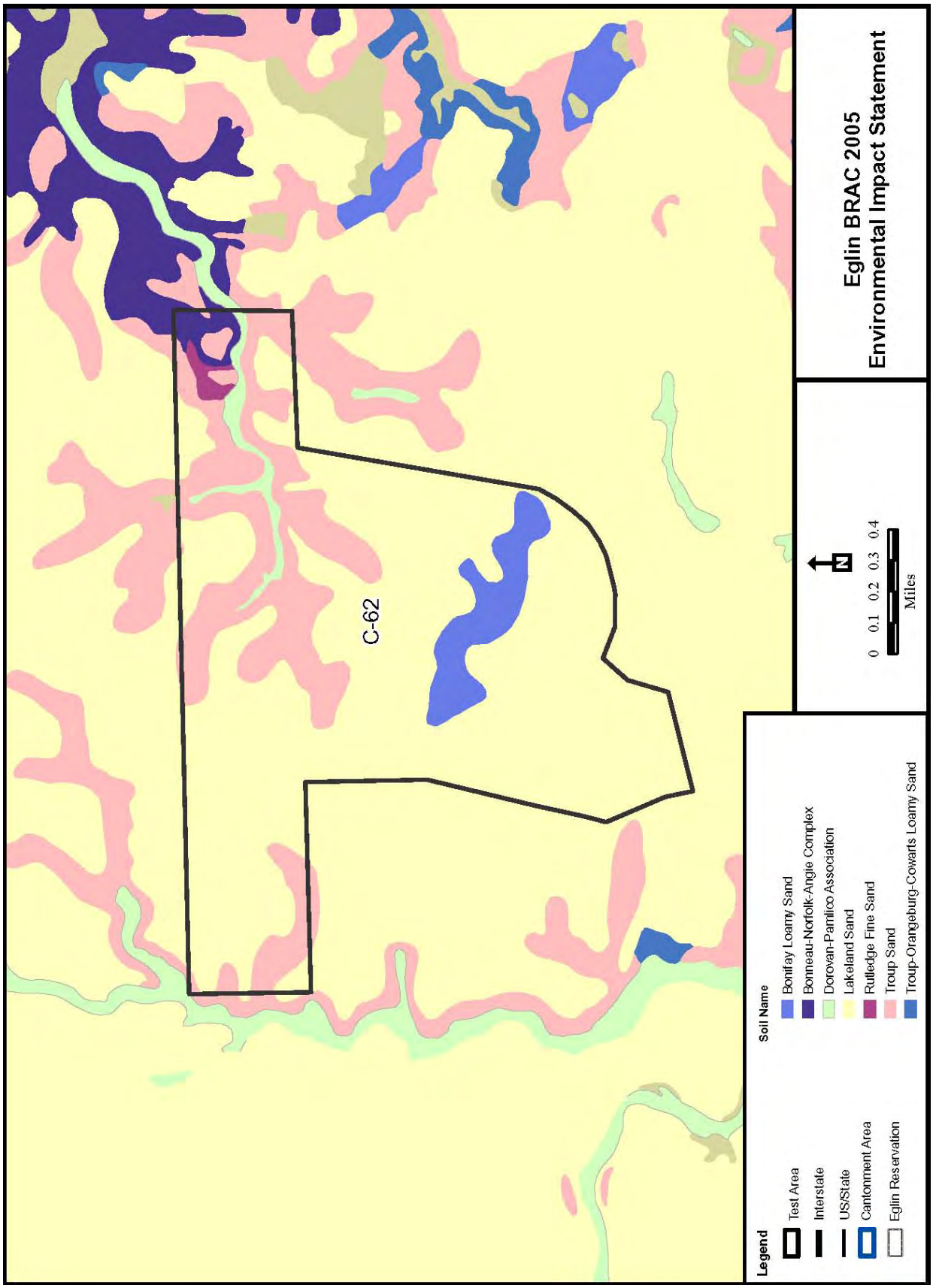

Figure 7-30. JSF Flight Training – Soils for TA C-62

Surface Water

Surface waters on or near TA B-75 include Wolf Creek and Holley Creek, which skirt the north and south edges of the test area (Figure 7-31). Both of these creeks drain into the Yellow River. There are no surface waters on TA B-82, though Turtle Creek runs adjacent to the southeastern corner of this test area.

Surface waters within TA C-62 include Oakie, Burntout, and Blount Mill Creeks (Figure 7-32). On the north end, Oakie Creek dominates the northern and eastern portions of the test area. On the northwestern side of the test area, the headwaters of Burntout Creek begin with several tributaries originating on TA C-62. On the southern portion of the test area, the headwaters of Blount Mill Creek begin with two main tributaries originating adjacent to the Open Burn/Open Detonation (OB/OD) site (U.S. Air Force, 2005i).

There are several creeks on TA C-52E, all of which drain into the Basin Creek watershed. Hogpen Branch, Pochanee Branch, Watering Creek, Middle Creek, and Basin Creek are interspersed throughout TA C-52E.

Surface Water Quality

Surface waters within TA B-75 lie within the Group 4 basin. Group 4 includes waters that flow into Pensacola Bay. The Verified List of Impaired Waters for Group 4 water basins has been adopted and submitted to the USEPA. This list serves as the Florida Department of Environmental Protection (FDEP) updated 303(d) list (FDEP, 2006b). Neither Wolf Creek nor Holley Creek is on this list of impaired waters. Turtle Creek, which runs adjacent to TA B-82, is not listed as impaired on the 303(d) list. Soil erosion from daily operations (tank training) and construction was noted as a potential effector for stream water quality. Risk of surface transport of metals into nearby streams was deemed to be minimal due to filtering effects of surrounding vegetation (U.S. Air Force, 2007i). However, groundwater transport was identified as a potential conveyance mechanism for metals.

Oakie, Burntout, and Blount Mill Creeks within TA C-62 fall within the Choctawhatchee-St. Andrew Bay Basin (the Group 3 basin). The Group 3 Verified List of Impaired Waters has been adopted, constituting the Group 3 basin-specific 303(d) list. None of the TA C-62 surface waters are listed as impaired on the 2006 303(d) list (FDEP, 2006f).

According to the *FDEP Florida Water Quality Assessment 305(b) Report* (FDEP, 2000), the streams on TA C-52 were either rated as "Fully Meets Use" or there was "insufficient data" to determine the status. No streams on TA C-52 were listed as impaired on the 1998 303(d) List (FDEP, 2004). Site specific water quality data was not available for the streams on TA C-52E.

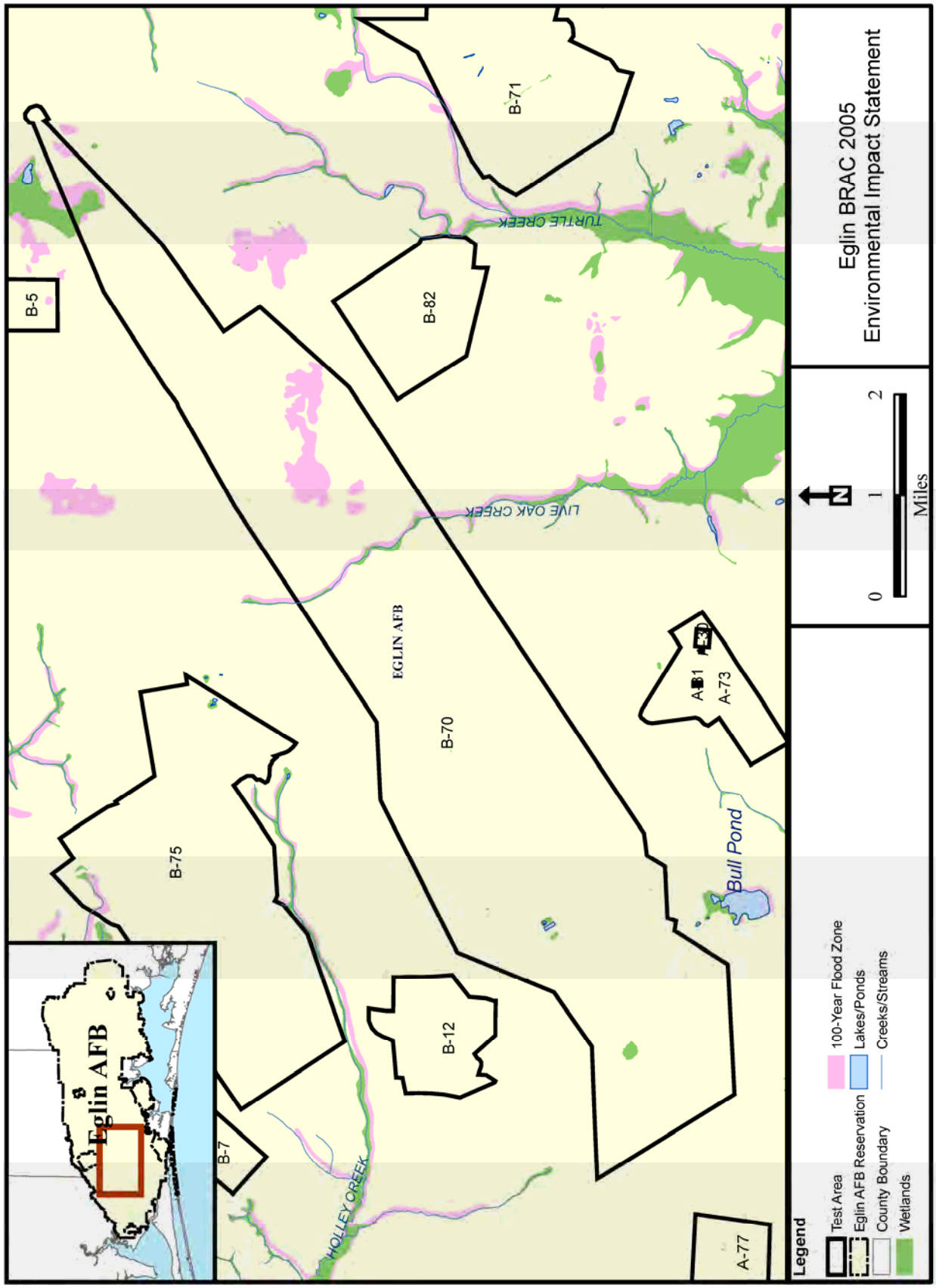

Figure 7-31. JSF Flight Training – Surface Waters at TA B-75 and TA B-82

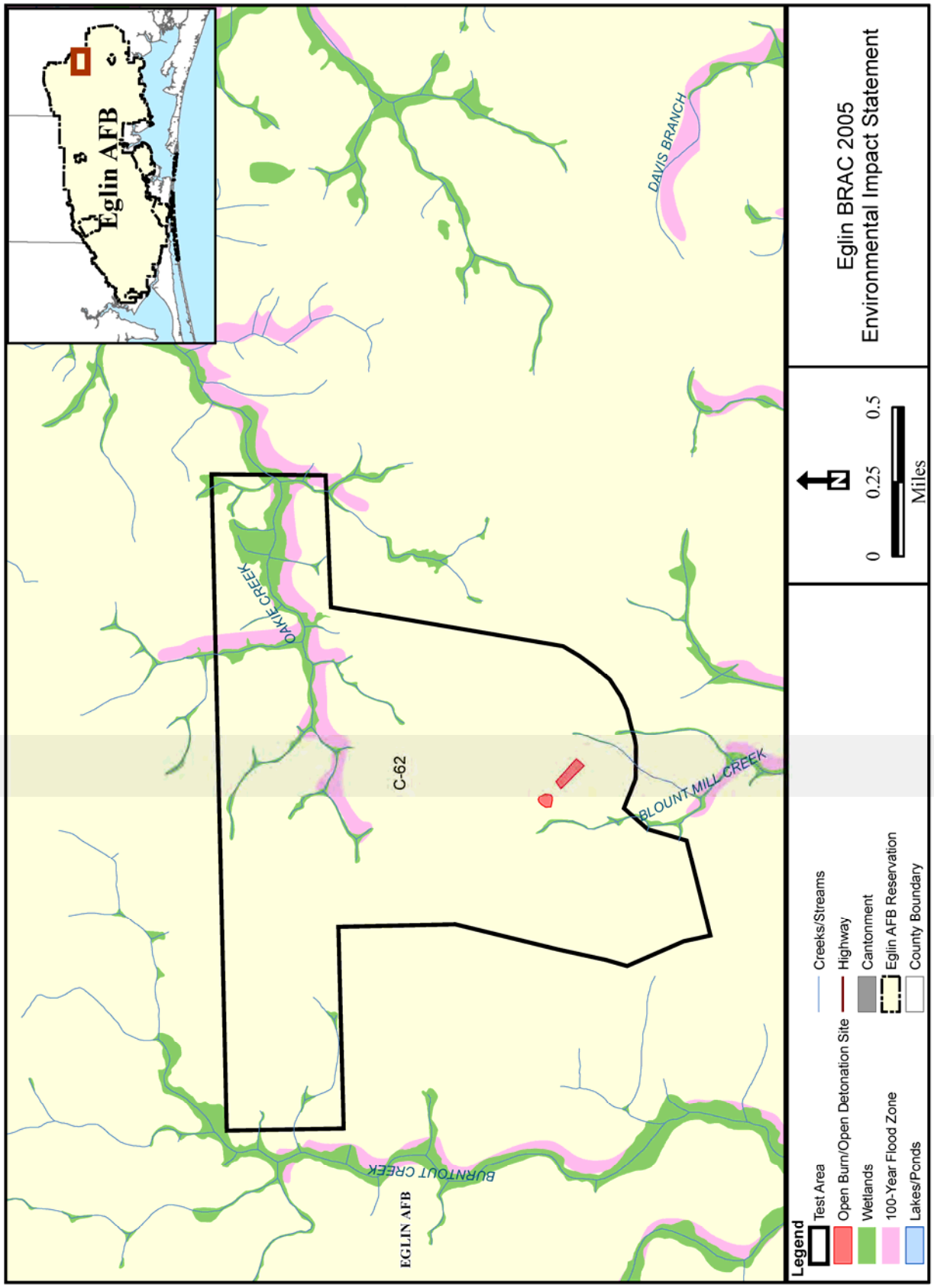

Figure 7-32. JSF Flight Training – Surface Waters at TA C-62

Wetlands and Floodplains

TA B-75 supports a small area of wetlands, which are associated with Wolf Creek and Holley Pond (Figure 7-31). Table 7-45 provides the types and acreages for these areas. TA B-75 comprises about 3,557 acres, less than 1 percent of which is covered by wetlands. The floodplains within TA B-75 are associated with Wolf Creek (Figure 7-31). The majority of TA B-75 is not within the 100-year flood inundation area. Table 7-45 provides the acreage of floodplains for this test area. Floodplains cover less than 1 percent of TA B-75. There are over 500 acres of wetlands on TA C-52E associated with the numerous creeks that run through this test area. There are no wetlands or floodplains on TA B-82.

Table 7-45. JSF Flight Training – Total Acreages for Wetlands and Floodplains of TAs B-75, C-62 and C-52E

Resource	B-75	C-62	C-52E
Wetlands (Palustrine)	12	60.4	532.10
Floodplains	29	77.5	200 (est.)

TA C-62 supports wetland areas associated with Oakie Creek, Blount Mill Creek, and Burntout Creek (Figure 7-32). Table 7-45 provides the types and acreages for these areas. Wetlands cover approximately 4.7 percent of the 1,290-acre TA C-62. The floodplains within TA C-62 are only associated with Oakie Creek (Figure 7-32). The majority of TA C-62 is not within the 100-year flood inundation area. Table 7-45 provides the acreage of floodplains for this test area. Approximately 6 percent of TA C-62 consists of floodplains.

Coastal Zone

The JSF Flight Training Alternative 1 area lies within the jurisdictional concerns of the FDEP under the Coastal Zone Management Act (CZMA). Coastal zone definitions, regulations, and requirements are discussed in Chapter 3 (Section 3.11.8, Laws and Regulations, Water Resources). Eglin prepared a CZMA determination to address the impacts to the coastal zone (Appendix I, *CZMA Determination*).

7.11.1.2 Environmental Consequences (Physical Resources – JSF Flight Training Alternative 1)

Soil and Water Resources

TA B-75 and C-62

JSF training would use TA B-75 for strafing training, but the majority of JSF strafing training would occur on TA C-62. Approximately 208,518 rounds of 25-mm

ammunition are expected to be fired each year by JSF students and instructors. This number of rounds is roughly 15 times the current amount of strafing rounds fired on TA C-62. It is about seven times the quantity analyzed in the *TA C-62 Programmatic Environmental Assessment*. Current activities at TA C-62 average 13,731 rounds of 20-mm ammunition per year with a maximum allowable amount of 27,462 rounds. Allowable amounts were based on mission capacity at the time the *TA-C62 Programmatic Environmental Assessment* was written in 2002. Analysis presented in the *TA C-62 Programmatic Environmental Assessment* found the allowable amount would have no adverse effects on environmental resources within TA C-62. However, JSF training activities would exceed the number of annually allowed rounds by 181,056. The departure of the 33 FW and their discontinued use of TA C-62 for strafing practice would effectively place the total number of strafing rounds projected for TA C-62 under this alternative at 208,518 (Table 7-46).

Table 7-46. Baseline and 100 Percent Surge Quantities of Expendables Used During Testing and Training Activities at TA C-62

Expendable	Baseline Testing Quantity	Baseline Plus 100 Percent Surge	JSF Total Quantity	JSF Quantity Over 100 Percent Surge
20-mm TP	13,731	27,462	208,518	181,056

Source: U.S. Air Force, 2002d
TP = target practice

Impacts to soil and water resources on TA C-62 from strafing would be sedimentation due to erosion and the possible leaching of metals into water systems from the corrosion of ammunition debris. Erosion would result from the maintenance of the target area, which must be kept free of vegetation. The 20-mm aircraft gunnery training target (TT-3) maintenance practices have caused severe erosion already of the headwater stream slope of Burntout Creek and have altered wetland habitats (Burntout Creek Headwater). Over its years of use, the target surface has been kept free of vegetation to allow for pilot target approach recognition and recovery of projectile debris. In years past, recovery machinery similar to golf ball collection equipment was used to periodically retrieve surface gunnery debris (U.S. Air Force, 2002d).

The increase in JSF flight training would not result in a change in vegetation management practices. The practice of keeping the area clear of vegetation would remain the same regardless of the number of munitions expended. Thus, the conditions that led to the erosion at Burntout Creek headwater slope would not change as a result of increased JSF flight training. Debris retrieval would likely increase but the equipment used does not result in more than minor surface soil disturbance. Besides keeping the target area free of surface debris, current debris retrieval procedures remove metals that could otherwise corrode and leach into soil and water.

Since debris retrieval is an established practice and the increased number of rounds would be retrieved, adverse impacts to physical resources are not anticipated from JSF training at TA C-62 and TA B-75. Erosion is already occurring at TA C-62 as a result of target area maintenance. Current maintenance practices would not change, and the erosion is not expected to worsen as a result of JSF training. Management practices for TA C-62 as identified in the *TA C-62 Programmatic Environmental Assessment* are listed below (U.S. Air Force, 2002d).

Management requirements presented here were drawn from the *2002 Test Area C-62 Programmatic Environmental Assessment* (U.S. Air Force, 2002d). These would also be applied to strafing targets at TA B-75.

- Monitor the test area: A monitoring plan should be developed to answer specific questions regarding the impact of the proposed training. The area of the test site should be monitored for all possible areas of impact. The monitoring should include, but not be limited to, chemical analysis of soils, groundwater monitoring, surface water monitoring, and endangered species surveys.
- Adhere to Eglin's Wildfire Specific Action Guide Restrictions for pyrotechnics use.
- No new cleared target areas should be established within 200 feet of any natural water body.
- Detonations of explosives should not occur within 200 feet of water bodies.
- If any ordnance lands in stream bank areas, they should be removed immediately in accordance with Air Force regulations.
- Conduct target and ordnance debris removal and disposal of solid debris from blanks and flares in accordance with Air Force regulations.
- Bullet containment, lead projectiles management, and lead reclamation should be employed to reduce lead concentrations.
- Vehicles should remain on roads or established tracks.

TA C-52E and TA B-82

Approximately 219 inert GBU-12 bombs and 635 live GBU-12 bombs are expected to be dropped on TA B-82 and TA C-52E each year by JSF students and instructors. Neither B-82 nor C-52E is frequently used for bomb drops. JSF flight training activities will not use chaff.

TA C-52E is used as a safety impact zone for munitions testing and is designated as a gunnery impact area. Historically, TA C-52E was used to test various air-to-ground munitions, though within recent years no ordnance has been dropped on this test area. There is one target, which is seldom used. JSF flight training may require land clearing to establish additional targets. Erosion risks are minimal for most of the test area, which is largely composed of well-drained Lakeland soil, but soil disturbance during target construction would potentially result in erosion. Near streams, the terrain is more sloped and the soils mucky and less apt to drain. These mucky soils, which are found in wetland areas of streams that run throughout TA C-52E, are acidic. Because of the acidity, moisture, and organic components of these soils, munitions dropped in these areas undergo more rapid corrosion, which releases metals more readily into soil and groundwater.

Metals from munitions casings and other components would be periodically retrieved through existing range cleanup procedures. Soil and water impacts from increased JSF training on TA B-82 and C-52E would not be considered adverse. Targets would not be established in slope or wetland areas.

7.11.2 JSF Flight Training Alternative 2

7.11.2.1 Existing Conditions (Physical Resources – JSF Flight Training Alternative 2)

Existing conditions for physical resources under JSF Flight Training Alternative 2 are the same as those described under JSF Flight Training Alternative 1, Section 7.11.1.1.

7.11.2.2 Environmental Consequences (Physical Resources – JSF Flight Training Alternative 2)

Impacts to physical resources under JSF Flight Training Alternative 2 would be identical to those described under JSF Flight Training Alternative 1, Section 7.11.1.2.

7.11.3 No Action Alternative

Under the No Action Alternative, air operations on the base would continue under current conditions and would incorporate the anticipated actions listed in Chapter 2 (Section 2.7, No Action Alternative). Under this No Action Alternative, no impacts to physical resources would be anticipated. Existing mitigation methods and management practices for the stabilization of soils and prevention of impacts to nearby wetlands and water sources would need to continue.

7.12 BIOLOGICAL RESOURCES

7.12.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.12.1.1 Existing Conditions (Biological Resources – JSF Flight Training Alternative 1)

Flora and Fauna

Wetland/Riparian, Flatwoods, and Sandhills ecological associations are found within or adjacent to the ROI (Figure 7-33, Figure 7-34, and Figure 7-35). Landscaped/urban areas and open grassland/shrubland also are found at these sites.

Sensitive Habitats and Sensitive Species

High Quality Natural Communities occur near Choctaw Field, Duke Field, TA C-62, TA B-75, and TA B-82, and on portions of Eglin Main Base and TA C-52E (Figure 7-36, Figure 7-37, and Figure 7-38). The Lower Weaver River Outstanding Natural Area exists north of Choctaw Field (Figure 7-37), and the Brier Creek Outstanding Natural Area/Significant Botanical Site exists south of TA C-62 and east of TA C-52E (Figure 7-38).

A seepage slope exists on the western headwater stream slope segment of Blount Mill Creek in the southern portion of TA C-62. Seepage slopes are wetlands located at the base of a slope where moisture is maintained by the down slope seepage of water. Soils remain saturated, but rarely have standing water.

Based on existing, available information, the species documented to occur or that may potentially be present within the JSF Flight Training alternative locations are identified in Table 7-47, and Figure 7-36, Figure 7-37, and Figure 7-38. All of the proposed locations are potential habitat for the Florida black bear, Florida pine snake, American kestrel, gopher tortoise, and indigo snake, except TA B-82 which is entirely landscaped/urban and grassland/shrubland.

One bald eagle nest is located on Eglin Main Base between Cobbs Overrun and TA A-22. An Okaloosa darter stream is located north of the Eglin Main Base runway (Eglin GIS, 2007c). At Duke Field, inactive red-cockaded woodpecker (RCW) cavity trees exist to the south and west, and an Okaloosa darter stream begins south of the field (Eglin GIS, 2007c). The gopher tortoise historically has been sighted at Duke Field (Eglin GIS, 2007c). No sensitive species have been documented at Choctaw Field, but there is the potential for several sensitive species in the area based on the type of habitat present (Table 7-47).

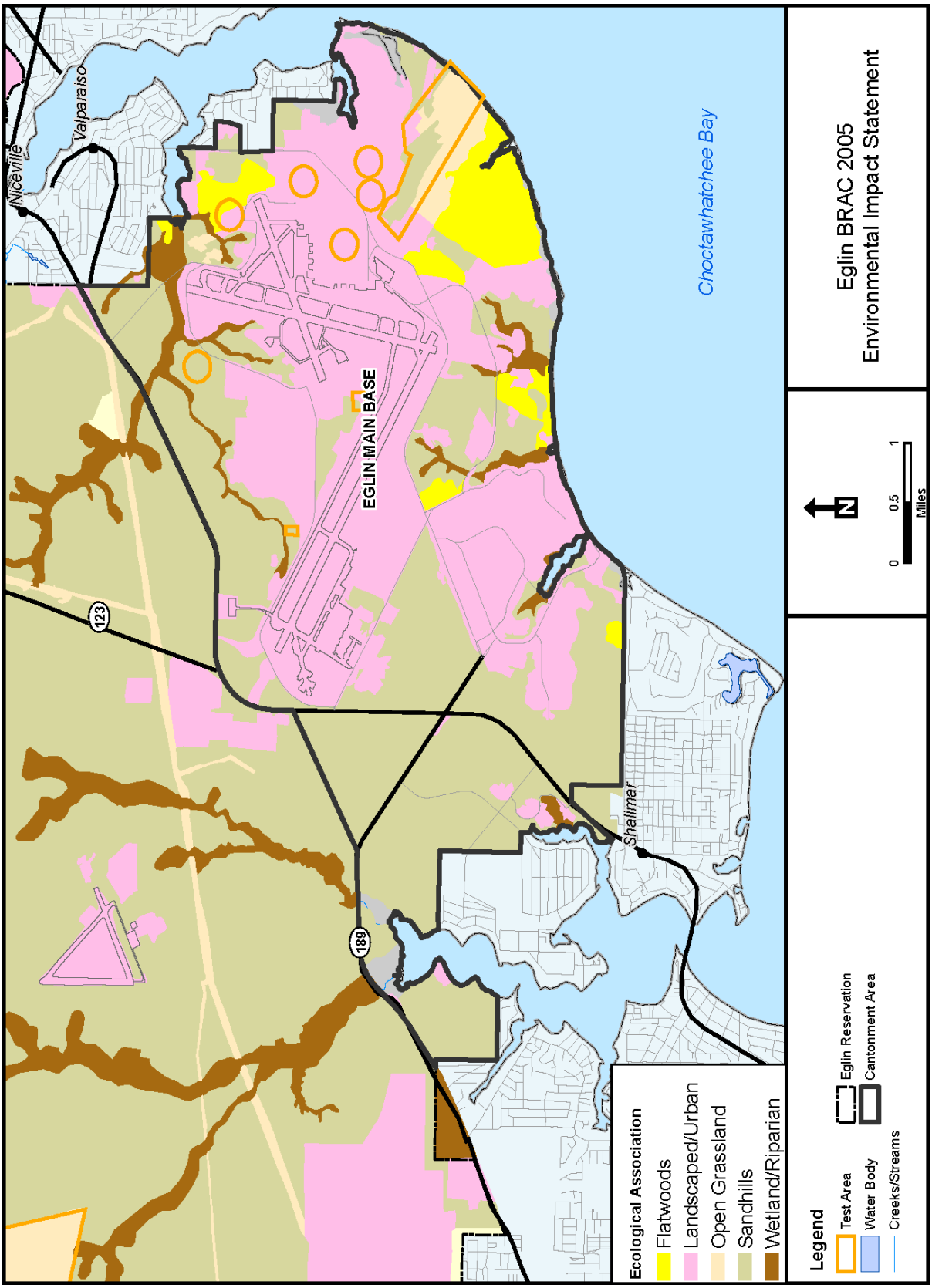

Figure 7-33. Ecological Associations for the JSF Flight Training Alternatives at Eglin Main Base

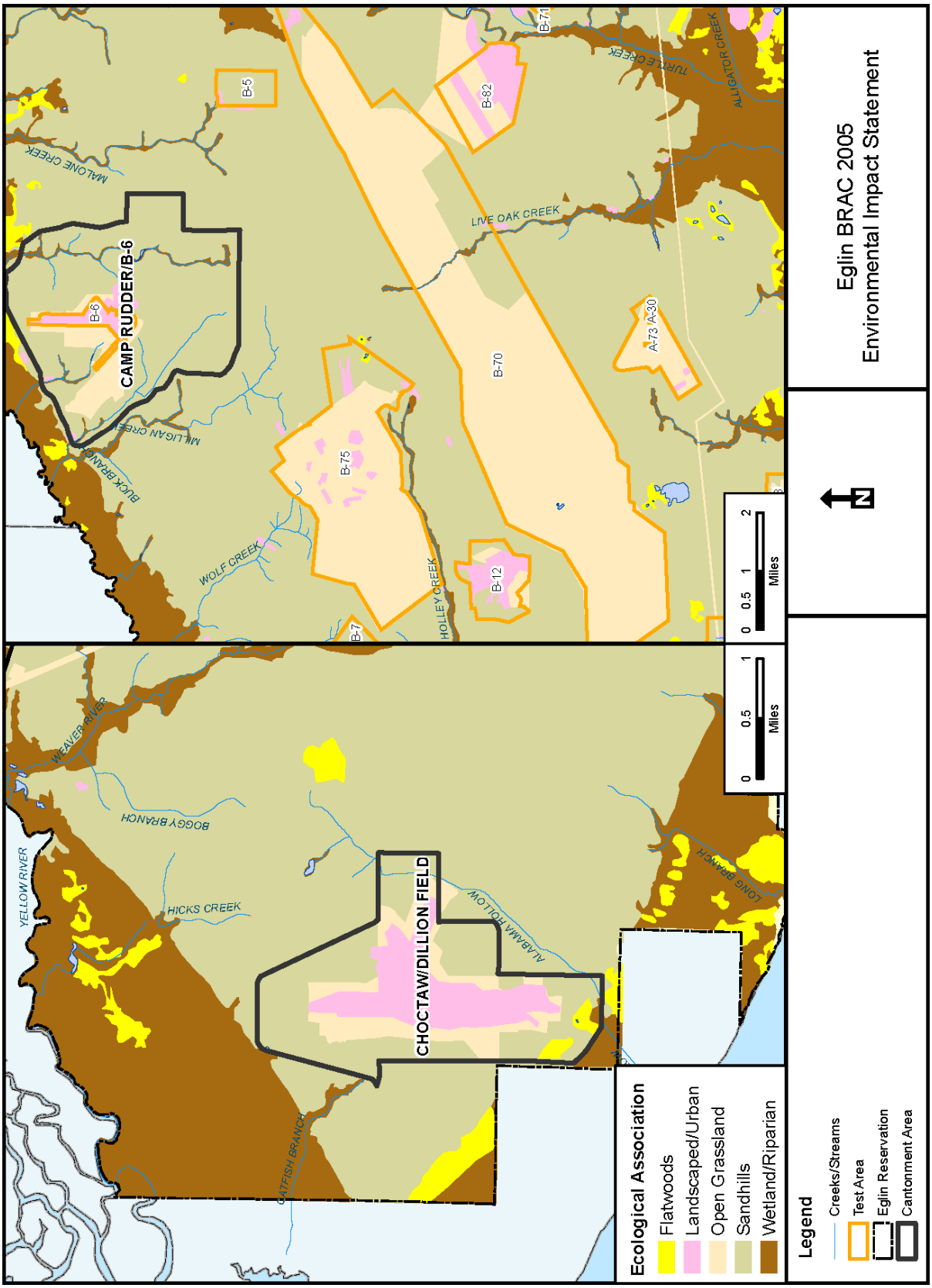

Figure 7-34. Ecological Associations for the JSF Flight Training Alternatives at Choctaw Field, TA B-82, and TA B-75

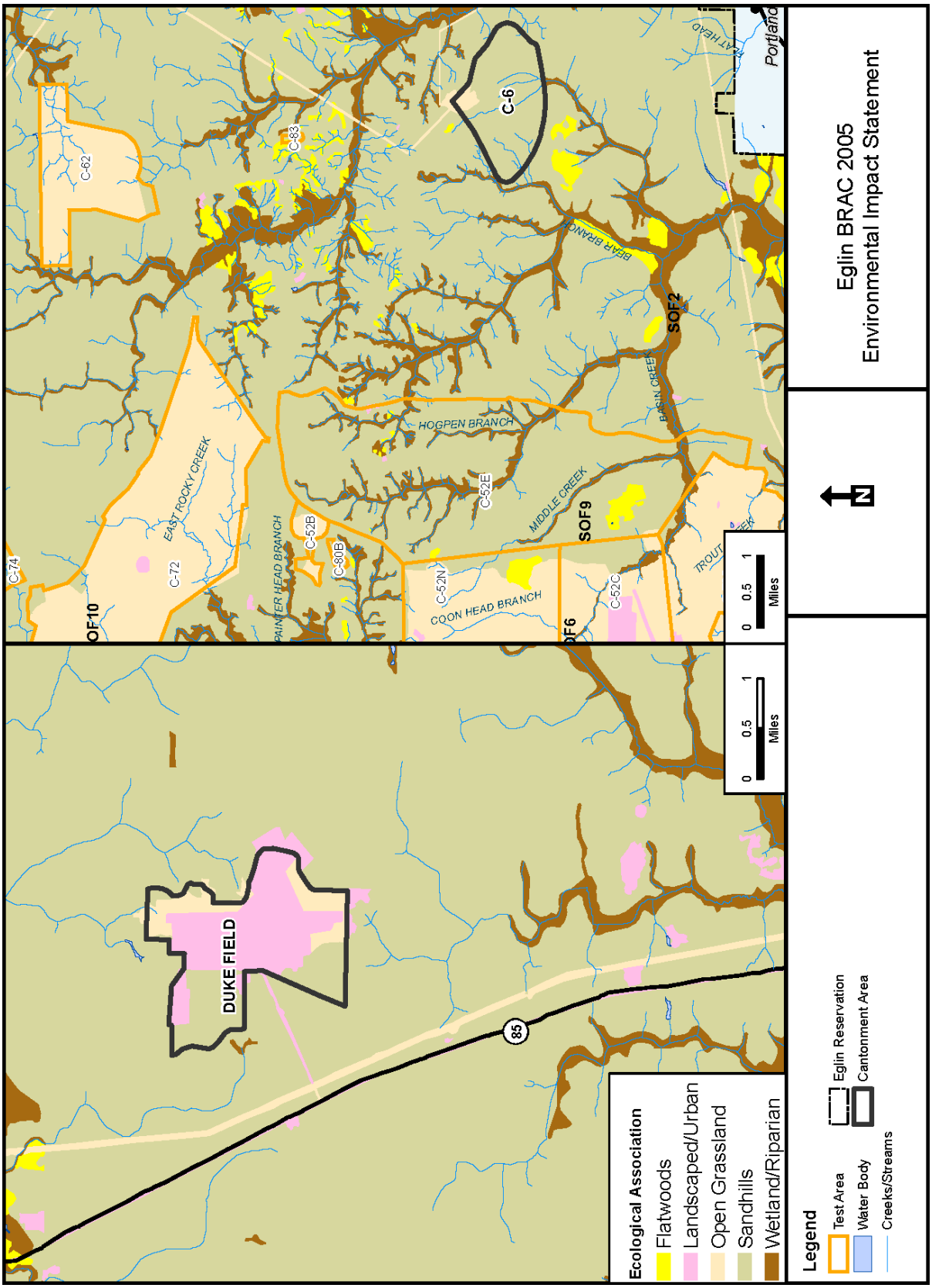

Figure 7-35. Ecological Associations for the JSF Flight Training Alternatives at Duke Field, TA C-52E, and TA C-62

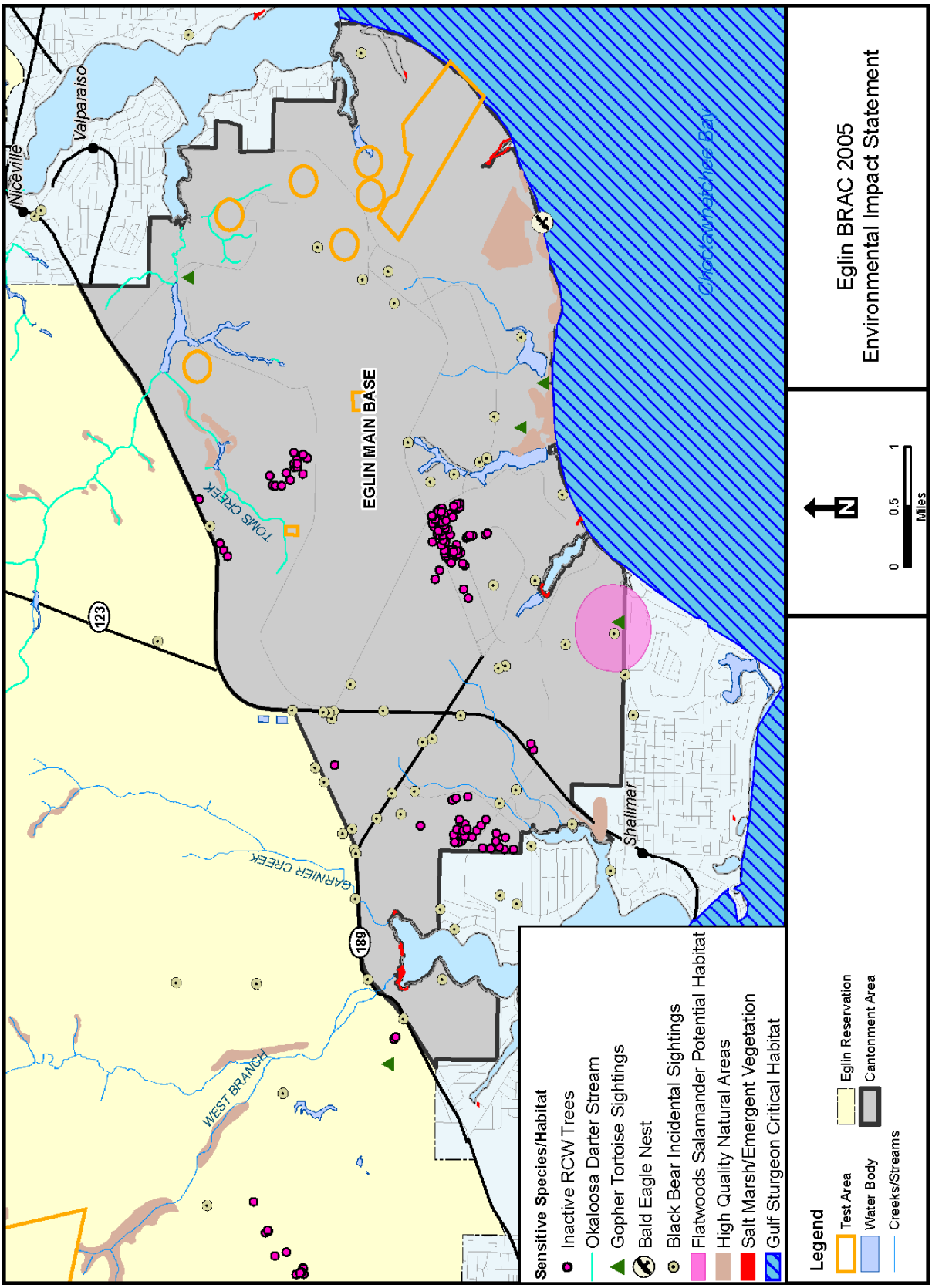

Figure 7-36. JSF Flight Training – Sensitive Habitats and Sensitive Species at Eglin Main Base

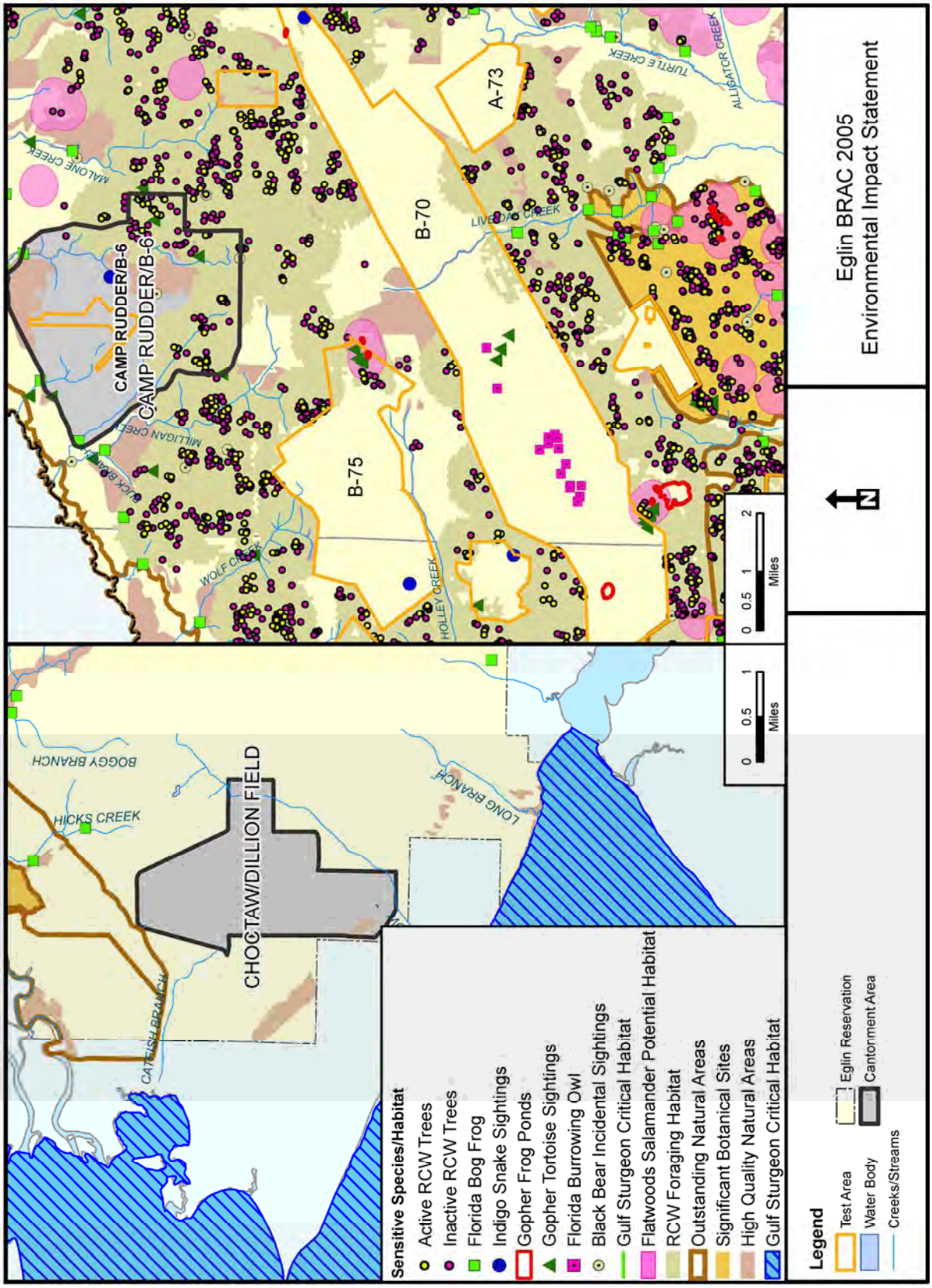

Figure 7-37. JSF Flight Training – Sensitive Habitats and Sensitive Species at Choctaw Field, TA B-75, and TA B-82

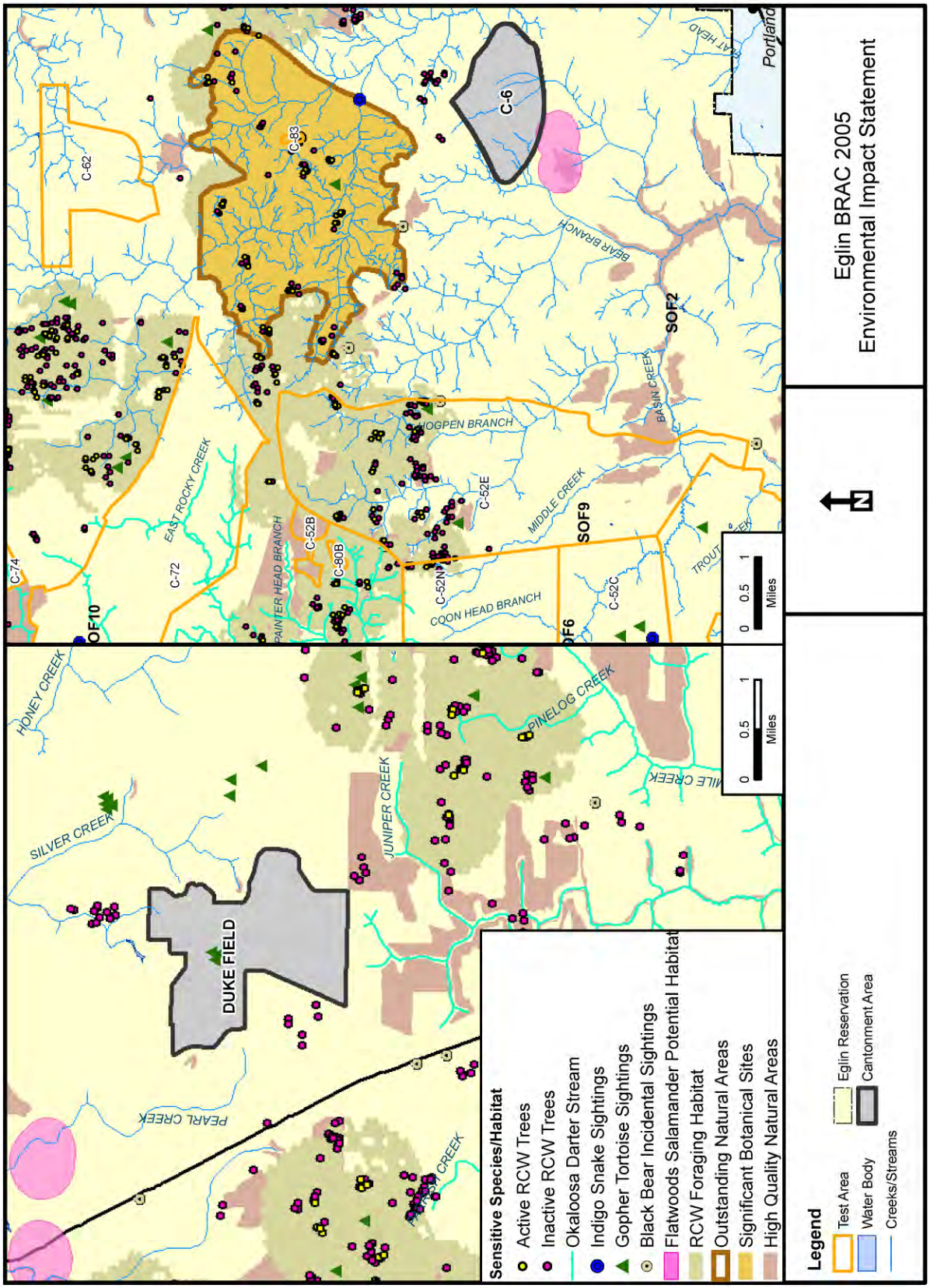

Figure 7-38. JSF Flight Training – Sensitive Habitats and Sensitive Species at Duke Field, TA C-52E, and TA C-62

Table 7-47. JSF Flight Training – Sensitive Species that May Occur on or Near the JSF Flight Training Alternative Locations

Common Name	Scientific Name	State Status	Federal Status	Location
Sensitive Animals				
Bald eagle	*Haliaeetus leucocephalus*	ST	--	EM
Gopher frog	*Rana capito*	SSC	--	B-75
Eastern indigo snake	*Drymarchon corais couperi*	ST	FT	EM, CF, DF, B-75, C-62, C-52E
Flatwoods salamander[1]	*Ambystoma cingulatum*	SSC	FT	B-75
Florida black bear	*Ursus americanus floridanus*	ST	--	EM, CF, DF, B-75, C-62, C-52E
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC	--	EM, CF, DF, B-75, C-62, C-52E
Gopher tortoise	*Gopherus polyphemus*	SSC	--	EM, CF, DF, B-75, C-62, C-52E
Okaloosa darter	*Etheostoma okaloosae*	SE	FE	EM, DF
Red-cockaded woodpecker	*Picoides borealis*	ST	FE	B-75, B-82, C-62, C-52E
Southeastern American kestrel	*Falco sparverius paulus*	ST	--	EM, CF, DF, B-75, B-82, C-62, C-52E
Sensitive Plants				
Arkansas Oak	*Quercus arkansana*	ST	--	EM, C-52E
Curtiss' Sandgrass			--	C-52E
Balzell's Sedge	*Carex baltzelli*	ST	--	EM, C-52E, B-75
Gulf Coast Lupine	*Lupinus westianus*	ST	--	DF
Hairy (or pineland) wild indigo	*Baptisia calycosa var villosa*	ST	--	C-62, CF, B-75
Large-leaved Jointweed	*Polygonella macrophylla*	ST	--	EM
Naked-Stemmed Panic Grass	*Panicum nudicaule*	ST	--	C-52E
Pineland Hoary Pea	*Tephrosia mohrii*	ST	--	EM, C-52E, B-75
Pine-Woods Bluestem	*Andropogon arctatus*	ST	--	C-52E
Small-flowered Meadowbeauty	*Rhexia parviflora*	SE	--	C-52E
Spoon-leaved (or water) Sundew	*Drosera intermedia*	ST	--	C-62
Sweet (or red flowering) Pitcher Plant	*Sarracenia rubra*	ST	--	C-62

1. Potential flatwoods salamander habitat
ST-state threatened; SE-state endangered; SSC-state species of special concern;
FT-federally threatened; FE-federally endangered
EM-Eglin Main Base; CF-Choctaw Field; DF-Duke Field
Sources: Eglin GIS, 2007a; Eglin GIS, 2007b; Eglin GIS, 2007c; U.S. Air Force, 2002d

Active RCW trees are located within 1 kilometer of TA C-62, but no active RCW trees exist within the test area boundaries. A 1994 gopher tortoise survey documented 106 active gopher tortoise burrows on TA C-62 (U.S. Air Force, 2002d); no surveys have been conducted since that time.

TA C-52E has 22 active RCW cavity trees (Gault, 2006). Also, the gopher tortoise is known to occur within TA C-52E (U.S. Air Force, 2005f).

TA B-75 has a concentration of sensitive species in its eastern portion, with active RCW trees, RCW foraging habitat, gopher tortoise burrows, a gopher frog pond, and potential flatwoods salamander habitat (Eglin GIS, 2007b). Additionally, RCW foraging habitat is present along almost the entire boundary of TA B-75, with multiple active RCW cavity trees in close proximity (Eglin GIS, 2007b).

RCW active trees and RCW foraging habitat are present to the east of TA B-82 (Eglin GIS, 2007b). No sensitive species have been documented on TA B-82.

Appendix H, *Biological Resources*, offers a more detailed natural history description of all of the species mentioned above.

7.12.1.2 Environmental Consequences (Biological Resources – JSF Flight Training Alternative 1)

This section discusses potential impacts to biological resources from the JSF Flight Training Alternative 1, including sensitive habitats and sensitive species. Analysis focuses on assessing the potential for impacts to biological resources from JSF air operations and munitions use, and on identifying methods to reduce the potential for negative impacts to biological resources from these activities. Potential impacts to marine biological resources from Eglin flight training over W-151 are covered in the *Eglin Gulf Test and Training Range (EGTTR) Programmatic Environmental Assessment* (U.S. Air Force, 2003f). The *EGTTR Programmatic Environmental Assessment* approved the occurrence of the baseline level of missions without having to conduct separate analyses for new, but similar, missions. Data available to define and describe flight activities included aircraft types, operational times within specific elements of airspace, speeds and durations for supersonic events, and a range of altitudes flown. JSF activities, which include subsonic and supersonic flight, are similar in scope to the missions approved under the *EGTTR Programmatic Environmental Assessment* and thus are considered similar enough to be covered by the environmental analyses in that document. In the EGTTR analysis, the lower ranges of the altitude blocks were emphasized to develop an estimate of the noise with the greatest impact. The related analyses determined that noise from subsonic and supersonic flight (and sonic booms) was not likely to adversely impact biological resources. Thus, impacts to biological resources from JSF flight training over W-151 would not be significant and are not discussed further.

Sensitive Habitats and Sensitive Species

Air Operations

Ground movements by aircraft would only occur on established airfields; therefore, no impacts would occur from air operations to sensitive habitats.

The primary issue of concern for sensitive species from JSF air operations is noise, especially for bird species. Most commonly, the reaction of birds and wildlife to aircraft noise, particularly when the aircraft is visible to the animal, is some degree of startle response, one response being flushing (i.e., abruptly leaving a nest; Gladwin et al., 1988). In this case, an animal could theoretically leave its nest open to predation, thereby affecting reproductive success (Larkin, 1996).

Since aircraft are already a major component of the existing noise environment at Eglin, aircraft noise from the alternatives would not pose a novel or new threat to birds and wildlife that would cause adverse reactions, other than temporary flight. For training, the JSF would use existing runways. Fixed-wing and rotor aircraft would differ only slightly from those currently in use today and would use existing routes and airspace blocks. Wildlife that continue to live near airfields are likely accustomed to the types of noise disturbance produced by missions, and are not deterred by the disturbance as long as the habitat is suitable. Even though noise is projected to be louder and cover more area, RCWs and migratory birds have thrived at Eglin in areas with loud noise environments; suitable habitat appears to have outweighed any negative influences associated with noise.

Bald Eagle. There is one known bald eagle nest near A-22, south of the Eglin Main Base cantonment area. The eagles apparently tolerate current noise levels. They have nested at this location for several years, moving from Rocky Bayou to TA A-22 in the mid 1990s. Average noise increases from the addition of new aircraft would not be abruptly noticeable, as flights of this new aircraft are integrated with other aircraft that currently use this runway on a day-to-day basis. Changes in flight patterns, such as lower altitude or routes closer to the nest, would be more likely to have an effect. However, such changes are not foreseen. In one study, bald eagle response was primarily related to the proximity of a disturbance such as a person or aircraft, rather than to a particular noise (Larkin, 1996); in effect, eagle response was related to a visual presence.

Eglin observes the restrictions detailed in the *National Bald Eagle Management Guidelines* (U.S. Fish and Wildlife Service [USFWS], 2007a). As pertains to aircraft activities, the guidelines state that aircraft should not operate within 1000 feet of the nest during the breeding season (1 October to 15 May), except where eagles have demonstrated a tolerance for the activity. Eagles at this site are exposed to aircraft noise daily and appear to have adjusted to the noise levels near the airfield. The gradual increase in JSF

aircraft traffic would allow the eagle an adjustment period. Thus, impacts to the bald eagle would not be significant.

Red-cockaded Woodpecker**.** Aircraft noise from JSF training has the potential to affect the RCW. Low-level flights over RCWs would expose the birds to high sound exposure levels (SEL) levels (Table 7-48). The noise and visual presence associated with these low-level flights have the potential to impact RCWs, particularly during nesting season (April to June) when birds may be flushed from their nests, possibly affecting reproductive success. However, brooding birds are less likely than roosting birds to respond to noise with a flight response, and the average time away from the nest after a noise-induced flight was less than five minutes (Bowles et al., 1995).

Table 7-48. Representative A-Weighted SEL in Decibels Under the Flight Track for the Aircraft at Various Altitudes in a Military Operating Area

Aircraft Type	Airspeed	Power Setting[2]	Altitude in Feet AGL[1]						
			300	500	1,000	2,000	5,000	10,000	20,000
F-15C	520	81% NC	116	112	107	101	90	80	65
F-35	500	Est% ETR*	133	129	121	112	99	87	74
F-16C	450	87% NC	109	105	100	94	84	76	65
F-18E/F	360	83% N2	113	110	104	97	86	76	65
C-130H	170	970 CTIT	100	97	91	86	77	70	61
H-60	140	LFO load	95	92	87	82	73	65	56

AGL = Above Ground Level; ETR = engine thrust request, F-16 engine is PW-229; RPM = revolutions per minute, %NC = percent core RPM; %N2 = percent RPM at engine location #2; CTIT = Centigrade Turbine Inlet Temperature; LFO load = Liftoff Loaded 140 Knots Indicated Airspeed (KIAS)

1. Level flight, steady high-speed conditions. Used standard acoustical conditions (70°F and 59% relative humidity).
2. Power setting metrics vary from engine to engine;

Delaney et al. (2002) measured responses of the RCW to low-level aircraft noise at Fort Stewart. Researchers did not see a flight response when helicopters were greater than 30 meters (98 feet) from nests and the noise level was less than 102 SEL. Fixed-wing aircraft did not elicit a flushing response when located further than 600 meters (0.38 mile) and noise levels were less than 90 SEL. However, the study did not test for RCW response at distances less than 600 meters (0.38 mile) or at noise levels greater than 90 SEL, so it is possible that RCWs could tolerate louder, closer noises. The 600-meter, 90-SEL measurement should not be viewed as an absolute threshold, only as an example of conditions during which the RCW did not flush.

At the airfields where takeoffs and landings would occur, the nearest RCW foraging habitat is approximately 1,610 meters (1 mile) from Duke Field, 9,660 meters (6 miles) from Choctaw Field, and 4,830 meters (3 miles) from Eglin Main Base. On the Eglin reservation, RCWs southeast of Duke Field may be exposed to high SEL levels during JSF take offs, landings, and touch-and-go-type operations. Due to the orientation of flight paths, no RCWs should be affected by F-35 flights in the Choctaw Field and Eglin Main Base areas.

Known RCW clusters are present in the areas under the MTRs VR-1082 and VR-1085, with a concentration of RCWs in Conecuh National Forest in south Alabama, and in the northeast portion of Eglin Range. It is unknown if and where RCWs may be located on private lands in the area. F-35 aircraft would fly as low as 500 AGL along certain segments of VR-1082 and VR-1085 generating SEL of 129 dB. Currently, these routes are flown at the same altitudes. However, the loudest aircraft that currently uses the routes frequently is the F-15, which generates an SEL of 112 dB at 500 AGL (Table 7-48).

As with MTRs VR-1082 and VR-1085, the presence and location of RCWs on private lands under the Tyndall MOA are not known; however, known RCW clusters do exist on Apalachicola National Forest lands. Any RCWs present under the Tyndall MOA flight paths may be exposed to sound exposure levels up to 133 dB from F-35 flights at 300 feet AGL. The loudest overflight event currently occurring regularly under Tyndall MOAs is 116 dB SEL at 300 feet AGL, as generated by F-15 aircraft.

Restricted airspace at Eglin Ranges (R-2914 A/B, R-2915 A/B/C, and R-2919 A/B) allows military flights to ground level. However, JSF aircraft in these areas are not expected to fly at altitudes lower than 500 AGL and would generate noise levels similar to those generated on the lowest segments of VR-1082 and VR-1085. Currently, the F-15 aircraft flies as low as 500 AGL, and the C-130, V-22 and various types of helicopters fly at altitudes less than 500 AGL in these areas.

JSF aircraft are expected to fly at high altitudes (greater than 10,000 AGL) within Eglin A/B/C MOAs and overflight noise events would generate noise at less than 87 dB SEL.

As stated previously, birds that live near airfields and under established flight paths are likely accustomed to the types of noise disturbance produced by aircraft, and in some cases it appears that the presence of suitable habitat outweighs the disturbance of loud noises (U.S. Air Force, 2007f). While introduction of the F-35 would increase the noise and activity levels at the airfields and along existing flight paths, increases would be gradual, allowing birds to acclimate to the noise. RCWs may exhibit a temporary flight response initially until they become accustomed to the increased noise levels. Overall, JSF flight training is not likely to adversely affect the RCW, and impacts to the RCW would not be significant. Due to the overall potential for impacts to federally listed species, Eglin has conducted an Endangered Species Act (ESA) Section 7 consultation with the USFWS (Appendix H, *Biological Resources*).

Southeastern American Kestrel. Kestrels are a type of raptor, or predatory bird. Research on noise and predatory birds indicates these types of birds are less likely to startle or flush from noise than other types of birds, such as songbirds. Low response was observed in nesting ospreys (Trimper et al., 1998). Red-tailed hawks exhibited habituation to helicopter noise (Anderson et al., 1989). In general, Manci et al. (1988) found that most raptors did not exhibit a negative response to low-level overflights.

Based on these observations, impacts to the Southeastern American kestrel from JSF flight training noise would not be significant.

Migratory Birds. Increased noise levels from the F-35 have the potential to disturb migratory birds. Because flight training is considered a Military Readiness Activity, the "take" of migratory birds in the course of this training would be allowed (Federal Register, 2007). However, noise increases would be gradual, allowing birds to acclimate to the noise. Impacts should be minimal based on results from the study *Distribution of Neararctic-Neotropical Migrant and Resident Bird Species among Habitats at Eglin and Tyndall Air Force Bases, Florida* (Tucker et al., 1996), which states that Eglin is not an important stopover site for neotropical migrants during the spring or fall.

Migratory and resident birds have thrived at Eglin in areas with loud noise environments; suitable habitat appears to have outweighed any negative influences associated with noise. Tucker and others (1996) found that both migratory and resident bird species prefer hammock, riparian, flatwoods, and barrier island habitats. In support of migratory birds and other sensitive species, Eglin will continue to maintain its hammock, riparian, flatwoods, and barrier island habitats in good condition; this will be the most important factor to the continued health of the bird communities in the area. Thus, JSF flight training would not have significant impacts on migratory birds.

Florida Black Bear. Black bears use a variety of swamp, hammock, and forest habitats on Eglin AFB. Exposure to low-level aircraft noise is likely already occurring on Eglin. Given the wide distribution of the black bear on Eglin AFB, low-level noise apparently is not a deterrent, with the presence of suitable habitat outweighing noise impacts. Thus, impacts to the black bear from JSF flight training noise would not be significant.

Indigo Snake, Flatwoods Salamander, Florida Pine Snake, Gopher Frog. JSF aircraft would fly over habitat for multiple sensitive reptiles and amphibians; thus, there is the potential for noise impacts. Few studies have been conducted on noise impacts to amphibians and reptiles. Some reptiles and amphibians exhibit a response to low-frequency impulse noise and may experience a temporary decrease in hearing sensitivity after prolonged exposure to 95 dB (Dufour, 1980; Manci et al., 1988). Overall, reptiles and amphibians have relatively poor hearing and depend more on vibrations to interpret surrounding activities, such as approaching predators and prey (Bowles et al., 1999). The four sensitive amphibian and reptile species mentioned above typically are associated with some type of burrow or live underwater, which would provide some protection from loud noise. Thus, the Eastern indigo snake is not likely to be adversely affected by aircraft noise, and impacts to all four of these amphibian and reptile species would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS (Appendix H, *Biological Resources*).

Air Operations Potential Mitigation

The following potential mitigation would minimize impacts to sensitive species from air operations:

- Restrict low-level aircraft flights within 1,000 feet (vertically) of the eagle nest on Eglin Main Base during the breeding season (1 October to 15 May).

Munitions Use

Strafing at TA B-75 and TA C-62, bombing at TA B-82 and TA C-52E, and flare use at various locations over the Eglin Reservation have the potential to cause direct physical impacts, noise impacts, and habitat impacts to sensitive habitats and species.

Sensitive Habitats. No direct impacts to sensitive habitats are anticipated as the result of munitions; however, some increased risk of wildfire would result from munitions use. Fires are usually beneficial in restoring natural communities, but it is unknown whether the wildfires potentially associated with the Proposed Action would have a net positive or negative effect on sensitive habitats on and near TA C-62, TA B-75, TA B-82, and TA C-52E. Wildfires can cause damage to sensitive habitats if they burn too hot, smolder, or if fire suppression activities are necessary.

For JSF training, wildfire operational plans would be developed with Eglin's Natural Resources Section to identify high wildfire risk conditions and notification procedures that units would follow to engage fire response personnel when needed. Munitions use would follow Eglin's Wildfire Specific Action Guide Restrictions, which rate fire danger from low to extreme (U.S. Air Force, 2006n). During days with low fire danger, there are no restrictions on missions, but on days with extreme fire danger, no pyrotechnics are allowed without prior approval from the Wildland Fire Program Manager at Eglin's Natural Resources Section. These restrictions during extreme fire danger would reduce the likelihood of a mission-induced wildfire and its potential negative effects. Thus, impacts to sensitive habitats from munitions use would not be significant.

Red-cockaded Woodpecker. Munitions use associated with JSF flight training may impact the federally endangered RCW from noise, direct physical impacts, and habitat alteration. The RCW is nesting successfully in close proximity to TA B-82 and on TA B-75 and TA C-52E, where munitions use already occurs. No RCW trees are within the impact zones for JSF munitions, thus there is limited potential for direct physical impacts to active cavity trees at any of the four test areas. Strafing by aircraft equipped with 25-mm rounds would occur on TA C-62 and TA B-75, using existing targets. RCW foraging habitat is within the safety zone of the strafing aircraft; however, the probability of stray munitions directly hitting an RCW is extremely low.

Ordnance noise is categorized as HE impulse noise, such as occurs from live bombs or artillery. This type of noise is accompanied by abrupt increases in pressure and powerful, low frequency sound that rapidly spreads from the point of detonation. The sound and pressure of a detonation can temporarily or permanently affect hearing, as well as injure or kill an animal depending on the proximity of the animal to the source. Inert and live bombs (GBU-12) would be dropped on existing targets on TA B-82 and TA C-52E. Potentially harmful levels of noise could extend outward to active cavity trees. Although brief, exposure to this noise carries a risk of acoustic discomfort. Similar exposures are likely occurring on occasion throughout these test areas and other test areas on the reservation with no known detrimental impacts to the overall population. Eglin NRS personnel have observed no difference in RCW productivity or survival from those clusters located near an active range compared to those far away. Compared to noise, habitat quality seems to be more influential in determining RCW productivity, survival and population stability (U.S. Air Force, 2007f).

RCWs continue to thrive in noisy test areas and exist near TA B-70 in areas exposed to noise from sonic booms. Still, the potential for noise impacts to RCWs exists and could result in non-lethal harassment. RCWs would be most sensitive during nesting season (1 April to 1 July); noise could directly affect eggs and could cause nest abandonment by adults.

Noise impacts from large-caliber weapons (20 mm and above) have been studied at Fort Stewart, Georgia. Delaney et al. (2002) noted that RCWs did not leave their nests when large-caliber weapons noise was greater than 700 meters away (Table 7-49). Observations closer than 500 meters were not made. The noise level was measured at 102 dB (unweighted SEL). It is reasonable to assume that similar distance and noise considerations would result in no disturbance to RCWs near TA C-62 and TA B-75. The closest targets to active RCW trees on TA C-62 and TA B-75 are 1,200 and 1,000 meters away, respectively.

Table 7-49. Red-cockaded Woodpecker Response to Large Caliber Weapon Noise

Noise Source	Noise Level (SEL)	Distance (m)	Criteria	Effects	Notes
20 mm	<102	>700	No flush response	Animals did not flush at these levels. Nesting and reproduction were not significantly affected.	Unable to test at < 500 m

Source: Delaney et al., 2002
m = meters; SEL = Sound Exposure Level in unweighted decibels

JSF explosives and munitions activities would increase wildfire activity at TAs B-75, B-82, C-52E, and C-62, requiring at least four additional wildland fire positions to respond to the increased number of wildfires (Furman, 2007a). Wildfires can be both beneficial and harmful to native species and habitats. Under the proper conditions,

fires have a beneficial effect on RCW habitat by maintaining good quality understory conditions. However, wildfires may result in negative impacts to RCW habitat and RCW cavity trees in areas that have not been burned within the last few years, or if fires occur under dry conditions. Such conditions result in hot fires that could damage normally fire-resistant longleaf pines, and could result in the destruction of RCW cavity trees. The test areas where JSF live munitions would be released have been used for years as bombing and strafing ranges. These test areas have regular mission-related fires, which keep fuel levels low and "hot" fires to a minimum. These test areas have good RCW habitat around them, as demonstrated by the number of RCW clusters in the surrounding areas.

Wildfire operational plans would be developed with Eglin's Natural Resources Section, and munitions use would follow Eglin's Wildfire Specific Action Guide Restrictions. Because these test areas already are exposed to similar noise events and the test areas receive fire on a regular basis, JSF munitions use is not likely to adversely affect the RCW, and impacts would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS (Appendix H, *Biological Resources*).

Flatwoods Salamander. The federally threatened flatwoods salamander requires frequent fire to keep scrubby vegetation to a minimum. Wildfires may achieve this purpose, but with every wildfire, there is the potential for the alteration of the hydrology of salamander habitat from fire suppression activities. TA B-75 has regular mission-related fires, which keep fuel levels low and "hot" fires to a minimum; thus, JSF munitions use is not likely to adversely affect the flatwoods salamander, and impacts would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS (Appendix H, *Biological Resources*).

Southeastern American Kestrel. The behaviors of this raptor of interest to this analysis are nesting and hunting activities. The kestrels frequently locate their nests in the abandoned longleaf pine nest cavities of the RCW and snags. The inactive and abandoned RCW cavity trees in proximity to TA C-62, TA C-52E, TA B-75, and TA B-82, along with other snags, may represent potential kestrel nesting sites. The pasture-like conditions of these test areas and their perimeter of turkey oaks and longleaf pines provide ideal perch sites for hunting. As with the RCW, direct physical impacts are unlikely and wildfires may be beneficial or harmful, depending on the intensity of the fire. Overall, impacts to the Southeastern American kestrel from JSF munitions use would not be significant.

Gopher Tortoise. Gopher tortoises, if present, may be affected by the noise of the event, or potentially from direct physical impacts from a projectile. Gopher tortoises are present on many of Eglin's bombing ranges despite the noise and disturbance. The presence of open, sunny habitat in proximity to good quality foraging areas appears to

outweigh any negative impacts from bombing. Additionally, the risk of noise disturbance and direct physical impacts is minimized by protection afforded to the tortoise from its underground burrow. Thus, impacts to the gopher tortoise from JSF munitions use would not be significant.

Munitions Potential Mitigations

The following potential mitigations would minimize impacts to sensitive habitats and species from munitions use:

- Develop wildfire operational plans with Eglin's Natural Resources Section to identify high wildfire risk conditions and notification procedures that units would follow to engage fire response personnel when needed.
- Follow Eglin's Wildfire Specific Action Guide Restrictions (U.S. Air Force, 2006n).

7.12.2 JSF Flight Training Alternative 2

7.12.2.1 Existing Conditions (Biological Resources – JSF Flight Training Alternative 2)

Table 7-47 (in Section 7.12.1.1) provides a summary of the sensitive species that may occur within the ROI of the JSF Flight Training Alternative 2 based on the identification of ecological classifications frequented by these species and by documented evidence. Sensitive habitats, sensitive species, and ecological associations are the same as those listed for the JSF Flight Training Alternative 1 (Figure 7-33, Figure 7-34, Figure 7-35, Figure 7-36, Figure 7-37, and Figure 7-38).

7.12.2.2 Environmental Consequences (Biological Resources – JSF Flight Training Alternative 2)

Air Operations

Impacts from JSF air operations for the JSF Flight Training Alternative 2 would be the same as those described for the JSF Flight Training Alternative 1, except noise impacts at Duke Field would be less, and noise impacts at Eglin Main Base would be greater. However, the increase does not significantly impact any sensitive species. Impacts to biological resources from JSF air operations would not be significant. Air operations associated with the JSF Flight Training Alternative 2 are not likely to adversely affect the RCW. However, due to the overall potential for impacts to federally listed species, Eglin is conducting an ESA Section 7 consultation with the USFWS.

Munitions Use

Impacts from JSF munitions use would be the same as those described above for the JSF Flight Training Alternative 1 at TA B-75, TA B-82, TA C-52E, and TA C-62. Munitions

and pyrotechnics use associated with the JSF Flight Training Alternative 2 is not likely to adversely affect the RCW or flatwoods salamander, and overall impacts to biological resources would not be significant. However, due to the overall potential for impacts to federally listed species, Eglin has conducted an ESA Section 7 consultation with the USFWS (Appendix H, *Biological Resources*).

7.12.3 No Action Alternative

The No Action Alternative would involve activities on Eglin Main Base, Duke Field, TA A-77, TA A-78, TA B-75, and areas under Eglin airspace. The majority of Eglin Main Base and Duke Field is landscaped/urban, with smaller areas of Sandhills. Most of TA B-75 and TA A-78 are Open Grasslands, with small areas of Sandhills. TA A-77 is mostly Sandhills with small areas of Open Grasslands. High Quality Natural Communities are present adjacent to TA A-77, TA A-78, and TA B-75.

On Eglin Main Base, inactive RCW trees, black bears, and one Okaloosa darter stream are present. The only sensitive species documented at Duke Field is the gopher tortoise. TA B-75 has a concentration of sensitive species in its eastern portion, with active RCW trees, RCW foraging habitat, gopher tortoise burrows, a gopher frog pond, and potential flatwoods salamander habitat (Eglin GIS, 2007b). Additionally, RCW foraging habitat is present along almost the entire boundary of TA B-75, with multiple active RCW cavity trees in close proximity (Eglin GIS, 2007b). Active RCWs and foraging habitat surround most of TA A-77 and TA A-78. Black bears, indigo snakes, and Florida pine snakes may traverse most of the areas described above.

Under the No Action Alternative, impacts to biological resources from JSF flight training would not occur. Most of the predictable actions that are to occur at Eglin through the year 2015 would be located either on Eglin Main Base or at established test areas, where wildlife habitat quality is poor, and few sensitive species are found. Drawdown of the 33 FW would reduce noise and activity levels at Eglin Main and in Eglin airspace over the reservation and Gulf, thus reducing disturbance to wildlife. The realignment of the Air Force Reserve's 919 SOW located at Duke Field would also reduce noise and activity levels, reducing disturbance to wildlife and potentially allowing an increase in prescribed burning in the Duke Field area.

AFSOC realignment would result in a reduction in air-delivered munitions at TAs A-77 and A-78. This reduction would decrease noise and activity levels at these two test areas and would likely result in a reduction in wildfires, which are often ignited by munitions at these sites. A reduction in wildfires may be considered beneficial, as long as frequent prescribed fires were still maintained in the area due to the number of RCW clusters in the vicinity. RCWs require frequent fire to maintain their foraging habitat, but wildfires can result in the killing of cavity trees, whereas with prescribed fires the Natural Resources Section can site-prep the trees to protect them.

Under the No Action Alternative, the explosive events and munitions use at TA B-75, TA B-82, TA C-52E, and TA C-62 would continue to occur as part of explosives testing, explosives ordnance disposal activities, and training operations. Any increases in munitions use would increase the probability of wildfire starts and noise impacts to sensitive species in the proximity of the test areas. However, these increases would not significantly impact any sensitive species.

Overall impacts to biological resources from the No Action Alternative would not be significant, and may be beneficial in certain aspects.

7.13 CULTURAL RESOURCES

7.13.1 JSF Flight Training Alternative 1 (Preferred Alternative)

7.13.1.1 Existing Conditions (Cultural Resources – JSF Flight Training Alternative 1)

This section describes known archaeological resources, historic structures, historic districts, or Traditional Cultural Properties within the identified areas of JSF Flight Training Alternative 1 that are listed or eligible to be listed on the National Register of Historic Places (NRHP) (Figure 7-39).

Choctaw Field is located at the western edge of the Eglin Military Complex. No historic structures, districts, or Traditional Cultural Properties are present at Choctaw Field.

Duke Field is located within the north-central portion of the Eglin Military Complex. There are no historic districts, historic buildings or Traditional Cultural Properties within the Duke Field cantonment determined to be eligible for listing on the NRHP.

Eglin Field is located within the south-central portion of the Eglin Military Complex. Adjacent to the Eglin Main Field are two historic districts. The first district is Eglin Field, consisting of 22 contributing structures. The second is the Strategic Air Command (SAC) Alert Historic District. Fourteen buildings or structures are considered to be contributing members of this district. Three other historic districts are also located on Eglin Main Base but are not directly adjacent to Eglin Main Field. These include the Warehouse Historic District with four contributing structures, the A-22 Historic District with 11 contributing structures, and the Marine Operations Historic District with two buildings and a boat dock. Another district, Camp Pinchot, is located off of Eglin Main Base and consists of 20 contributing structures and seven non-contributing structures.

Fourteen historic structures not associated with any of the historic districts are present in both JSF Flight Training Alternatives (Table 7-50). These structures, considered eligible for nomination to the NRHP, are also located within the proposed noise contours.

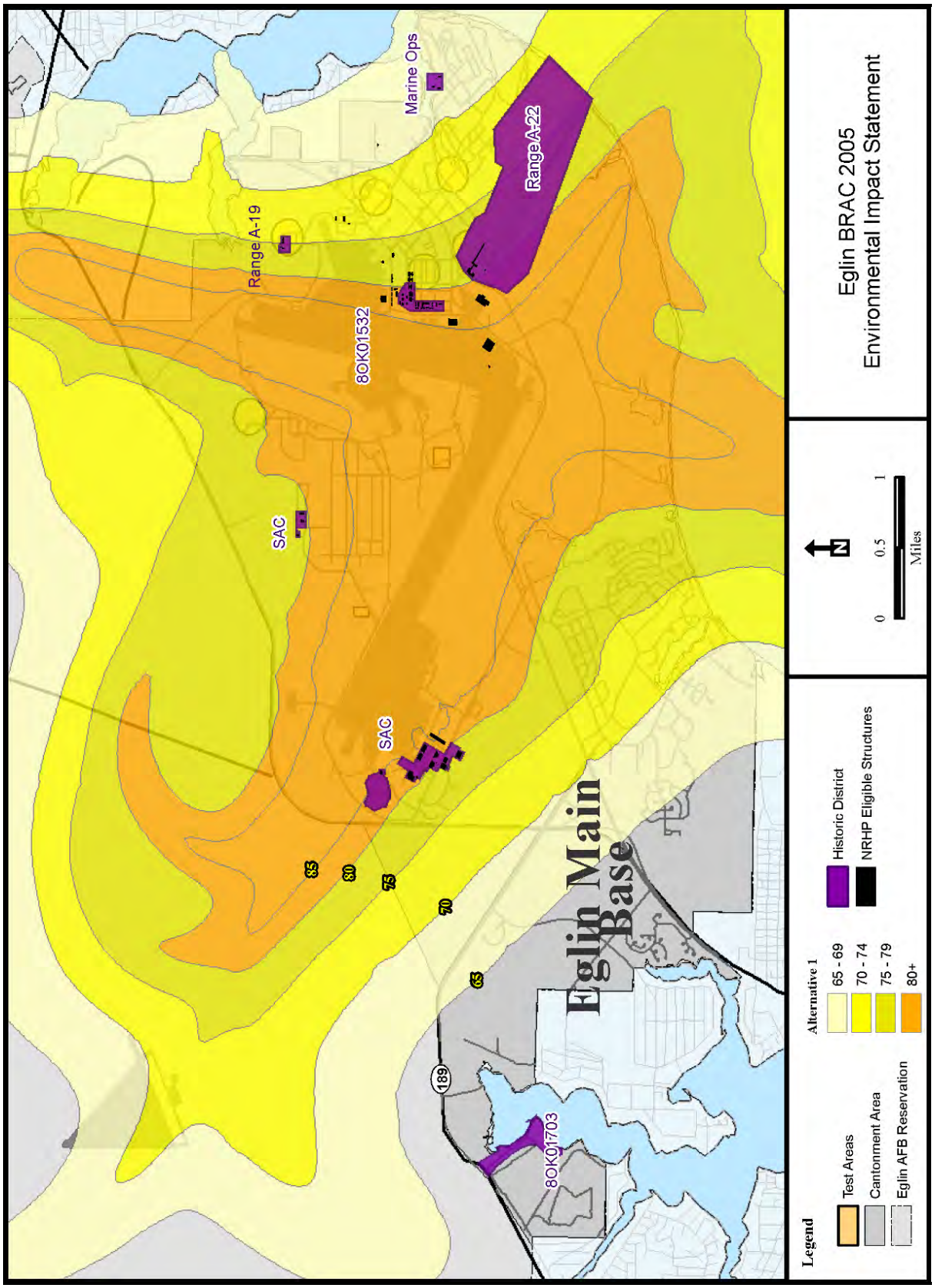

Figure 7-39. Historic Districts, Historic Structures, and Noise Contours on Eglin Main Base

Table 7-50. Eligible Historic Structures (Non-Historic District) Within 65 dB+ Noise Contours on Eglin Main Base

Site Identification	Building Number	Name	Current Use	Temporal Association	Year Built
8OK01309	40	Survival Equipment Shop	Government Offices	World War II	1943
8OK01311	8	Exchange Administrative Office	Central Exchange Administration	World War II	1943
8OK01312	10	Administrative Office	Base Post Office	World War II	1943
8WL01502	123	Readiness Crew Quarters	Fighter Alert Crew Quarters	Cold War	1949
8OK1484	130	Aircraft Maintenance Hanger	King's Hanger	Cold War	1950
8OK1303	33	Warehouse	Civil Engineering Maintenance Shop	World War II	1943
8OK1304	34	Flight Simulator Training Facility	Disaster Preparedness Facility	World War II	1941
8OK1307	37	Headquarters Group Maintenance and Supply	Environmental Health Offices	World War II	1941
8OK1306	36	Aircraft Field Maintenance Shop	Environmental Health Offices	World War II	1941
8OK1305	35	Supply and Dayroom	Headquarters Squadron Offices	World War II	1941
8OK1310	44	Armament Instrument and Inspection	Telecommunications Facility	World War II	1943
8OK1334	68	Temporary Hangar 68	Aircraft Maintenance Hangar	World War II	1942
8OK1844	73	Astro-Inertial Laboratory	Missile Test Laboratory	Cold War	1962
8OK2084	954	Air Defense Command Type 2 Ops Building	Non-Air Force Administrative Office	Cold War	1955

Due to the rapid schedule of the EIS and size of the area under this noise footprint of this study, a best available information approach was used to conduct historic properties inventory of the area under this APE off Eglin. The inventory of off-base resources under the APE was limited to a records search discussed in Appendix F.

Bombing and strafing training would take place on TAs C-62, B-75, B-82, and C-52E. No NRHP-eligible cultural resources are present on TA B-82. No NRHP-eligible cultural resources are on TA B-75. However, within 100 meters of TA B-75, two sites are considered potentially eligible for nomination to the NRHP. Two NRHP-eligible

archaeological resources are located within 400 meters. Also, Metts Cemetery is approximately 30 meters outside the boundaries of the range. The cemetery is not considered an NRHP-eligible historic property. Because all these distances are well outside the safety buffer for TA B-75, it is highly unlikely that any of these properties will be affected by munitions usage.

TA B-75 and TA C-62 landscapes are considered to be too disturbed, with a low probability for intact cultural resources, and are not recommended for additional survey. Within TA C- 62, there are nine known archaeological sites. Two of these are considered potentially eligible for listing on the NRHP, while the other seven are considered ineligible for listing on the NRHP and require no additional consideration. There are 25 archaeological sites located in TA C-52E. Twenty-one of these sites are considered ineligible to the NRHP; three are under review to determine eligibility, and one is considered eligible for nomination to the NRHP (site 8WL1727). There are also unsurveyed areas on TA C-52E with a high probability for containing cultural resources. Archaeological surveys are planned for this area. All planning actions and, if necessary, mitigative actions related to the above, are to be completed under provisions of the project-specific programmatic agreement (Appendix F, *Cultural Resources*).

7.13.1.2 Environmental Consequences (Cultural Resources – JSF Flight Training Alternative 1)

Areas affected by this alternative would include the noise environment of areas at Eglin Main Base, Duke Field, and Choctaw Field where the noise environment has increased from levels noted in the *Air Installation Compatible Use Zone (AICUZ) Study* for Eglin AFB (U.S. Air Force, 2006d). Also, under this alternative, TA B-75 and TA C-62 would be used for strafing by the JSF, and C-52E and B-82 would be used for dropping inert ordnance.

Adverse effects are not expected to occur to cultural resources under this alternative. To discuss the effect to cultural resources, the activity is separated into two aspects, overflight of inhabited areas and bombing strafing training that would occur on Eglin AFB as a result of this alternative.

No adverse effect is expected to cultural resources at TAs C-62, B-75, and C-52E with the bombing and strafing activities that would occur under JSF Flight Training Alternative 1. However, archaeological survey remains incomplete in portions of the alternative's area where there is high potential for NRHP-eligible cultural resources. Completion of this survey, and any subsequent treatment, protection, or mitigation of adverse effects for such resources will be accomplished under provisions of the project-specific programmatic agreement in Appendix F, *Cultural Resources*.

Previous studies have demonstrated that little probability exists that runway operations noise brings structural damage to buildings. In fact, several studies of the effects of noise on historic properties located in high aircraft-noise zones have found that vibration resulting from the activities of tour groups, and even vacuuming, generated more structural vibration than was being generated by aircraft noise (NRC/NAS, 1977; National Aeronautics and Space Administration [NASA], 1976; NASA, 1978). Subsonic sound of less than 130 dB is highly unlikely to damage structural elements (Sutherland, 1990). Despite this, vibrations from flight operations may lead to increased rattling of structural elements, adding to annoyance factors for occupants.

For additional analysis on potential impacts to land use and management practices relating to noise resulting from flight operations, refer to Sections 7.3 (Noise) and 7.4 (Land Use).

7.13.2 JSF Flight Training Alternative 2

7.13.2.1 Existing Conditions (Cultural Resources – JSF Flight Training Alternative 2)

The resources affected under JSF Flight Training Alternative 2 are identical to those affected under JSF Flight Training Alternative 1 (Figure 7-40).

7.13.2.2 Environmental Consequences (Cultural Resources – JSF Flight Training Alternative 2)

Adverse effects are not expected to cultural resources under this alternative. Discussion of consequences under JSF Flight Training Alternative 2 is identical to those consequences discussed under JSF Flight Training Alternative 1.

7.13.3 No Action Alternative

Under this No Action Alternative, the actions described in Chapter 2 (Section 2.6, Operational Requirements for JSF Flight Training) would not occur. If BRAC-related activities were not to occur at Eglin, the F-15 aircraft flown by the 33 FW were to depart, and the list of predicted projects in Chapter 2 (Section 2.7, No Action Alternative) and Chapter 9 were to occur, no adverse effects to cultural resources would be expected under the No Action Alternative for the JSF flight training. Noise levels at Eglin would be somewhat less than current levels (see Section 7.3 for additional noise environment data).

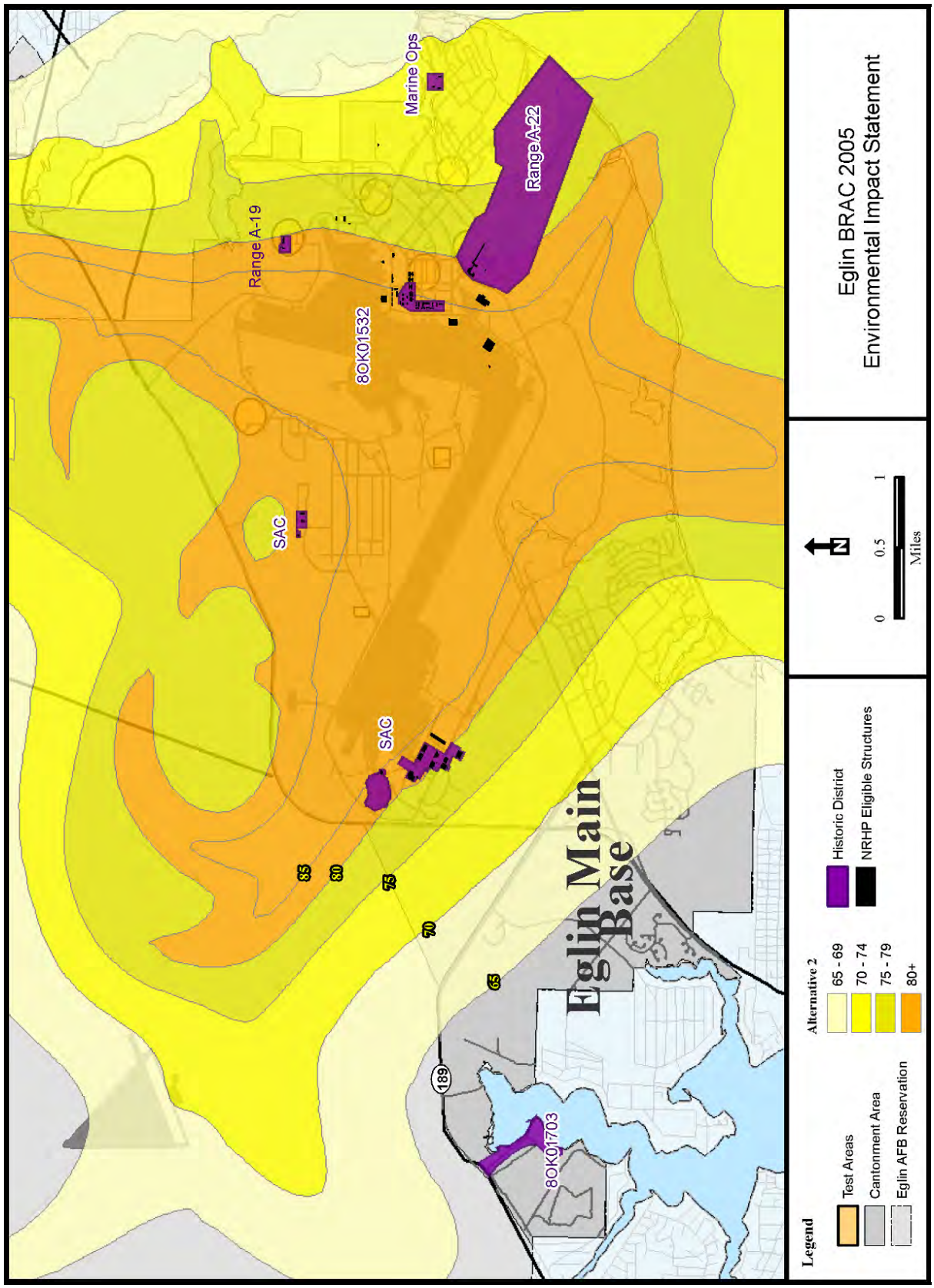

Figure 7-40. Historic Districts, Historic Structures, and Noise Contours on and Around Eglin Main Base

8. SUMMARY OF POTENTIAL IMPACTS

8.1 INTRODUCTION

This chapter presents a summary of the overall impacts of the 2005 BRAC decisions and associated activities and evaluates how interactions between alternatives might have additional impacts on environmental resources.

As previously described in Chapters 1 and 2, the BRAC decisions for Eglin AFB are the establishment of the Joint Strike Fighter (JSF) Initial Joint Training Site (IJTS) at Eglin AFB (including the beddown of the F-35) and realignment of the 7th Special Forces Group (Airborne), or 7SFG(A), to Eglin AFB from Fort Bragg, North Carolina. The Eglin Military Complex will also require a spatial and scheduling reconfiguration that accommodates the training requirements associated with BRAC actions as well as the current users. As indicated in Chapter 1, the 2005 BRAC Report requires by law that the Proposed Action must occur at Eglin AFB. Therefore, the No Action Alternative cannot be selected but was used for comparative environmental analysis.

8.2 SUMMARY OF THE POTENTIAL IMPACTS OF ALTERNATIVE INTERACTIONS

While it is important to understand the impacts for each alternative independently and how they compare to each other, it is even more important to understand how the interactions between alternatives affect the overall level of impact when taken in context of the entire BRAC action. It is important to note that implementing BRAC would require the selection of an alternative for each of the four requirements analyzed in this EIS (one each for the 7SFG(A) Cantonment, the 7SFG(A) Range, the JSF IJTS, and the JSF Flight Training, respectively). In some cases alternatives by themselves may cause potentially significant or adverse impacts, in which case selecting two or more alternatives that have potentially significant or adverse impacts to the same resource (i.e., overlapping impacts) may result in an impact that might be perceived by the public as untenable and could be avoided by selecting a different combination of alternatives. Additionally, while two or more alternatives may independently impact the same resource in an insignificant manner, the overlapping or additive effect on that resource may result in a significant impact that must be mitigated or could be avoided through a different combination of alternatives.

The interactions between alternatives consist of three types:

- Overlapping – overlapping impacts are associated with site-specific spatial relationships between alternatives. Overlapping impacts occur when alternative or impact footprints from two or more different alternatives overlap, thus impacting the same resource within the same area. An example of an

overlapping impact would be two or more different alternatives (7SFG(A) alternatives and JSF IJTS alternatives) impacting the same red-cockaded woodpecker cluster or impacting the same roadway. As a result, if each alternative was selected together the impact footprints would overlap and thus cause an even greater impact to that particular resource than if a different combination was chosen.

- Additive – additive impacts are associated with impact relationships between alternatives where the project or impact footprint does not necessarily overlap. Additive impacts occur when impacts from two or more different alternatives affect the same resource within the area of influence, but not necessarily within the same footprint. An example of an additive impact would be two or more different alternatives (7SFG(A) alternatives and JSF IJTS alternatives) impacting different red-cockaded woodpecker clusters in different locations on Eglin AFB (perhaps one cluster in the east and one cluster in the west) or impacting the same regional transportation network (e.g., each of three alternatives affects different roadways in the same county). As a result, if each alternative was selected, the additive result of each alternative's impacts would result in impacts on a larger spatial scale than if a different combination was chosen. In most cases additive impacts to certain resources are unavoidable because each alternative by itself would have an impact and a configuration of four alternatives must be chosen in order to implement the BRAC decision (transportation is a good example of this).
- Overlapping/Additive – an overlapping/additive impact is essentially a combination of the two descriptions above. Overlapping/additive impacts occur when alternative or impact footprints from two or more different alternatives overlap as well as affect similar resources that are spatially separated. An example of an overlapping/additive impact would be two or more different alternatives (7SFG(A) alternatives and JSF IJTS alternatives) impacting the same red-cockaded woodpecker cluster or impacting the same roadway, as well as impacting different red-cockaded woodpecker clusters in different locations on Eglin AFB, or impacting the same regional transportation network (e.g., two affect Highway [Hwy] 123, one alternative affects Hwy 85, and another affects Hwy 90, all in the same county). As a result, if each alternative were combined the overlapping and additive result of each alternative's impacts would result in impacts on a larger spatial scale than if a different combination was chosen.

Table 8-1 shows how the interaction between alternatives affects the level of impact. Due to the level of complexity regarding the requirements and the number of potential alternative combinations (330 possible four-alternative combinations), Table 8-1 provides interaction summaries between two alternatives at a time. Inferences can be made across three or more alternatives based on the information presented in Table 8-1 and the interactions between alternatives identified in Table 8-1 (i.e., as more alternatives are added, the level of impact would likely increase). The color coding in

Table 8-1 reflects the degree of impact without consideration of any mitigations outside those required by law, similar to that described for Table 2-31, Summary Alternative Impact Comparison, in Chapter 2.

- Green – No beneficial or adverse impact.
- Yellow – Potential for adverse impact resulting from overlapping and/or additive impacts of two alternatives that separately may or may not have adverse impacts (i.e., a combination of two "green" alternatives or one "green" and one "yellow" alternative in Table 2-31). The combination of the two alternatives would result in the potential for adverse impacts to the resource.
- Orange – Potential for adverse impact resulting from overlapping and/or additive impacts of two alternatives that separately have adverse impacts (i.e., a combination of two "yellow" alternatives in Table 2-31). The combination of alternatives would result in greater adverse impacts to the resource due to the overlapping and/or additive nature of the combination, but would not result in an adverse impact.
- Red – Potential for adverse impacts resulting from overlapping and/or additive impacts of two alternatives that separately may or may not have adverse impacts (i.e., a combination of two "yellow" alternatives or one "yellow" and one "red" alternative in Table 2-31). The combination of the two alternatives may result in adverse impacts to a resource where separately they would not.
- Purple – Potential for compounding adverse impacts resulting from overlapping and/or additive impacts to a resource from two alternatives that, separately, may or may not have adverse impacts (i.e., a combination of one "yellow" and one "red" alternative or two "red" alternatives in Table 2-31).
- Black – some cells are blacked out because the nature of the table allows for a cross alignment of the same sub-alternative. A cell where the same sub-alternative intersects along the vertical and horizontal aspect of the matrix has been blacked out.

Table 8-1. Alternative Interaction Summary

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Socioeconomics	*7SFG(A) Range*																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	JSF IJTS																
	1	+/O	+/O	+/O	+	+	+	+	+	+	+	+			+	+	+
	2	+/O	+/O	+/O	+	+	+	+	+	+	+	+			+	+	+
	JSF Flight Training																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+			
	2	+	+	+	+	+	+	+	+	+	+	+	+	+			
	3	+	+	+	+	+	+	+	+	+	+	+	+	+			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives impacting socioeconomics within the same county, one affecting schools and the other affecting recreation
Example of O = two alternatives affecting the same school districts or housing areas

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Air Quality	*7SFG(A) Range*																
	1	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O
	2	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O
	3	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O
	4	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O
	5	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O
	JSF IJTS																
	1	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			+/O	+/O	+/O
	2	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			+/O	+/O	+/O
	JSF Flight Training																
	1	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			
	2	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			
	3	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives impacting air quality within the same Air Quality Region
Example of O = two alternatives affecting the same localized area/county

Table 8-1. Alternative Interaction Summary, Cont'd

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Hazardous Materials	*7SFG(A) Range*																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	2	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	3	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	4	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	5	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	JSF IJTS																
	1	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			+	+	+
	2	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			+	+	+
	JSF Flight Training																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+			
	2	+	+	+	+	+	+	+	+	+	+	+	+	+			
	3	+	+	+	+	+	+	+	+	+	+	+	+	+			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives generating hazardous materials but different kinds, or both affecting different ERP sites
Example of O = two alternatives affecting the same ERP site or generating the same types of hazardous waste

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Solid Waste	*7SFG(A) Range*																
	1	O	O	O	+/O	+/O	+/O	+/O	+/O	+/O	O	+/O	O	O	+/O	+/O	+/O
	2	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O
	3	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O
	4	+	+	+	+	+	+	+	+	+	+	O	+	+	+/O	+/O	+/O
	5	+	+	+	+	+	+	+	+	+	+	O	+	+	+/O	+/O	+/O
	JSF IJTS																
	1	O	O	O	O	O	O	O	O	O	O	+			+/O	+/O	+/O
	2	O	O	O	O	O	O	O	O	O	O	+			+/O	+/O	+/O
	JSF Flight Training																
	1	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			
	2	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			
	3	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives generating solid waste, but within different counties, resulting in likelihood of disposal at different landfills
Example of O = two alternatives generating solid waste, but within the same county, resulting in likelihood of disposal at the same landfill

Table 8-1. Alternative Interaction Summary, Cont'd

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	1B	1C	2A	2B	2C	2D	2E	3	4	5	1	2	1	2	3
Transportation	*7SFG(A) Range*																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	2	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	3	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	4	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	5	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	JSF IJTS																
	1	O	O	O	+	+	+	+	+	+	+	+			n/a	n/a	n/a
	2	O	O	O	+	+	+	+	+	+	+	+			n/a	n/a	n/a
	JSF Flight Training																
	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives impacting regional transportation, but not necessarily the same roadways
Example of O = two alternatives impacting the same roadways

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	1B	1C	2A	2B	2C	2D	2E	3	4	5	1	2	1	2	3
Biological Resources	*7SFG(A) Range*																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	2	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	3	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	4	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	5	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	JSF IJTS																
	1	+	+	+	+	+	+	+	+	+	+	+			n/a	n/a	n/a
	2	+	+	+	+	+	+	+	+	+	+	+			n/a	n/a	n/a
	JSF Flight Training																
	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives impacting different species, or the same species, in different locations
Example of O = two alternatives impacting different species at the same location, or the same species at the same location

Table 8-1. Alternative Interaction Summary, Cont'd

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Cultural Resources	*7SFG(A) Range*																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	2	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	3	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	4	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	5	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	JSF IJTS																
	1	+	+	+	+	+	+	+	+	+	+	+			n/a	n/a	n/a
	2	+	+	+	+	+	+	+	+	+	+	+			n/a	n/a	n/a
	JSF Flight Training																
	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives impacting different cultural sites, or different historical buildings not within the same historical district
Example of O = two alternatives impacting the same cultural sites/historical buildings, or different historical buildings within the same historical district

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Physical Resources	*7SFG(A) Range*																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	2	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	3	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	4	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	5	+	+	+	+	+	+	+	+	+	+	+	+	+	n/a	n/a	n/a
	JSF IJTS																
	1	+	+	+	+	+	+	+	+	+	+	+			n/a	n/a	n/a
	2	+	+	+	+	+	+	+	+	+	+	+			n/a	n/a	n/a
	JSF Flight Training																
	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			
	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives impacting different water bodies via erosion, or different wetland areas
Example of O = two alternatives impacting the same water body via erosion, or the same wetland area

Table 8-1. Alternative Interaction Summary, Cont'd

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Land Use	*7SFG(A) Range*																
	1	+	+	+	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+	+	+	+	+
	2	+	+	+	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+	+	+	+	+
	3	+	+	+	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+	+	+	+	+
	4	+	+	+	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+	+	+	+	+
	5	+	+	+	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+/O	+	+	+	+	+
	JSF IJTS																
	1	+	O	+	+	+	+	+	+	+	+	+			O	O	O
	2	+	O	+	+	+	+	+	+	+	+	+			O	O	O
	JSF Flight Training																
	1	O	O	O	O	O	O	O	O	O	+	+	O	O			
	2	O	O	O	O	O	O	O	O	O	+	+	O	O			
	3	O	O	O	O	O	O	O	O	O	+	+	O	O			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives impacting the same or different land uses in different areas/locations
Example of O = two alternatives impacting the same or different land uses in the same area/location

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Utilities	*7SFG(A) Range*																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+	O	O	O
	2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	3	+	+	+	+	+	+	+	+	O	+	+	+	+	+	+	+
	4	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	5	+	+	+	+	+	+	+	+	+	O	O	+	+	+	+	+
	JSF IJTS																
	1	O	O	O	+	+	+	+	+	+	O	+			O	O	O
	2	O	O	O	+	+	+	+	+	+	O	+			O	O	O
	JSF Flight Training																
	1	O	O	O	O	O	O	O	O	O	O	O	O	O			
	2	O	O	O	O	O	O	O	O	O	O	O	O	O			
	3	O	O	O	O	O	O	O	O	O	O	O	O	O			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives impacting different utility systems or needing new separate systems at different locations
Example of O = two alternatives impacting the same utility system or needing a new separate system at the same location to serve both alternatives

Table 8-1. Alternative Interaction Summary, Cont'd

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Noise	*7SFG(A) Range*																
	1	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	2	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	3	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	4	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	5	+	+	+	+	+	+	+	+	+	+	+	+	+	+/O	+/O	+/O
	JSF IJTS																
	1	O	O	O	+	+	+	+	+	+	+	+			+/O	+/O	+/O
	2	O	O	O	+	+	+	+	+	+	+	+			+/O	+/O	+/O
	JSF Flight Training																
	1	O	O	O	O	O	O	O	O	O	O	+	O	O			
	2	O	O	O	O	O	O	O	O	O	O	+	O	O			
	3	O	O	O	O	O	O	O	O	O	O	+	O	O			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives causing noise impacts to different areas
Example of O = two alternatives causing noise impacts to the same areas, thereby compounding the noise impacts

Resource	Alt.	*7SFG(A) Cantonment*											*JSF IJTS*		*JSF Flight Training*		
		1A	**1B**	**1C**	**2A**	**2B**	**2C**	**2D**	**2E**	**3**	**4**	**5**	**1**	**2**	**1**	**2**	**3**
Safety	*7SFG(A) Range*																
	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	+	+	+	+
	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	+	+	+	+
	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	+	+	+	+
	4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	+	+	+	+
	5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	+	+	+	+
	JSF IJTS																
	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			+	+	+
	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a			+	+	+
	JSF Flight Training																
	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	+			
	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	+			
	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	+			

+ = Additive Impact; O = Overlapping Impact; n/a = no interaction between alternatives within the resource area
Example of + = two alternatives that create different, unconnected SDZs or ESQDs in different locations
Example of O = two alternatives that create SDZs/ESQDs in the same location, possibly resulting in expansion of the SDZ/ESQD due to the interaction

ESQD = Explosive Safety Quantity Distance; IJTS = Initial Joint Training Site; JSF = Joint Strike Fighter; SDZ = Surface Danger Zone

Based on evaluation of overlapping and additive impacts associated with alternative combinations it is reasonable to conclude that adverse impacts are compounded under the following resources and associated alternative combinations:

- **Transportation – Combination of 7SFG(A) Cantonment Alternative 1A, 1B, or 1C and JSF IJTS Alternative 1 or 2.** One of greatest potentials for significant impacts to compound is associated with a combination of alternatives that result in placement of the 7SFG(A) Cantonment and the JSF IJTS at or near Eglin Main Base. Individually these two alternatives are expected to result in significant and adverse impacts to regional roadways around the Eglin Main West Gate area due to increased localized traffic levels. Placing these two components in the same area results in the transportation impacts from each individual alternative to overlap and exponentially increase the significant and adverse impacts as each alternative is expected to impact the same roadways. If each alternative is anticipated to result in shifting a roadway level of service (LOS) to LOS F, adding another alternative that increases the amount of traffic on that roadway makes the situation worse. While an "F" could be considered as the worst possible condition there are still varying degrees of "F" – an "F" that is closer to a "D" is likely more tenable than an "F" that is far removed from the "D" designation; it is likely more perceptible to the person waiting in his/her car to get through an intersection as under one alternative he/she may have to wait 15 minutes to get through an intersection while under the overlapping impact he/she might have to wait 30 minutes. These combined impacts may be perceived by the public to be significant.
- **Land Use – Combination of 7SFG(A) Cantonment Alternatives 2-5, 7SFG(A) Range Alternatives 1-5, and JSF Flight Training Alternatives 1-3.** Compounding adverse land use impacts would occur when a combination of any of the aforementioned alternatives is selected. Individually each of the 7SFG(A) alternatives has adverse impacts to land use due to the closure of large areas of the Eglin Reservation that are currently accessible to the public for recreational activities, with 7SFG(A) Range Alternative 3 having an adverse impact to land use due to closure of the heavily utilized Duck Pond recreational area. JSF Flight Training alternatives have adverse impacts associated with noise from the JSF – land uses containing sensitive noise receptors underlying departure and approach lanes for the JSF at Eglin Main and Duke Field would experience an increase in noise levels that are considered incompatible with certain (e.g., residential) land uses. While a combination of any of these alternatives would not necessarily affect the same land use in the same area (i.e., overlapping impact) the additive nature of land use impacts from a combination of any of these alternatives would result in a compounding of land use impacts in the local area/region. These results may be perceived to be adverse by the public.

- **Solid Waste – Combination of JSF Cantonment Alternatives with any 7SFG(A) Cantonment and/or 7SFG(A) Range Construction Alternative.** Construction, demolition and renovation associated with the establishment of the JSF Cantonment area would generate the greatest mass of construction debris requiring disposal. Although available information indicates that sufficient landfill capacity exists within the ROI for disposal of this waste, the impact of additional wastes from additional construction or demolition activities would result in a compounding of impacts to solid waste resources in the ROI. This may be perceived by the public to be an adverse impact during the construction phase of activities.

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9. CUMULATIVE EFFECTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

9.1 CUMULATIVE EFFECTS

9.1.1 Introduction

According to Council on Environmental Quality regulations, cumulative effects analysis in an environmental impact statement (EIS) should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 Code of Federal Regulations 1508.7).

Cumulative effects may occur when there is a relationship between a proposed action or alternative and other actions expected to occur in a similar location or during a similar time period. This relationship may or may not be obvious. The effects may then be incremental and result in cumulative impacts. Actions overlapping with or in close proximity to the Proposed Action or alternatives can reasonably be expected to have more potential for cumulative effects on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide in the same time frame will tend to offer a higher potential for cumulative effects.

In this EIS, the Air Force has made an effort to identify actions on or near the action area that are under consideration and in the planning stage at this time. These actions are included in the cumulative analysis to the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action or alternatives outlined in this EIS. Although the level of detail available for those future actions varies, this approach provides the decision maker with the most current information to evaluate the consequences of the alternatives. The EIS addresses cumulative impacts in order to assess the incremental contribution of the alternatives to impacts on affected resources from all factors.

The analysis first discusses past actions, events, and circumstances that are relevant to the environments associated with the Eglin base realignment and closure (BRAC) alternatives. Following is a discussion of other actions that, when combined with the Eglin BRAC actions, may result in incremental impacts.

9.1.2 Relevant Past and Present Actions

For over 60 years, Eglin Air Force Base (AFB) has armed the U.S. military through the development and testing of conventional weapons. Over 50 specific test areas and sites

are located on the Eglin land and water ranges in the Gulf of Mexico for specialized weapons testing (U.S. Air Force, 1996a), the majority of which is air-to-ground testing. The approximately 130,000 square miles of airspace overlying the land and water ranges permits relatively unconstrained operations. Eglin contains the largest test range in the continental United States and the only supersonic range (Test Area [TA] B-70) east of the Mississippi River. The preservation of unique test areas on Eglin AFB is critical to the new generation of large footprint and long-range standoff weapons. The combination of extensive land and water ranges provides the necessary areas to contain large weapons footprints and long distances required for testing the new generation of weapons.

Areas that exist beyond and between the test areas are multi-use interstitial areas used primarily for safety buffers. These areas are also used for air-to-ground training when scheduling permits and for recreational purposes. Training at Eglin includes primarily the Air Force Special Operations Command, other Air Force units, some ground training by the Alabama Army National Guard and the Army Rangers, and the Navy air-to-ground training and Explosive Ordnance Disposal (EOD) school. Public recreation, including hunting, hiking, boating, and fishing, occurs on approximately 272,800 acres and is on a non-interference basis with military uses.

The relevant past and present actions associated with the impacts of the Proposed Action include continued use of the test and interstitial areas for military test and training, existing base development and operations, plus nearby development and infrastructure improvements such as roads, pipelines, and power transmission lines. Additionally, the 2004 and 2005 hurricane seasons resulted in Florida's exposure to numerous hurricanes causing significant damage to the Florida panhandle in 2004 and 2005, affecting employment and housing markets throughout northwest Florida. Past and present actions in and around the action areas associated with these activities may have cumulative effects on the local environment.

9.1.3 Reasonably Foreseeable Future Actions

For the purposes of facilitating cumulative impact analysis, reasonably foreseeable actions have been categorized as those projects outside of the control of Eglin AFB; generally these are regional development projects. Based on their scope, projects have been identified that may contribute incrementally to impacts associated with this Proposed Action; projects that the Air Force considered minor in scope (e.g., building of a courthouse annex, improvements to roadways for pedestrians, etc.) are not identified here and were not included in the impact analysis.

Developments of Regional Impact (DRIs). Review of the latest West Florida Regional Planning Council (WFRPC) Annual Report (2005) shows that there are no DRIs that

entered the review process during 2005. As of the 2004 review process, the only DRIs associated with Okaloosa County were related to proposed changes at Bluewater Bay (northeast of Niceville) and Emerald Bay (at the south Okaloosa-Walton County line).

Destin/Fort Walton Beach Airport Construction Projects. The Destin/Fort Walton Beach Airport is planning many new construction projects over the next few years. Plans include constructing an air traffic control tower, overlaying the runway with asphaltic concrete, installing an approach lighting system for Runway 32/14, and installing a GPS approach and acquiring a strip mall for a south approach.

Bob Sikes Airport Projects. The Bob Sikes Airport in Crestview is planning the following projects: widening and overlaying all taxiways and rehabilitating Runway 17/35; designing and installing an approach lighting system with new Precision Approach Path Indicator (PAPI); and resurfacing and expanding the apron.

DeFuniak Springs Airport Projects. The DeFuniak Springs Airport is planning new projects over the next few years which include overlaying the taxiway and constructing an apron, constructing an apron and expanding an apron, expanding the taxiway and constructing T-Hangers, installing guidance signs, and constructing additional terminal parking and terminal facility expansion.

Panama City-Bay County International Airport Relocation. The Panama City-Bay County International Airport is in the process of relocating to a 4,000-acre complex in the West Bay area. This project is expected to be completed in calendar year 2009.

Mid-Bay Bridge Widening and Bypass. The Mid-Bay Bridge Authority plans to widen the Mid-Bay Bridge and the northern corridor up to State Route (SR) 20 to four lanes. They are also planning a four-lane "bypass" from the Mid-Bay Bridge to Hwy (or SR) 85, going around the city of Niceville. The plans together would provide four-lane access to Destin from Interstate 10 (I-10). However, all of the projects are in the very early planning stage. The construction would be paid for by the collection of tolls (Okaloosa-Walton Transportation Planning Organization: Project Priorities FY 2007-2011).

Florida Department of Transportation (FDOT) SR 85 and SR 123 Interchanges. The FDOT is considering a proposed action to construct two interchanges; one at the southern intersection of SR 85 and SR 123, and another adjacent to the Okaloosa Regional Airport. The proposed interchange is a two-lane flyover (overpass) for northbound traffic on SR 85 to connect with SR 123, eliminating the traffic signal that currently handles left-turning traffic onto northbound SR 123. The FDOT would construct a second overpass at the current intersection between SR 85 and the airport exit at the east end of the airport to a flyover for both airport entry from and exit to

SR 123. SR 85 entry to and exit from the airport would occur directly from SR 85. Additionally, the FDOT would construct a frontage road that parallels SR 85 to connect SR 123 to the airport entrance and exit flyover. Southbound traffic on SR 123 turning left at SR 85 would relocate onto the frontage road; SR 85 southbound traffic turning right onto SR 123 would use the same east airport entrance intersection and frontage road. The proposed action would require 35.4 acres for right-of-way expansion and a lease involving the clearing of 4.6 wooded acres to widen the existing roads, construct the interchange, construct the frontage road, place five stormwater dry retention beds, and relocate existing utilities. The FDOT would conduct the proposed action on Eglin-owned land and would require an easement across federal property to provide additional rights-of-way to accommodate the proposed construction.

Area Transportation Improvements. Currently, there are plans to upgrade part of Hwy 85 from four to six lanes. This project would affect the stretch of highway from General Bond Boulevard to Hwy 123 and its interchange at the Airport.

9.1.4 Cumulative Effects Analysis

Cumulative effects are assessed for each of the resources analyzed in previous sections. For this analysis, the past, present, and future actions would be the sum of all the activities associated with the Proposed Action (Sections 2.3 through 2.6), the No Action Alternative (Section 2.7), and the other actions described in this chapter.

Airspace

As indicated in Chapter 7 (Section 7.2, Airspace), the Joint Strike Fighter (JSF) flight operations would impact air traffic controller workload and contribute to increased congestion (air and ground delays) for military and civilian aircraft across the region. The JSF flight operations would contribute to an already-congested airspace created by the continuing growth of other civilian and military aviation customers in the region.

Projects occurring at the civilian airports located in Destin, Pensacola, Panama City, DeFuniak Springs, and Crestview (Bob Sikes Airport) are anticipated to result in increased use of these airfields by civilian aircraft. Therefore, airspace use surrounding the Eglin Range complex, which includes Eglin Main Base (not including cantonment areas) and the two auxiliary fields being used for training activities, is anticipated to increase. The complex regional airspace configuration and use calls for modifications involving all the civilian and military users of the airspace.

Noise

Under any of the JSF flight training action alternatives, time-averaged aircraft noise levels at several known noise-sensitive locations would increase to a level that may be

considered by the public to be adverse (Chapter 7, Section 7.3, Noise). Cumulative impacts would occur wherever noise impacts from proposed BRAC actions would overlap with noise impacts resulting from other reasonably foreseeable actions planned to occur at Eglin AFB.

The majority of the relevant past and present actions considered as part of the cumulative impacts analysis process involve construction of a new facility or demolition of an existing facility. Construction noise is temporary, lasting only for the duration of the construction project, and is typically limited to normal working hours (7:00 AM to 5:00 PM). In many locations, construction noise would be drowned out by aircraft noise. Noise impacts associated with these projects are expected to be limited to within the boundaries of Eglin AFB and would be insignificant either separately or cumulatively.

New facilities proposed to be constructed on Eglin AFB may be exposed to high noise levels due to aircraft overflight and munitions use. Where practicable, on-base structures should incorporate noise attenuation measures in accordance with the Air Force noise guidelines published at DoDI 4165.57, *Air Installation Compatible Use Zones*.

In addition to several construction projects, the Alabama Army National Guard (ALARNG) proposes to expand and increase operations at the Cobb Training Site on the Eglin Range (U.S. Air Force, 2007c). ALARNG training would occur in the western portion of the Eglin Range and would be geographically distant from 7th Special Forces Group (Airborne) (7SFG(A)) munitions training activities, which would occur in the eastern or central portions of the range. Therefore, noise from these two types of training would not be expected to be additive to one another. JSF high-explosives munitions training would occur in the western portion of the range, near ALARNG training locations. However, targets used for both JSF and ALARNG training would be located near the geographic center of the range and neither are expected to contribute to noise levels of greater than 62 decibels (d) CDNL extending beyond range boundaries.

Land Use

Land use changes associated with the JSF Initial Joint Training Site (IJTS) and 7SFG(A) cantonments and training would incrementally contribute to the changing character of the area. Key elements of the Proposed Action, including facility construction, flight activities, and ground training are generally consistent with the existing land use plans for Eglin Main Base and the Eglin Range and would not be expected to substantially affect land use patterns in these areas. However, the 7SFG(A) cantonments that could be located near Duke Field and the 7SFG(A) ranges that would be required for training would have an adverse impact on existing recreational use. Up to approximately

62,000 acres within the Eglin Range currently open for recreational activities (including hunting) could become closed to the public because of safety and security concerns.

The Proposed Action should not have any cumulative land use impacts on the majority of the reasonably foreseeable cantonment area projects on Eglin AFB. It is unknown at this time if the proposed 96th Security Forces Squadron complex and the new Explosive Ordnance Disposal complex located along Nomad Way would conflict with the proposed JSF IJTS cantonment if it is located in the 33 FW area. It is also possible that a potential expansion of the University of Florida REEF could conflict with the proposed 7SFG(A) cantonment if the expansion or cantonment were to be located within the North Poquito area. The increase in noise exposure and its effect on land use compatibility could have a potentially adverse cumulative impact on the Military Family Housing (MFH) Privatization Program. Future studies associated with the MFH Program would need to consider the potential increase in noise exposures that could result from the Proposed Action. No cumulative land use impacts are anticipated for either Duke Field or Choctaw Field if they are used for JSF training activities. The JSF IJTS and 7SFG(A) training activities that would occur on the Eglin Range fit within the existing uses of this area, and adverse cumulative impacts are not expected.

The 7SFG(A) cantonment and training alternatives would have an additional incremental impact on recreational use when combined with the impacts from the ALARNG Cobb Training Site and the LADAR Test Laboratory and Outdoor Test Range. Use of TA B-75 or B-5 for new small arms range complex would create new surface danger zones (SDZs) that would extend beyond the boundaries of the existing training areas. During range firing, the affected areas would have to be closed. This would require temporary closure of portions of Management Units 12 and 14 (TA B-75) or 2 and 6N (B-5) for up to 41 weekends and 40 weekdays per year. The closures associated with the 7SFG(A) range training alternatives primarily impact recreational use on the management units in the central and eastern portion of the Eglin Range. Additional area to the west would be closed from the ALARNG training. The outdoor LADAR test range is proposed to be located west of TA C-53 and would impact recreational use on a portion of Management Unit 13. However, the affected area would be within the area that would be conditionally closed under the 7SFG(A) training alternatives because of the addition of the Group 2 firing ranges and maneuver area. The additional future projects on the Eglin Reservation would further exacerbate the restrictions on the availability of recreational opportunities on Eglin and the impact on the availability of recreational activities would be adverse.

Potential increases in noise exposures from the proposed JSF airfield and aircraft operations would have adverse impacts on existing off-base land uses especially on residences located within affected areas. Depending on which alternative is selected,

between 9,000 to 21,000 acres of off-base area would be exposed to noise levels of 65 dB day-night sound level (DNL) or greater and 2,000 to 6,000 off-base acres would be exposed to noise levels of 75 dB DNL or greater. The affected off-base property includes areas of land and water.

Noise impacts on the surrounding communities would be greatest northeast of Eglin Main Base in Valparaiso and Niceville. Other impacted areas include unincorporated areas of Okaloosa County part of the city of Shalimar, the eastern end of Okaloosa Island, a portion of Destin, property located just east of Destin near the Mid Bay Bridge, and the area southeast of Crestview over the Shoal River. Depending on the alternative, between 60 to 350 acres of residential land located primarily in the Valparaiso and Niceville areas would be exposed to noise levels that exceed 75 dB DNL. Although local conditions may require residential use, it is discouraged in areas with noise levels of 65 to 70 dB DNL and strongly discouraged in areas with noise levels of 70 to 75 dB DNL. Nearly all studies analyzing aircraft noise and residential compatibility recommend no residential uses in noise zones above 75 dB DNL. The additional noise exposures that would result from the proposed action should be considered in any future land use planning in the potentially affected areas. The Okaloosa County Year 2020 Comprehensive Plan indicates that the land use in Valparaiso and Shalimar would remain static.

Socioeconomics and Environmental Justice

The drawdown of the 33 FW and the President's Budget Decision analyzed in the No Action Alternative would occur prior to the BRAC actions, beginning in FY 2007 and is estimated to be complete by FY 2011. During this time, the base population on Eglin AFB would actually decrease from nearly 28,300 personnel in FY 2008, including active duty military, civilians, contractors, and dependents to 25,211 personnel in FY 2010 (Table 9-1). The loss of personnel from the drawdown of the 33 FW and the President's Budget Decision would flow through the regional economy and the population loss and the decrease in demand for goods and services would result in a loss of jobs, tax revenues, and the demand for services. These losses would be partly offset, however, by the transition of the 7SFG(A) personnel into the region beginning in FY 2009. The incoming personnel would generate additional activity in the region, increasing the demand for goods and services, subsequently creating jobs and generating tax revenue. As the 7SFG(A) continues the transition, scheduled to be completed in FY 2011, base population would increase to over 32,600 personnel. The JSF personnel would begin to beddown in the region in FY 2010 with the arrival of the first aircraft and then continue until FY 2016, continuing to stimulate economic activity in the region of influence (ROI). By the end-state of the BRAC actions, as well as the 33 FW drawdown and the President's 2007 Budget, Eglin AFB population would be over 36,000.

Table 9-1. Annual Changes from Proposed Action

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016 BRAC End-State
Eglin AFB Population with BRAC									
Officers	1,563	1,538	1,499	2,039	2,066	2,095	2,115	2,138	2,152
Enlisted	6,368	5,585	4,997	7,992	8,303	8,586	8,846	9,113	9,276
Civilian/CME	9,147	9,203	9,506	9,582	9,480	9,499	9,500	9,529	9,529
International	-	-	3	10	83	86	86	132	132
Dependents	11,214	10,083	9,206	13,042	13,515	13,952	14,344	14,750	15,024
Total Eglin AFB Population	28,292	26,409	25,211	32,665	33,447	34,218	34,891	35,662	36,113
BRAC Construction Spending ($M)									
	FY 2008	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**	**Construction End-State**
JSF IJTS	65.1	75.0	85.6	20.5	38.3	-	-	-	284.5
7SFG(A)	10.7	220.0	38.5	115.4	-	-	-	-	384.6
Base Operating Support	2.4	23.9	58.4	6.6	1.7	-	-	-	93.0
Total BRAC Construction Spending	78.2	318.9	182.5	142.5	40.0	-	-	-	762.1

AFB = Air Force Base; BRAC = Base Realignment and Closure; FY = fiscal year; IJTS = Initial Joint Training Site; JSF = Joint Strike Fighter; $M = million dollars

The BRAC action would also have an increase in construction spending of approximately $762 million in order to establish the cantonment and range areas for the 7SFG(A) and the JSF. The largest share of spending would occur in FY 2009.

The combined effects of the BRAC actions, military construction (MILCON) spending, and the 33 FW and other personnel decreases would have a long-term effect on the regional economy. Table 9-2 presents the estimated total jobs attributable to BRAC related activities between FY 2008 and FY 2016. The direct base jobs support an induced number of jobs. MILCON directly supports jobs and expenditures create indirect and induced jobs within the ROI. The table demonstrates that total jobs will vary from FY 2008 through FY 2012 and then stabilize between FY 2012 and 2016.

In FY 2008, the number of jobs supported by Eglin AFB and related BRAC spending is estimated to be 28,500 (Table 9-2). MILCON spending would begin in FY 2008 and stimulate the economy, bringing the number of jobs supported to over 32,300 in FY 2009. However, the drawdown of the 33 FW and the decrease in personnel from the President's 2007 Budget would offset some of the job gains. The number of jobs supported by Eglin AFB would decrease slightly between FY 2009 and 2010. With the beddown of the JSF and the realignment of the 7SFG(A), the number of jobs would

increase and stabilize with approximately 32,000 jobs between FY 2011 and FY 2016 (Table 9-2).

Table 9-2. Projected Eglin AFB Supported Jobs in the ROI

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
Officers	1,563	1,538	1,499	2,039	2,066	2,095	2,115	2,138	2,152
Enlisted	6,368	5,585	4,997	7,992	8,303	8,586	8,846	9,113	9,276
Civilian/Other	9,147	9,203	9,509	9,592	9,563	9,585	9,586	9,661	9,661
Total	17,078	16,326	16,005	19,623	19,932	20,266	20,547	20,912	21,089
Induced	9,859	9,425	9,240	11,328	11,507	11,700	11,862	12,072	12,175
Milcon/Related[1]	1,626	6,632	3,796	2,964	832	-	-	-	-
Total Jobs	28,563	32,383	29,041	33,915	32,271	31,966	32,409	32,984	33,264

1. Includes Direct, Indirect, and Induced

The specific effects of the personnel changes related to the BRAC actions and the No Action Alternative were estimated using the Impact Analysis for Planning (IMPLAN) economic impact model. Table 9-3 illustrates the total effects of the BRAC actions in combination with the No Action Alternative at the end of the transition.

Table 9-3. Aggregated Socioeconomic Effects of BRAC at End-State

	7SFG(A) Effects	JSF IJTS Effects	No Action Alternative Effects	Aggregated Effects	
	Totals	Totals	Totals	Totals	Total Percent Change
Population					
Existing Conditions, 2005[a]	388,466	388,466	388,466	388,466	
Direct	6,067	4,885	-4,561	6,391	1.6%
Induced	2,516	2,587	-2,443	2,660	0.7%
Total	8,583	7,472	-7,004	9,051	2.3%
Employment					
Existing Conditions, 2004[b]	189,469	189,469	189,469	189,469	
Direct	2,200	2,326	-2,172	2,354	1.2%
Induced	1,287	1,322	-1,251	1,359	0.7%
Total	3,527	3,648	-3,423	3,753	2.0%
Housing					
Existing Conditions, 2000[c]	156,795	156,795	156,795	156,795	
Direct	2,200	2,326	-2,172	2,354	1.5%
Induced	1,287	1,322	-1,251	1,359	0.9%
Total	3,527	3,648	-3,423	3,753	2.4%
Students					
Existing Conditions, 2005[d]	61,955	61,955	61,955	61,955	
Direct	1,521	879	-821	1,580	2.5%
Induced	435	710	-422	723	1.2%

Continued on the next page…

Table 9-3. Aggregated Socioeconomic Effects of BRAC at End-State, Cont'd

	7SFG(A) Effects	JSF IJTS Effects	No Action Alternative Effects	Aggregated Effects	
	Totals	Totals	Totals	Totals	Total Percent Change
Total	1,957	1,589	-1,243	2,302	3.7%
School Revenue					
Existing Conditions, 2005[e]	$413,847,831	$413,847,831	$413,847,831	$413,847,831	
Direct	$10,144,790	$5,862,554	-$8,689,533	$,317,811	1.8%
Induced	$4,602,302	$4,732,454	-$4,468,349	$4,866,408	1.2%
Total	$14,747,092	$10,595,008	-$13,157,882	$12,184,219	2.9%
Law Enforcement					
Existing Conditions, 2005[f]	670	670	670	670	
Total	37	31	N/A	68	10.1%
Fire Protection					
Existing Conditions, 2006[g]	657	657	657	657	
Total	13	11	N/A	24	3.7%
Medical					
Existing Conditions, 2006[h]	11,446	11,446	11,446	11,446	
Total	249	217	N/A	466	4.1%

a. Office of Economic and Demographic Research, The Florida Legislature, 2005
b. U.S. Bureau of Economic Analysis, 2006
c. U.S. Census Bureau, 2000a, 2000b, 2000c
d. Florida Department of Education, 2005a
e. Florida Department of Education, 2005b
f. Florida Department of Law Enforcement, 2005
g. Department of Homeland Security, U.S. Fire Administration, 2006
h. Orcutt, 2006

A net total of approximately 9,051 persons would enter the region as a result of BRAC, including civilians, contractors, and dependents, increasing the total population 2.3 percent between 2008 and 2016. The increase in population would subsequently contribute to the creation of jobs, additional income and tax revenues, as well as additional demand for public services.

Employment would also increase as a result of the aggregated BRAC actions, in spite of the loss of jobs caused by the drawdown of the 33 FW and related personnel. The 7SFG(A) would create a total of 3,527 jobs, including the employment of the incoming personnel and secondary jobs that would be created from the additional spending of the incoming personnel. The JSF personnel would increase employment by 3,648 jobs, while the actions associated with the No Action Alternative would decrease the number of jobs in the region by 3,423. Total employment in the region would be expected to increase by 3,753 jobs as a result of the combined BRAC and No Action Alternatives, an increase of 2.0 percent.

As with employment, assuming one BRAC-related job per household, the number of housing units demanded would also increase in relation to the increase in employment.

An estimated total of 3,753 housing units would be demanded by the incoming population. If these households were to rely completely on new construction, the number of housing units would increase 2.0 percent as a result of the incoming personnel.

Recently, the strength of the housing market has been a concern for the United States as well as the state of Florida. Demand for housing increased corresponding to the decrease in interest rates and the availability of new mortgages, including adjustable rate mortgages, that allowed more people to own homes. Housing prices also increased across the country. In 2004, the median price of a housing unit in Okaloosa County was $169,833, as compared to the median price in the United States of $170,800. In 2007, the median price increased to $215,900 in Okaloosa County surpassing the median price in the United States of $212,300 (Economic Development Council [EDC] of Okaloosa County, FL, "Okaloosa County Real Estate"). Santa Rosa County experienced a similar increase in the median price between 2004 and 2005, when the median sales price increased over 23 percent (Florida Legislature Office of Economic and Demographic Research, 2007, "Santa Rosa County Profile"). Information on the median sales price for Walton County was not available.

The rate of price increases began to slow between 2005 and 2007, when higher interest rates, increased property taxes, and increased homeowner's insurance contributed to the weakening of the housing market. While housing prices in Florida continue to increase, the increase is more gradual than that experienced at the height of the housing market. As the housing market continues to adjust to the excess inventory, some areas in the United States are expected to experience decreasing housing prices and declining equity. In the ROI, however, the increased demand from the personnel entering the region as a result of BRAC may stimulate the housing market to the extent that housing prices would stabilize.

In addition to the increase in population, the BRAC actions would also increase the number of students in the three school districts in the ROI. By using demographics provided by the U.S. Army and Air Force, an estimated 1,957 students would enter the region's school districts from the 7SFG(A) actions, and 1,589 students would enter as a result of the JSF. However, 1,243 students would be estimated to leave the region's school districts from the change in personnel related to the No Action alternative. In total, an estimated 2,302 students would be added to the region, increasing the student population by 3.7 percent (Table 9-3).

In relation to the number of students in the region, the amount of revenues collected by the three school districts would also increase. In aggregate, school revenues would increase by over $12 million, an increase of 2.9 percent.

For public services including law enforcement, fire protection, and medical services, it is reasonable to assume that a decrease in population would not necessarily result in a decrease in the provision of those services or the number of people to fill those

positions. Therefore, it is assumed that, regardless of the decrease in the regional population caused by the 33 FW drawdown, the number of law enforcement officers, firefighters, and medical professionals would remain the same. The BRAC actions and subsequent increase in population would then drive an increase in the provision of public services in order to maintain the current levels of demand and supply. Therefore, an estimated additional 68 law enforcement officers would be required as a result of the 7SFG(A) actions and the JSF actions. Twenty-four firefighters would be needed and 466 medical professionals would be needed throughout the region to maintain the current level of public services in relation to the increased population from the BRAC actions.

The BRAC actions would also require additional construction spending to build or renovate suitable facilities for the 7SFG(A) and the JSF. The additional construction spending would filter through the regional economy and contribute to job growth, income growth, and total economic output. In 2004, the construction industry provided approximately 15,400 jobs in the ROI. A total of over $762 million would be spent by the U.S. Air Force for construction for the BRAC actions, including approximately $93 million that is related to overall base operating support and not directly to either BRAC action. The additional spending by the Air Force would then multiply through the economy until a total of over $1.2 billion in total spending has cycled through the economy. The construction spending would also contribute to job growth by creating a total of 15,850 jobs in the region, of which 10,338 would be directly related to the construction industry and corresponding industries, including industries such as food services, retail, and other services (Table 9-4). However, these effects are not permanent, as the additional jobs and incomes would be supported only by the increased construction spending which would stop when the construction is completed.

Table 9-4. Estimated Impact of Military Construction

	Direct	Indirect	Induced	Total
Total Spending (Output)	$762,099,968	$194,143,002	$259,956,694	$1,216,199,677
Incomes Generated	$346,824,576	$82,779,526	$83,123,107	$512,727,198
Jobs Supported	10,338	2,290	3,223	15,850

Source: Haas Center for Business Research and Economic Development, 2006

Several other large construction and infrastructure improvement projects are expected, including major projects at three of the ROI's airports: Destin/Fort Walton Beach Airport, Bob Sikes Airport, and DeFuniak Springs Airport. These construction projects, as well as the infrastructure improvement projects planned for the Mid-Bay Bridge and Hwy 85 and Hwy 123 interchanges, would contribute to the regional economy by creating additional employment, especially in the construction and construction-related industries. The various airport improvements were scheduled to take place between 2007 and 2011, overlapping the construction scheduled for the BRAC actions. The schedule for the road improvements is not known at this time. The magnitude of these construction projects is such that it is possible that construction workers may migrate to

the region or possibly commute daily or weekly from outside of the region. However, these construction projects are temporary and the change in population, if any, from the construction workers is not expected to contribute to a permanent increase in the region's population.

Under the JSF flight training alternatives, disproportionate concentrations of minority and/or low-income populations underlie noise levels of 65 dB DNL or greater in the special use airspace that would be utilized by the F-35. These populations would be subject to adverse noise impacts from these noise levels. Two military training routes (MTRs) are proposed for use in JSF flight training, VR-1082 and VR-1085, where JSF training would increase noise levels. The MTRs overfly 10 counties in Florida and Alabama. Of the 10 counties, the population under the MTRs by census tracts in three of the counties have minority and/or low income populations that are disproportionate to the respective populations in each county overall. All three counties (Clarke, Monroe, and Wilcox) are located in Alabama. In total, beneath the MTRs, 21,323 persons could potentially be affected by noise levels of between 57 and 76 dB DNL. Of the total population to be affected, over 18,000 would be minority and/or low income persons and over 5,000 would be persons under the age of 18. Aircraft sortie-operations on the MTRs would continue to be relatively infrequent (less than 2 per day). However, individual overflights could be alarming to people overflown and would be expected to cause significant annoyance to between 6 to 40 percent of the population affected (Section 7.3, Noise).

Also, flight training operations from the JSF are anticipated to present special risks to children as several schools and daycares underlie the special use airspace. The JSF flight training would increase the noise levels currently experienced by these schools and daycares and would have the potential to interrupt speech and hinder the learning process in classrooms. Noise levels of 62 dB CDNL from the 7SFG(A) high explosive training would occur beyond Eglin Range boundaries. These noise levels would have the potential of affecting up to 43 acres, of which 31 acres are zoned for residential use in the vicinity of Big Hammock Point and Sharon Lake. Residents of these areas affected by increased high-explosive noise levels may experience annoyance and/or activity disruption from the noise. However, these increased noise levels would not disproportionately affect minority and/or low-income populations or areas with high concentrations of children. Noise levels from the BRAC-related construction are not expected to affect any communities of concern or pose a special risk to children.

Transportation

- Programmed and planned improvements in the Okaloosa Walton County area may affect the study area. Programmed projects are currently funded for construction within the next five years and were generally considered to be complete for the end-state analyses. Planned projects are not currently funded but have been included in the Transportation Planning Organization's (TPO's) *2030 Long Range Transportation Plan* and *Cost Feasible Plan* (TPO, 2007). The *Cost*

Feasible Plan projects reasonably available future funding based on past funding and identifies projects anticipated to be built with the projected revenues. The 2030 plan identifies several projects that will positively impact roadways in the study area. Tables showing the Planned and Programmed Improvements are included in Appendix B.

These roadways are projected to be built by 2030, 14 years past the planning horizon of this study. While the TPO may prioritize projects, there is no specific list of projects that are anticipated to be complete by the project end state.

The Northwest Florida Transportation Corridor Authority adopted its Phase II Master Plan in June 2007. The Phase II Master Plan identifies a potential new corridor in the region. This proposed project begins at SR 79 in Bay County, runs east-west approximately parallel to SR 20 to the Mid-Bay Bridge (SR 293) and then traverses the southern edge of Eglin AFB intersecting SR 285 and SR 85 running parallel to SR 20, then following north of and parallel to SR 85, intersecting SR 123 then running north of and parallel to General Bond Blvd and north and east of SR 189 and SR 393 parallel, bypassing Fort Walton Beach and Mary Esther to SR 87 in Santa Rosa County. The current alignment is general in nature as the proposed bypass is still under study and discussion. There is no funding currently associated with this project; however, should this project move forward, it may become an alternative to widening some of the facilities identified as deficient in this analysis.

All of the future year (2016) traffic impact analyses conducted for the BRAC alternatives included the roadway projects that are currently funded for construction in the study area. In addition, all of the analyses took into account population and employment growth that is anticipated to occur off-base in Okaloosa and Walton Counties between now and 2016. This future year growth is included in all of the 2016 traffic analyses.

The planned 2030 roadway projects may partially address some of the needed improvements identified in these analyses. However, these projects may not be funded until after the BRAC actions are complete. The bypass project may also have an impact on the needed improvements; however, it is still conceptual in nature, and its exact impacts are unknown. Any of these projects would help in addressing the roadway needs identified in these analyses and will have a positive impact on the roadway network in general. The results of this analysis indicate that there are several roadways operating deficiently in the study area today, and the number of deficient roadway segments would increase by 2016 when both the BRAC alternatives and area growth is taken into consideration.

Utilities

Of the actions described as potentially creating cumulative impacts, several pertain to utilities on the cantonment area of Eglin AFB and two pertain to utilities on the Eglin Range. None of the regional development projects would create cumulative impacts to

the utilities. Since the overall use of electricity and natural gas is projected to be less than current capacity, it is not expected that the relevant reasonably foreseeable actions would have a cumulative impact when combined with the JSF and 7SFG(A) cantonment or range requirements.

A total of 102,708 ft^2 of additional building space is proposed for Eglin Main Base. This results in cumulative impacts to the Main Base water system (potable water) and the two wastewater treatment plants that service Main Base and which are tentatively identified to service the proposed JSF IJTS and the 7SFG(A) cantonment area sub-alternatives for the Triangle and West Gate. Based on estimates by the American Water Works Association (AWWA, 2006) of water use and wastewater flow per square foot per day in an office building, the additional square footage would add 5,340 gallons of potable water use and wastewater flow per day to the overall Main Base water system and wastewater treatment plants (WWTP) on Main Base.

Part of the proposed construction of additional buildings is the associated demolition of several buildings and the EOD facility totaling approximately 41,150 ft^2 (U.S. Air Force, 2006v). The square footage being demolished would reduce the overall amount of potable water being consumed and wastewater being produced by 2,140 gallons per day and would help to lessen the cumulative impacts to the water system and WWTPs on Eglin Main Base. The overall increase in potable water consumption and wastewater flow as a result of the proposed construction and demolition of buildings would be 3,200 gallons per day (Table 9-5).

The proposed housing privatization project for Eglin AFB would create cumulative impacts to the amount of potable water consumed and the amount of wastewater produced when combined with the proposed building construction/demolition projects, the JSF IJTS, and the 7SFG(A) cantonment area.

Table 9-5. Projected Potable Water and Wastewater Generated by Proposed Projects on Eglin Main Base

Proposed Projects	Projected Amounts of Potable Water Use (gallons/day)	Projected Amount of Wastewater (gallons/day)
Construction/Demolition	3,200	3,200
JSF IJTS	537,000[a]	108,335
7SFG(A) cantonment area	413,500[a]	70,965
Total	953,700	182,500

JSF = Joint Strike Fighter; IJTS = Initial Joint Training Site
a. Projected estimates for potable water use by the JSF IJTS and the 7SFG(A) are more than likely higher than will be their actual water use. The liberal estimates were used to account for industrial uses of water.

In conjunction with the additional wastewater resulting from the proposed JSF IJTS and the 7SFG(A) cantonment area, the total wastewater increase that could result once all of these projects are complete would be 182,500 gallons of wastewater per day or 0.183 million gallons per day (mgd) (Table 9-5). Considering total capacity for wastewater treatment on Main Base is 2.5 mgd and 41 percent of the total capacity is

currently being used (as of July 2006), the additional 0.183 mgd would increase the amount of capacity being used to 48 percent of the total permitted capacities for the two facilities (Table 9-6).

Table 9-6. Potential Cumulative Impact on Wastewater Treatment Plant Capacity

WWTP	Total Capacity in mgd	Current Annual Average in mgd (Including July 06)	Annual Average in mgd Including Proposed Projects[1]	Percent of Capacity Used
Two Main Base Treatment Facilities	2.5	1.02	1.203	48.1%

WWTP = Wastewater Treatment Plant; mgd = million gallons per day
1. Proposed projects include JSF IJTS, 7SFG(A) cantonment area, construction/demolition building projects

The most influential factor that may reduce the amount of wastewater treatment required by the two facilities on Main Base is the recent approval by the Air Force for the construction of a large, new wastewater treatment facility by Okaloosa County near the intersection of Timberlake Road and Lewis Turner Boulevard on Eglin AFB. This new facility is expected to be completed in mid-2009 and to have a capacity of 10.0 mgd (Helms, 2006). To alleviate the amount of wastewater being treated by the facilities on Main Base, some of the wastewater may be treated by the new facility. In addition, the Poquito Bayou sub-alternative site for the 7SFG(A) cantonment area would utilize this new facility for wastewater treatment if selected for the 7SFG(A) cantonment. Other factors that may reduce the overall amount of wastewater requiring treatment is the final size of the buildings to be constructed, and the final number of housing units to be built for the privatization initiative.

The cumulative impact to potable water resulting from the proposed JSF IJTS and the 7SFG(A) cantonment area in conjunction with the other proposed projects on Main Base would increase the total consumption of potable water on Main Base to 3.67 mgd (Table 9-7). Considering the permitted average daily limit and maximum daily limit for the Main Base Water Systems are 5.29 and 6.08 mgd respectively, the 3.67 mgd would remain within permitted levels (Table 9-7).

Table 9-7. Potential Cumulative Impact on Permitted Levels of Main Base Water Systems

Water Supply System	2005 Average Daily Rate (mgd)	Average Daily Rate Proposed projects[1] (mgd estimate)	Total Average Daily Rate (mgd)	Permitted Average Daily Limit (mgd)	Permitted Maximum Daily Limit (mgd)
Two Main Base Water Systems	1.95	1.72	3.67	5.29	6.08

mgd = million gallons per day
1. Proposed projects include JSF IJTS, 7SFG(A) cantonment area, housing privatization, construction/demolition building projects

On the Eglin Range, two reasonably foreseeable actions may combine with the proposed JSF auxiliary field use and the proposed 7SFG(A) ranges to cause cumulative impacts. The ALARNG training site is located in the same vicinity of Choctaw Field,

which is proposed to be used as an auxiliary field for the JSF. Additional personnel located at Choctaw Field in support of the JSF auxiliary field requirements would increase the amount of potable water consumed and wastewater produced at the site. In the same area west of Hwy 87, the proposed ALARNG training site would also increase the consumption of potable water and the generation of wastewater. Cumulatively, in this part of the Eglin Range an increase would result for the consumption of water and in the generation of wastewater.

The proposed development of the LADAR test laboratory and outdoor range west of TA C-53 would require infrastructure to support electrical, natural gas, potable water and wastewater. Currently the area has no utilities. Approximately 14,000 ft^2 of buildings are proposed for construction and about 20 employees would be located on site. Based on estimates by the American Water Works Association (AWWA, 2006) of water use and wastewater flow per square foot per day in a facility of this type, the additional square footage would add between 500 and 750 gallons of potable water use and wastewater flow per day. In this same area, several of the 7SFG(A) ranges are proposed in Alternatives 1 and 2. The ranges would be located in and adjacent to TA C-53. As discussed in the utilities analysis for 7SFG(A) Range Alternatives 1 and 2, there is no existing utility infrastructure on TA C-53 except for an electrical distribution line. Potable water wells, wastewater treatment, and natural gas infrastructure would be required. Cumulatively, the need for utilities in this area of the Eglin Range would increase.

The combined requirement for utilities in these areas may provide an opportunity to share resources. Rather than increasing the existing number of septic tanks in the same geographical area, a wastewater treatment facility could be established to service both the ALARNG training site and the current and future wastewater needs at Choctaw Field that result from additional JSF support personnel. The same approach could be used at the LADAR facility and the proposed 7SFG(A) ranges at TA C-53.

New potable water wells required for the increases in consumption will require Consumptive Use Permits from the State of Florida. Rather than applying for multiple permits, a more efficient and accurate use of water could occur by combining additional water needs to establish water systems west of Hwy 87 and in the vicinity of the LADAR facility and TA C-53.

Air Quality

The Proposed Action would incrementally contribute air pollution emissions during construction and would allow for increased air pollutant emissions thereafter associated with operations, maintenance, and travel of residents. This contribution would relate to regional air quality goals and attainment standards. The contribution from the Proposed Action would be negligible on a regional scale as construction and demolition impacts would be short-term and end when the contractors complete the project. Aircraft emissions would be ongoing and would be a permanent change in annual air

emissions. It should be noted that as the F-35s are introduced to Eglin AFB, the F-15s currently based at Eglin will be phased out. The air emissions are expected to have a slight net increase from aircraft emissions. Air emissions associated with the project represent a small percentage of the Okaloosa, Santa Rosa, and Walton Counties' annual emissions. Project emissions would not contribute to other county emissions in any applicable manner.

Regional development projects consist of construction or improvement projects. Air emissions from these activities would be temporary, intermittent, and minor. As a result, the Air Force does not expect cumulative impacts associated with air emissions from the Proposed Action and the regional development projects to adversely affect regional air quality. Eglin cantonment and range projects are discussed as part of the No Action Alternative in Section 4.7.6. The cumulative impacts include impacts associated with the No Action Alternative plus the regional projects and the BRAC action.

Documentation of some of the projects discussed in Section 2.7, No Action Alternative, (see Table 9-8) would not impact air quality. Based on emission estimations and the BRAC alternatives, the cumulative nature of these air emissions would not be sufficient to adversely affect air quality in the region.

Table 9-8. Projects Analyzed for Air Quality With No Impacts Expected

Project	Emissions (tons/year)				
	CO	NO_x	PM_{10}	SO_2	VOC
Cantonment					
Relocate AF EOD Admin Complex	10	3	1	0	1
96th Security Forces Sqd	84	26	9	3	9
PMEL Facility	25	9	14	1	2
Ranger Training Brigade	22	7	7	2	2
Okaloosa Regional Airport	15	13	247	1	2
Military Family Housing	80	27	74	3	16
Veterans Administration Community-Based Outpatient Clinic	91	6	9	0	8
Joint Reprogramming Facility	3	1	0	0	0
Decrease in Personnel	-14	-2	0	0	-1
Range					
ALARNG	1731	1104	599	112	200
Camp Rudder	22	7	7	2	2
Regional Development Action					
Interchange @ SR85 & SR123	263	33	94	2	16
Eglin BRAC Emissions					
Eglin BRAC Emissions	1121	2063	970	81	307
Cumulative Impacts					
Total Emissions	3452	3297	2031	208	564
ROI Emissions	150,219	22,909	30,829	4,097	23,742
Percent ROI Emissions	*2%*	*14%*	*7%*	*5%*	*2%*

CO = Carbon Monoxide; NO_x = Nitrogen Oxides; PM_{10} = Particulate Matter Less Than or Equal To 10 Microns in Diameter; ROI = Region of Influence; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound
Note: No documentation was found for previously discussed projects that are not included in this table.

Safety

The ALARNG Master Plan implementation, the establishment of and outdoor LADAR test range, as well as the 7SFG(A) range and JSF flight training actions, would require portions of the range currently open for recreation to be closed to the public during testing and/or training activities. Eglin has procedures in place for instituting and enforcing these closures, so no cumulative impacts are anticipated to the public as a result.

Implementation of any of the activities associated with munitions, ordnance, or explosives would not be expected to prevent or significantly limit the ability of range managers to conduct EOD and range maintenance activities. All ordnance would be handled by trained and qualified personnel in accordance with all explosive safety standards and detailed published technical data. Storage of munitions would take place in designated and approved areas. Therefore, there would be no cumulative impacts related to explosives safety.

Regional development actions include upgrades to or expansion of four regional airports (Okaloosa Regional Airport, Bob Sikes Airport in Crestview, The DeFuniak Springs Airport, and Panama City-Bay County International Airport). This may eventually lead to increased air traffic overall in the area. Viewed in conjunction with proposed JSF flight training activities, there is potential for cumulative effects to require reevaluation or alteration of flight patterns in order to maintain flight safety in the region. Current safety policies and procedures at Eglin and regional airports are designed to ensure that the potential for aircraft mishaps is reduced to the lowest possible level. These safety policies and procedures would continue under the JSF flight training and anticipated future actions at regional airports. Since the total number of military and commercial flights is likely to increase, it is expected that the number of bird strikes per year would similarly increase. However, the overall risk associated with bird-aircraft strikes is expected to remain low.

Solid Waste

Solid waste generation at Eglin AFB would increase due to the increased number of personnel and operations (i.e., range operations) as well as the construction, demolition, and renovation activities to support the JSF and 7SFG(A). These activities would have a cumulative impact to landfill capacity available within the region of influence (ROI). In addition, military project activities identified under the No Action Alternative and other actions being undertaken by civilian interests (identified in Section 9.1.3) will result in the generation of additional solid wastes requiring disposal. Due to the existing landfill capacity and number of landfills available within the vicinity, the overall cumulative impact with regard to available landfill capacity is anticipated to be minimal as sufficient capacity exists to provide for the disposal of solid wastes generated within the area for the foreseeable future. Although sufficient landfill capacity is available within

the area for the disposal of solid wastes associated with planned and ongoing activities, short term impacts may be realized depending upon the number of projects (planned and ongoing) utilizing an individual landfill. Short-term impacts may include the ability to schedule delivery of wastes for disposal at given landfills or longer turnaround time for trucks due to delays in unloading. Because it is not known which landfills are being utilized by any given project or activity, short-term impacts are identified as a potential but may not be realized depending upon the usage of individual landfills.

Reasonably foreseeable future actions identified for Eglin AFB and the region include construction, demolition and/or renovation of existing structures as discussed under the No Action Alternative and other actions (e.g., Regional Development) in this chapter. These projects would contribute to the available disposal capacity within the area as additional debris would be generated from these planned activities. Although it is not possible to accurately estimate the mass of waste associated with these projects with available information, several thousand tons of debris would be associated with the construction and demolition from these projects. This would result in an cumulative impact that would reduce the overall capacity of landfill space available within the area for the disposal of municipal solid and debris wastes.

Since most construction projects would likely be completed within a three- to -year timeframe, the increase in waste generation (construction debris) would be of short duration when compared to the remaining years of capacity available within existing landfills.

Hazardous Materials

Eglin AFB has developed programs and procedures to comply with all federal/state hazardous materials and hazardous waste management and reporting requirements. No cumulative impacts to hazardous material and hazardous waste management are anticipated.

The implementation of the ALARNG Master Plan for Cobb Training Site would involve munitions that contain hazardous chemicals in the form of explosives or propellants. There is potential for cumulative effects when these chemicals are examined in conjunction with the increased use of munitions under the 7SFG(A) range and JSF flight training proposed alternatives.

Many projects (past, present, and future) involve construction on various portions of Eglin AFB. Many environmental restoration program (ERP) sites are located throughout Eglin Main Base and the Eglin Range. Most of these sites have been designated “No Further Action” and as such would not be affected by construction or other activities in their vicinity. Regardless, development on or near any ERP sites would be coordinated with all applicable organizations/agencies.

Numerous present and future projects involve the demolition of existing buildings to make way for new facilities. Buildings constructed before 1989 or 1978 are likely to contain asbestos and/or lead-based paint, respectively, to some extent. Eglin has procedures in place if these are encountered and would use certified contractors to assist with removal and disposal. New buildings would not contain these materials, so there would be a cumulative net beneficial effect to the health and safety of military and civilian personnel working in these facilities.

Physical Resources

Soils

Changes to soils associated with the JSF IJTS cantonment and training would not substantially alter soils in the area. The Proposed Action, including facility construction, flight activities, and ground training are generally consistent with existing uses for Eglin Main Base and would not be expected to substantially affect the soils in these areas. At the JSF IJTS alternative locations, it is expected that minimal impacts would occur since much of the alternative locations are Urban Land; thus, the soil has already been impacted by the runway location and associated buildings.

Construction-related soil disturbance at multiple adjacent locations can have cumulative impacts. If the actions are concurrent, wind-borne eroded soil and transport through stormwater runoff can have cumulative impacts on water quality. Where the terrain slopes to greater than 12 percent, transport of soil as a result of stormwater is increased. Together with the potential expansion of the University of Florida REEF complex and MFH-related actions at the North Poquito Bayou location, soil disturbance from the 7SFG(A) cantonment construction would be adverse. The aforementioned construction activities would occur at locations that are primarily sandy. While sandy soils allow for rapid infiltration of water, they can also erode quite easily if situated on a steep slope. Some areas within the 7SFG(A) sites are very sloped (greater than 12 percent) such as along creeks and waterway, though most of the terrain throughout the alternative areas is relatively flat. Naturally forested areas in these locations would become deforested through construction activities. It is particularly important that BMPs for the 7SFG(A) locations be implemented in order to reduce potential cumulative impacts. These include silt fencing, hay bales, and wherever possible, seeding, so that soil/sediment runoff is slowed.

Water Resources

Stormwater runoff can adversely impact water resources, due to its ability to carry sediments and contaminants. Addition of impermeable surfaces (i.e., concrete, asphalt) would result in an increase in stormwater runoff. For the JSF IJTS alternatives, no impacts to water resources are expected since the alternative locations are already

developed. These areas currently have a large amount of impervious surfaces (such as current runway facilities) and stormwater treatment facilities already in place.

The 7SFG(A) alternatives lie within undeveloped areas which would require the removal of vegetation. Removal of vegetation as well as the construction of the cantonment area would expose soil to wind and stormwater, which could transport sediments to nearby surface waters. Stormwater transport is assisted by sloping, barren terrain. Sandy soils readily absorb stormwater, limiting its transport across the surface of the terrain. Most of the 7SFG(A) alternative areas are characterized by sandy soils and flat terrain, with slopes increasing only near streams or bayous found on or near some of the alternative sites. The addition of impervious surfaces within the cantonment areas would increase the amount of available stormwater. Other construction projects that also would increase stormwater have been proposed for areas around the 7SFG(A) Cantonment Alternative 1 areas. These projects include the construction of MFH around Poquito Bayou, a Veterans Administration Hospital, and expansion of the University of Florida REEF. Cumulatively, these projects could disturb through construction sloped areas near streams or bayous. Poquito and Garniers Bayous would potentially be affected. The sediment transport into these bayous and resulting changes to water quality may be perceived by the Florida Department of Environmental Protection (FDEP) as potentially adverse. The Army would obtain construction and stormwater permits as part of the action. As required by the FDEP, the Army would develop a comprehensive stormwater, erosion, and sedimentation control plan (or SWPPP) and implement site-specific management practices to control erosion.

If all projects include implementation of site-specific management actions and BMPs, it is unlikely that adverse cumulative impacts to water resources would occur.

Biological Resources

Localized loss of habitat, degradation of habitat, noise impacts, or direct physical impacts to species can have a cumulative impact when viewed on a regional scale if that loss or impact is compounded by other events with the same end result. Analysis of potential impacts has identified minimal potential for direct physical impacts or noise impacts to sensitive species, provided Eglin user groups implement management actions and regulatory requirements. Regionally and cumulatively, very few acres of sensitive habitat would be cleared for BRAC and other upcoming Eglin activities (less than 0.1 percent of Eglin land). Similar habitats exist on other portions of Eglin and on nearby public lands (e.g., Blackwater River State Forest, Conecuh National Forest); these areas would continue to be managed as high quality, significant habitats. Thus, on a regional scale, upcoming land clearing at Eglin would result in only a small reduction in sensitive habitats and would not be significant.

Eglin AFB has an estimated 400,000 acres of potential tortoise habitat, with the majority of it presently unoccupied. Up to 19 known active gopher tortoise burrows may be affected by direct land clearing. Due to the large amount of potential tortoise habitat on Eglin, relocation could easily occur; thus direct impacts to the gopher tortoise population would be minimal. Of more concern would be the loss of suitable acres of sandhills habitat on public land due to the rapid reduction in gopher tortoise habitat on surrounding private lands. Eglin currently serves as a relocation area for off-site tortoises, and the Florida Fish and Wildlife Conservation Commission (FWC) would like to continue to move tortoises to Eglin to preserve the species. Only one percent of Eglin's sandhills habitat would be cleared for upcoming Eglin activities, leaving many acres of potential tortoise habitat. Cumulatively, Eglin activities would not result in significant adverse effects to the gopher tortoise.

Eglin contains over 95 percent of Okaloosa darter streams (236 miles). Recognizing the importance of preventing excess sediment from reaching darter streams, Eglin is actively restoring darter streams and surrounding riparian areas to reduce sedimentation, thus promoting the recovery of the Okaloosa darter population. Eglin has sited new ranges and construction areas to avoid riparian areas, thus minimizing direct impacts and indirect sedimentation impacts. At most, land clearing and construction would potentially affect only a couple of miles of stream. Due to the importance of erosion control near Okaloosa darter streams, stream buffers would be maintained at all darter streams where upcoming clearing and construction would occur and appropriate erosion control measures would be employed during clearing and construction. Cumulatively, activities at Eglin would not result in notable adverse effects to the Okaloosa darter, and may actually result in overall improvements in the darter population through past, present, and future restoration activities.

Eglin AFB has the largest RCW population in the western portion of the Florida Panhandle, with 366 active clusters. Together with Blackwater River State Forest and Conecuh National Forest, there are over 400 active clusters in the western Florida Panhandle. Direct land clearing for BRAC and other past, present, and foreseeable projects would impact less than 0.1 percent of the 210,000 acres managed for RCWs on Eglin. Additionally, Blackwater and Conecuh maintain approximately 28,000 acres of foraging habitat, and are actively restoring additional acreage to create potential RCW habitat. Up to 17 inactive RCW trees may be cut for BRAC and 1 inactive tree for the ALARNG SARC; however, there are almost 4,300 inactive RCW trees on Eglin. Regionally, the loss of 18 inactive RCW trees and less than 200 acres of RCW foraging habitat would not significantly impact RCWs.

Although upcoming land clearing would directly affect only a small portion of Eglin (approximately one percent), far-reaching indirect impacts may occur due to increased mission activity (7SFG(A), JSF, and other user groups), new construction in previously undeveloped fire-dependent habitats, and continued development in the communities

surrounding Eglin. The primary cumulative impact to biological resources would be related to reductions in prescribed fire on Eglin. Multiple species, particularly the RCW, are dependent on fire to maintain quality habitat. The long-term effectiveness of alternate management techniques such as mechanical or chemical understory control is uncertain, but these techniques would be employed in foraging habitat and other high priority areas where prescribed burning was restricted. Due to the importance of the Eglin RCW population regionally (Eglin is a core population), reductions in quality foraging habitat may affect future growth potential because Eglin would not be able to put recruitment clusters in previously designated areas, delaying Eglin's population recovery. Also, Eglin would likely lose the ability to use a number of clusters as donors for translocation, which may affect not only the potential for Eglin's population to grow, but also other partners in the Southern Regional Translocation cooperative because Eglin may not be able to provide as many birds for translocation. Cumulatively, reductions in prescribed fire may negatively affect RCWs on Eglin through group isolation, habitat fragmentation, habitat degradation, and loss of foraging habitat, but group demography, population level, and recovery unit level would not be affected.

Impacts to certain biological resources from 7SFG(A) and JSF activities increase when viewed cumulatively with other activities occurring regionally and in the future (i.e., loss of gopher tortoise habitat regionally). In other cases, impacts decrease when viewed on a larger spatial and temporal scale (i.e., clearing of RCW foraging habitat). Although negative impacts would occur to some biological resources, overall, upcoming BRAC activities, in concert with other regional and upcoming future activities, would not threaten the continued existence of any biological resources; thus impacts would not be significant. Implementation of management actions, regulatory requirements, and an increase in Eglin AFB prescribed fire support would further reduce the potential for negative impacts to biological resources.

Cultural Resources

Damage to the nature, integrity, and spatial context of cultural resources can have a cumulative impact if the initial act is compounded by other similar losses or impacts. The alteration or demolition of historic structures and likewise the disturbance or removal of archaeological artifacts may incrementally impact the cultural and historic setting of Eglin AFB.

None of the Eglin range or region development projects discussed have been identified as contributing to cumulative impacts to archaeological resources. In terms of historic resources, the potential for Cold War Era military resources exists across most of Eglin AFB. If impacts to these resources are anticipated due to range activities, plans for the protection or mitigation of these resources must be developed by Eglin's Cultural Resources Branch in consultation with the State Historic Preservation Officer (SHPO)

and other consulting parties as appropriate. With the exception of the MFH planned action, no cantonment area activities have the potential to cumulatively impact cultural resources. The MFH Program includes the demolition, construction, and renovation of MFH units through implementation of the MFH Demolition, Construction, Renovation, and Leasing Program, otherwise known as MFH Privatization, at Eglin AFB and Hurlburt Field. Within the project area for MFH is one Historic District (Camp Pinchot) listed on the National Register of Historic Places (NRHP). If demolition of the Camp Pinchot Historic District would occur, this would result in the loss of one of Eglin's two Historic Districts and one of the last remaining historic structures of the Choctawhatchee National Forest in its formative period.

Within BRAC project alternative areas, there is one Historic District (Eglin Field) listed on the NRHP and one Historic District (SAC Alert) considered to be eligible for the NRHP. The individual structures within the Eglin Field and SAC Alert Historic Districts are not listed on the NRHP individually; they are listed inclusive of the District as a whole. Demolition of contributing resources without prior mitigation has the potential of affecting the District as a single resource. Demolition of structures within these Districts may result in the degradation of Eglin's Historic Districts.

If proper mitigation or protective measures are undertaken in consultation with the SHPO and other consulting parties within these aforementioned Historic Districts (Camp Pinchot, Eglin Field, and SAC Alert) to affected structures, no cumulative impacts are expected to this resource area.

9.2 OTHER ENVIRONMENTAL CONSIDERATIONS

9.2.1 Relationship Between Short-Term Uses and Long-Term Productivity

Construction, demolition, and renovation-related activities would result in a short-term use of resources. Long-term productivity impacts are determined by comparing the project's impacts against long-term regional and local planning objectives. Impacts are associated with land use changes, population increases, and the related traffic and socioeconomic factors. The short- and long-term effects of the Proposed Action and alternatives are summarized below.

Short-Term Uses

All alternatives would have minor short-term effects related to their construction activities through the use of construction-related materials, fuels, etc. The significant economic benefits created during construction in the form of jobs and the direct and

indirect demand for goods and services would offset the short-term use of the environment.

Long-Term Productivity

Long-term adverse impacts to productivity as a result of unmitigated short-term impacts and uses would include the following:

- Decreases in available recreational land on Eglin AFB (i.e., increased area closures – Sections 4.3, 5.3, 6.3, 7.4)
- Increased traffic in the local area (Sections 4.5, 6.5)
- Increased noise levels associated with the F-35 (Section 7.3)
- Increased demand for housing (Sections 4.4, 5.4, 6.4)
- Increased demand for utilities (Sections 4.6, 5.5, 6.6, 7.6)
- Increases in mobile air pollution sources (Sections 4.7, 5.6, 6.7, 7.7)

Long-term beneficial impacts to productivity would include the following:

- Overall support of the region's continued economic development through:
  - Creation of more jobs locally (Sections 4.4, 5.4, 6.4).
  - Increases in the tax base (Sections 4.4, 5.4, 6.4).
  - Increased revenues for local businesses (Sections 4.4, 5.4, 6.4).
  - Increased revenues for local utilities (Sections 4.6, 5.5, 6.6, 7.6).
  - Increased housing construction (Sections 4.4, 5.4, 6.4).

Short-Term Uses Versus Long-Term Productivity

The two- to three-year construction/demolition period for all alternatives would result in a short-term increase in employment, income, and net fiscal benefits and revenues to the surrounding community. Additionally, there would be a short-term increase in the amount of local building supplies needed to execute the project. It is not expected that the availability of these resources for other users would be reduced due to the small size of the project relative to the regional building industry.

Local short-term resource uses resulting from all alternatives would be consistent with the maintenance and enhancement of long-term productivity for the local communities and state and region; use of the Eglin Military Complex as a center of excellence for military testing and training is consistent with regional planning objectives, and Eglin's continued growth is beneficial and essential from an economic standpoint.

Many of the potential adverse impacts to long-term productivity are the result of short-term factors, which are often mitigated through planning aspects when implementing a proposed action and/or alternatives; traffic is one example. The Proposed Action and alternatives analyzed in this document would have immediate impacts to traffic in the short-term with long-term implications.

Typically, the Department of Defense (DoD) looks to normal civil highway programs to make highway improvements to defense installations because the installations generate major economic benefits. The Air Force, local planning agencies, and the Florida Department of Transportation (FDOT) would work to address transportation issues to ensure that long-term impacts would be mitigated through proper planning and design of local roadways and transportation infrastructure. The Defense Access Road (DAR) Program is one method for DoD to help pay for public highway improvements required as a result of sudden/unusual defense-generated traffic impacts. The challenge is accommodating Eglin's growth and the needs of the local community in a manner that is mutually beneficial. While there are potential adverse impacts to long-term productivity, many impacts can be mitigated, resulting in benefits to long-term productivity associated with local increases in employment, income, and net fiscal benefits and revenues that outweigh short-term impacts.

Consolidation of training facilities would use valuable resources in the short-term. However, consolidating facilities is a more efficient use of land area allowing for greater long-term productivity in the unused areas. Specifically, unused areas are available for other uses. Investment of resources in the short term for future productivity over the long term results in the need for fewer resources in the future to achieve the same level of productivity. As an example, by co-locating the JSF IJTS with the rest of the JSF Program, the need for excessive travel and related expenditure of fuel and other resources is minimized or eliminated. This savings in productivity over the long term would be realized through reduced energy consumption, more efficient land use, and reduced financial cost.

9.2.2 Irreversible and Irretrievable Commitment of Resources

The National Environmental Policy Act (NEPA) requires environmental analysis to identify any irreversible and irretrievable commitments of resources involved in the implementation of the Proposed Action or alternatives. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. *Irreversible* effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. *Irretrievable* resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

Implementing the Proposed Action through any of the alternatives would require a commitment of natural, physical, human, and fiscal resources. In all of these categories, irreversible and irretrievable commitments of resources would occur. Land required for new construction would be irreversibly committed during the functional life of the facilities; in some cases land uses would change from undeveloped to developed. Although it is possible for land to revert to its former state if the facilities were abandoned and destroyed, the likelihood of such an occurrence for established facilities would be low.

Considerable amounts of fossil fuels and construction materials, such as steel, cement, aggregate, and bituminous material, would be expended under the action alternatives. These physical resources should generally be in sufficient supply during the proposed project initiation, and their commitment to the project would not have an adverse effect on the resource's continued or future availability.

Some biological resources would be irreversibly and irretrievably lost with construction of the proposed project, and some areas of wildlife habitat would be lost. However, based on the size of the Eglin Complex compared to the amount of acreage that would be used for facilities, the loss would be minimal; sensitive habitat areas would be avoided to the extent practicable and impacts to sensitive species would be mitigated as discussed in the EIS.

In terms of human resources, labor would be used in preparation, fabrication, and construction of the project. Labor is generally not considered to be a resource in short supply, and commitment to the project would not have an adverse effect on the continued availability of these resources. Project construction would require a substantial expenditure of funds.

The proposed commitment of natural, physical, human, and fiscal resources is based on the requirements mandated by Congress through the BRAC Commission's recommendations. It is anticipated that businesses, employees, and residents of the local area would benefit from improved economics resulting from implementation of the Proposed Action.

10. LIST OF PREPARERS

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12. GLOSSARY OF TERMS

Affected Resource	Any resource that the proposed action may impact.
Aircraft Mock-ups	A full-sized scale model of a particular aircraft, used for demonstration, study, or testing.
Aircraft Operations	Flights and supporting operations that occur at a particular airfield.
Ambient Air Quality	The air quality surrounding a particular area.
Aquifer	An underground bed or layer of earth, gravel, or porous stone that yields water.
Asbestos	Either of two incombustible, chemical-resistant, fibrous mineral forms of impure magnesium silicate, used for fireproofing, electrical insulation, building materials, brake linings, and chemical filters.
Bonifay Loamy Sand	A strongly sloping soil in uplands, which is well-drained. The typical surface layer is very dark grayish brown and is roughly 7 inches in thickness. Loamy subsoil occurs at a depth of 40 inches or more and tends to be yellowish in color. Surface runoff is rapid but these soils generally hold a seasonal high water table from December to April. Bonifay soils are typically not well-suited toward crop cultivation.
Cantonment Area	An area where personnel are housed or routinely conduct work.
Corridor	An area of land, airspace, or water forming a passageway.
Cradle to grave	Occurring or persisting from beginning to end.
C-weighted decibels	When describing large amplitude impulsive sounds such as a clap of thunder, a gunshot, or an explosion, the actual total amount of acoustic energy created by the event is an important consideration. Sounds of this nature are normally measured on the "C-weighted" scale, which gives nearly equal emphasis to all frequencies, but suppresses the very low and very high bands. Values of C-weighted noise are shown in terms of C-weighted decibels (dBC).
Dorovan Muck	Clay-like soil that contains much organic matter from decomposed woody and herbaceous remains characterized by a very dark brown or almost black peat that sticks together when pressed.
Drop Zones	The area into which soldiers or supplies are parachuted from an aircraft.
Ecological Association	A complex of communities, which develops in accord with variations in physiography, soil, and successional history within the major subdivision of a biotic realm.
Ecosystem	An ecological community together with its environment, functioning as a unit.
Environmental Justice	The combination of social and environmental movements, which deals with the inequitable environmental burden born by groups such as racial minorities or economically disadvantaged groups.
Floodplains	A plain bordering a river and subject to flooding.
General Conformity Rule	Ensures that the actions taken by federal agencies in nonattainment and maintenance areas meet national standards for air quality.
Ground Maneuvers	Military missions conducted on the ground.
Halogenated Solvents	A substance that is treated with any of a group of five chemically related nonmetallic elements, including fluorine, chlorine, bromine, iodine, and astatine; that is capable of dissolving another substance.
Impervious Surface Areas	Areas that contain artificial structures, such as pavements and building roofs, which replace naturally pervious soil with impervious construction materials.

Interstitial Areas	The areas between test areas.
Lakeland Sands	The Lakeland series consists of very deep, excessively drained, rapidly permeable, strongly acidic soils that form in thick beds of eolian, fluvial, or marine sands on broad, nearly level to very steep uplands in the Lower Coastal Plain
Mitigate	To moderate (a quality or condition) in force or intensity; alleviate.
Potable Water	Water that is fit to drink.
Proponent	One who argues in support of something; an advocate.
Pyrotechnics	A mixture of chemicals which, when ignited, is capable of reacting exothermically to produce light, heat, smoke, sound or gas.
Receptors	Receivers of stimuli such as noise.
Revegetation	The process of replanting and rebuilding the soil of disturbed land.
Riparian	Of, on, or relating to the banks of a natural course of water.
Rutledge Fine Sand	Black to gray in color, very poorly drained, nearly level soils with a water table at or near the surface for long periods of time during the year. Rutledge soils occur in shallow, depression areas along ponds, streams, creeks and bays; thus, flooding is common. Typical surface layers are black sand, approximately 7 inches in thickness. Gray soils lie beneath this layer.
Sortie	An operational flight by a single aircraft from take-off through landing including performance of missions and training events.
Strafing	An attack of machine-gun or cannon fire from a low-flying aircraft.
Supersonic Corridor	A passage of restricted airspace in which aircraft may exceed the speed of sound.
Test Area	An area where military testing occurs.
Troup Sand	A moderately well-drained soil that forms in sandy and loamy marine sediments.
Understory	An underlying layer of vegetation, especially the plants that grow beneath a forest's canopy.
Uplands	Land or an area of land of high elevation, especially when level.
Urban Land	Of, relating to, or located in a city.
Warfighter	A person who fights in or plans a war; a military soldier or officer; a warrior.
Water Operations	Military training exercises and missions performed on the water.
Wetlands	Ecosystems that form transitional areas between terrestrial and aquatic components of a landscape. Typically they are shallow-water to intermittently flooded ecosystems, which results in their unique combination of hydrology, soils, and vegetation.