

FINAL



ENVIRONMENTAL ASSESSMENT

**INSTALLATION DEVELOPMENT AT
LACKLAND AIR FORCE BASE, TEXAS**

**United States Air Force
Air Education and Training Command
Lackland Air Force Base, Texas**

December 2006

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**FINDING OF NO SIGNIFICANT IMPACT AND
FINDING OF NO PRACTICABLE ALTERNATIVE
INSTALLATION DEVELOPMENT AT LACKLAND AIR FORCE BASE, TEXAS**

AGENCY: Department of the Air Force, 37th Training Wing, Lackland Air Force Base (AFB), Texas

BACKGROUND: The proposed action includes implementation of the Base Realignment and Closure (BRAC) Commission final recommendations, as well as other installation development activities based on the current Capital Improvements Program (CIP) for Lackland AFB. An Environmental Assessment (EA) was completed and is attached and incorporated by reference. It analyzed a proposed action to implement the requirements of the BRAC program and components of the CIP, the maximum potential development alternative, and the no action alternative.

SUMMARY OF FINDINGS: The categories of cultural resources (including archaeological and historic resources) and occupational health were eliminated from detailed analysis because development would not be permitted on cultural resource areas, and because contractors would be responsible for compliance with applicable *Occupational Safety and Health Act* regulations concerning occupational hazards for all employees, respectively. Direct, indirect, and cumulative impacts regarding noise, land use, earth resources, water resources, hazardous materials and wastes, biological resources, utilities and infrastructure, socioeconomics, and air quality were all analyzed. No significant impact will result as a result of the implementation of the requirements of the BRAC program and components of the CIP proposed action, the maximum potential development alternative, or no action alternative.

The conditions and characteristics anticipated under the no action alternative for each of the resources will continue at levels equal to those occurring under the existing condition. No significant environmental impacts are experienced or generated by the existing condition. Likewise, no environmental regulations are violated by the existing operating procedures. Therefore, no significant impacts will be expected for the no action alternative.

Demolition and construction activities in the vicinity of the proposed action locations will result in a minor temporary increase in noise levels. The proposed action is not expected to result in sustained significant noise impacts; potential cumulative impacts will increase noise slightly above baseline conditions. Demolition and construction noise impacts for the alternative action will be the same as for the proposed action. The alternative action includes a 15 percent increase in based aircraft operations; however, noise levels will remain below residential land use thresholds. The proposed action and alternative action both comply with the installation's land use plan; therefore, no impacts to land use are expected. Demolition and construction activities associated with the proposed action and the alternative action will require limited soil disturbances typical at construction sites and occur primarily in previously disturbed areas. Impacts to earth resources will be minimized by use of standard engineering practices.

Construction associated with the proposed action and the alternative action will increase impervious surfaces (and subsequently stormwater runoff) by an estimated 2 and 5 percent, respectively. Authorization to discharge under the Texas Pollutant Discharge Elimination System Construction Stormwater General Permit will be secured and Stormwater Pollution Prevention Plans will be prepared. Therefore, no significant adverse effects on surface water will be expected as a result of the proposed action or as a result of the alternative action. The proposed action and alternative action will both result in increased use of the Edwards Aquifer due to increased personnel, but this increase will not be significant. Neither the proposed nor alternative action will be expected to reduce water availability to existing users or degrade groundwater quality; therefore, neither the proposed action nor the alternative action will be expected to have an adverse effect on groundwater.

There may be asbestos and/or lead-based paint debris generated by the demolition projects associated with both the proposed action and the alternative action. Any such debris will be handled and disposed of

according to the guidelines established in the base's Hazardous Waste Management Plan; therefore, no adverse effects are expected as a result of hazardous debris generated by the proposed action or the alternative action. The construction and demolition associated with the proposed action will not significantly impact vegetation, wildlife reproduction, movement, or habitat. No threatened or endangered species are known to occur on the installation, and Lackland AFB could support the slight population increase resulting without impacting the continued existence of the eight federally listed species that occur in the Edwards Aquifer. Similarly, the alternative action is not expected to impact biological resources on Lackland AFB.

Minor cumulative impacts will be expected on stormwater utilities resources as a result of the increase in impervious cover associated with the proposed action. The remaining utility systems supporting the installation will be capable of supporting the increase in demand that will occur as a result of the proposed action. The alternative action will have slightly higher impacts on stormwater utilities and the remaining utilities; however, the impacts are still expected to be minor. There will be a slight beneficial impact on socioeconomics as a result of implementation of the proposed action or the alternative action. Potential impacts to air quality are not expected to be significant for the proposed action and the alternative action.

ENVIRONMENTAL JUSTICE: Activities associated with the proposed action will not impose adverse environmental effects on affected human populations. Therefore, no disproportionately high and adverse effects will occur to minority populations or low-income populations.

SUMMARY OF PUBLIC REVIEW AND INTERAGENCY COORDINATION: The Draft Environmental Assessment and Draft Finding of No Significant Impact were made available to the public for 30 days. All comments received were addressed in the Final EA. All activities addressed in the EA have been coordinated with the appropriate federal, state, and local agencies and have been found to comply with the criteria or standards of environmental quality.

FINDING OF NO PRACTICABLE ALTERNATIVE: Pursuant to Executive Order 11988, and taking the above information into account, I find that there is no practicable alternative to the proposed implementation of those seven proposed action projects sited within the floodplain described in the attached EA that includes all practicable measures to minimize harm to the existing environment. Overall, approximately 2.13 acres of impervious (impenetrable) cover will be added from the construction of the seven proposed facilities in the floodplain resulting in a minimal impact on the total volume of stormwater runoff.

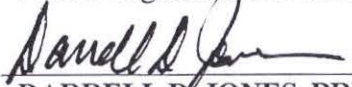

MARK A. POHLMEIER, COLONEL, USAF

The Civil Engineer

Headquarters Air Education and Training Command

20 Dec 06
Date

DECISION: Based on my review of the facts and analysis contained in this environmental assessment, I conclude the implementation of the proposed or alternative action will not produce significant impacts, either by itself or by considering cumulative impacts. Accordingly, the requirements of the National Environmental Policy Act, regulations promulgated by the President's Council on Environmental Quality, and 32 Code of Federal Regulations 989 are fulfilled and an environmental impact statement is not required.


DARRELL D. JONES, BRIGADIER GENERAL, USAF
Commander, 37th Training Wing
Lackland Air Force Base, Texas

JAN 05 2007
Date

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit	L _p	pressure level
µg/m ³	micrograms per cubic meter	LOS	level of service
µm	micrometer	LTA	Lackland Training Annex
37 TRW	37 th Training Wing	MCF/day	thousand cubic feet per day
AAM	Annual Arithmetic Mean	mgd	million gallons per day
AAQS	ambient air quality standard	MILCON	Military Construction
ac-ft	acre-feet	MOA	Memorandum of Agreement
ac-ft/yr	acre-feet per year	mph	miles per hour
AETC	Air Education and Training Command	MSA	Metropolitan Statistical Area
AFB	Air Force Base	msl	mean sea level
AFI	Air Force Instruction	NA	not applicable
AIHA	American Industrial Hygiene Association	NAAQS	National Ambient Air Quality Standards
AICUZ	Air Installation Compatible Use Zone	NEPA	National Environmental Policy Act
AOC	Area of Concern	NO ₂	nitrogen dioxide
AQCR	air quality control region	NO _x	nitrogen oxides
BA	Biological Assessment	O ₃	ozone
bgs	below ground surface	OSHA	Occupational Safety and Health Administration
BO	Biological Opinion	Pb	lead
BRAC	Base Realignment and Closure	PM _{2.5}	particulate matter equal to or less than 2.5 microns in aerodynamic diameter
CAA	Clean Air Act	PM ₁₀	particulate matter equal to or less than 10 microns in aerodynamic diameter
CFR	Code of Federal Regulations	ppm	parts per million
CIP	Capital Improvements Program	PSD	prevention of significant deterioration
CO	carbon monoxide	psi	pounds per square inch
CPS	CPS Energy	RCRA	Resource Conservation and Recovery Act
CWA	Clean Water Act	RH&T	Recruit Housing and Training
dB	decibel	ROI	region of influence
dba	A-weighted decibel	SAP	satellite accumulation points
DoD	Department of Defense	SAPA	San Antonio Port Authority
EA	Environmental Assessment	SAWS	San Antonio Water System
EAA	Edwards Aquifer Authority	SIP	State Implementation Plan
EAC	Early Action Compact	SO _x	sulfur oxides
EIS	Environmental Impact Statement	sq ft	square feet
EO	Executive Order	SWP3	Stormwater Pollution Prevention Plan
ERP	Environmental Restoration Program	TCEQ	Texas Commission on Environmental Quality
FAA	Federal Aviation Administration	TPDES	Texas Pollutant Discharge Elimination System
FONSI	Finding of No Significant Impact	tpy	tons per year
ft	foot	TXDOT	Texas Department of Transportation
HABS	Historic American Buildings Survey	US	United States
HAP	hazardous air pollutant	USACE	United States Army Corp of Engineers
HUD	Housing and Urban Development	USC	<i>United States Code</i>
IAAFA	Inter-American Air Force Academy	USEPA	United States Environmental Protection Agency
ISD	Independent School District	USFWS	United States Fish and Wildlife Service
KFA	Kelly Field Annex	VOC	volatile organic compound
L _{dn}	day-night average sound level	WWTP	Wastewater Treatment Plant
L _{eq}	equivalent sound level		

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Environmental Assessment

**Installation Development at
Lackland Air Force Base, Texas**

**Department of the Air Force
37th Training Wing
Lackland Air Force Base, Texas**

December 2006

Cover Sheet

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COVER SHEET

Responsible Agency: 37th Training Wing, Lackland Air Force Base (AFB), Texas.

Proposed Action: Installation Development for Lackland AFB, Bexar County, Texas.

Point of Contact: Mr. John Wildie, 37 CES/CEV, 1555 Gott Street, Lackland AFB, Texas 78236, 210-671-5337.

Report Designation: Final Environmental Assessment

Abstract: The proposed action is to implement the requirements of the Base Realignment and Closure (BRAC) program related to Lackland AFB and perform other installation development activities based on the current Lackland AFB Capital Improvements Program (CIP) to upgrade, replace, or supplement facilities. Conversely, the Air Force could select to take no action (no action alternative). The alternative action (the potential development alternative) is to develop the facilities on Lackland AFB to the maximum capability of the installation and conduct technical and flying operations at maximum sustainable levels. The following biophysical resources were identified for study at Lackland AFB: noise, land use, earth resources, water resources, hazardous materials and wastes, biological resources, utilities and infrastructure, socioeconomics, and air quality.

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Contents

CONTENTS

Page

Chapter 1 Purpose of and Need for Action.....	1-1
1.1 Purpose of and Need for Action	1-1
1.2 Location.....	1-2
1.3 Scope of the Environmental Review	1-2
1.4 Applicable Regulatory Requirements.....	1-3
1.5 Introduction to the Organization of the Document.....	1-3
1.6 Public Involvement Summary	1-4
Chapter 2 Description of Proposed Action and Alternatives	2-1
2.1 Introduction	2-1
2.2 History of the Formulation of Alternatives	2-1
2.3 Identification of Alternatives Eliminated from Consideration	2-1
2.4 No Action Alternative	2-2
2.5 Detailed Description of the Proposed Action	2-2
2.6 Potential Development (Alternative Action).....	2-4
2.6.1 Maximum Sustainable Population	2-4
2.6.2 Maximum Developable Acreage	2-16
2.6.3 Maximum Sustainable Flying Mission Levels	2-18
2.7 Past, Present, and Reasonably Foreseeable Actions in the Region of Influence...	2-19
2.7.1 Expansion of the Security Forces Officer Course and Security Forces Apprentice Course and Construction of a Mission Rehearsal Area.....	2-19
2.7.2 Upgrade of Existing and Construction of New Sanitary Sewer Lift Station ..	2-19
2.7.3 Construction of Munitions Transport Rest Area.....	2-19
2.7.4 Relocation of C-5 Formal Training Unit	2-19
2.7.5 Construction of Security Forces Operations Facility	2-20
2.7.6 Construction of Student Dormitories	2-20

2.7.7 Implementation of the Medina Regional Security Operations Center Community Plan	2-20
2.7.8 Outdoor Recreational Complex	2-20
2.7.9 Basic Military Training Demolition Projects Phase I	2-20
2.7.10 Basic Military Training Demolition Projects Phase II	2-20
2.7.11 Basic Military Training Demolition Projects Phase III	2-21
2.7.12 Basic Military Training Demolition Projects Phase IV	2-21
2.7.13 Construction of Kelly Parkway East of Lackland AFB	2-21
2.8 Comparison Matrix of Environmental Effects of All Alternatives	2-21
 Chapter 3 Affected Environment	 3-1
3.1 Introduction	3-1
3.2 Installation Location, History, and Current Mission	3-1
3.3 Description of the Affected Environment	3-3
3.3.1 Noise	3-3
3.3.1.1 Effects of Noise Exposure	3-5
3.3.1.2 Baseline Noise	3-5
3.3.1.3 Noise Complaints	3-8
3.3.2 Land Use	3-9
3.3.2.1 Existing Conditions	3-10
3.3.3 Earth Resources	3-11
3.3.3.1 Geology	3-11
3.3.3.2 Topography	3-11
3.3.3.3 Soils	3-14
3.3.4 Water Resources	3-15
3.3.4.1 Surface Water	3-15
3.3.4.2 Groundwater	3-16
3.3.5 Hazardous Materials and Wastes	3-17
3.3.5.1 Hazardous Materials	3-17
3.3.5.2 Hazardous Waste	3-18
3.3.5.3 Environmental Restoration Program	3-18
3.3.5.4 Lead-based Paint and Asbestos	3-18
3.3.6 Biological Resources	3-22
3.3.6.1 Vegetation and Wildlife	3-22
3.3.6.2 Threatened and Endangered Species	3-23
3.3.6.3 Wetlands	3-24
3.3.6.4 Floodplains	3-24
3.3.7 Utilities and Infrastructure	3-27
3.3.7.1 Electricity and Natural Gas	3-27

3.3.7.2 Potable Water	3-28
3.3.7.3 Solid Waste Management.....	3-29
3.3.7.4 Wastewater	3-30
3.3.7.5 Transportation.....	3-30
3.3.7.6 Drainage	3-31
3.3.8 Socioeconomics	3-32
3.3.8.1 Population.....	3-32
3.3.8.2 Housing	3-32
3.3.8.3 Education.....	3-32
3.3.8.4 Economy.....	3-33
3.3.9 Air Quality	3-34
3.3.9.1 Definition of the Resource	3-34
3.3.9.1.1 Federal Air Quality Standards	3-34
3.3.9.1.2 General Conformity	3-36
3.3.9.1.3 Stationary Source Operating Permits.....	3-37
3.3.9.2 Existing Condition.....	3-37
3.3.9.2.1 Climate.....	3-37
3.3.9.2.2 Regional Air Quality.....	3-38
3.3.9.2.3 Current Air Emissions	3-38
Chapter 4 Environmental Consequences	4-1
4.1 Introduction	4-1
4.2 Change in Current Mission.....	4-1
4.3 Description of the Effects of All Alternatives on the Affected Environment	4-1
4.3.1 Noise	4-1
4.3.1.1 Proposed Action	4-2
4.3.1.2 Alternative Action	4-3
4.3.1.3 No Action Alternative	4-4
4.3.1.4 Cumulative Impacts	4-4
4.3.1.5 Measures to Reduce Impacts.....	4-7
4.3.2 Land Use	4-7
4.3.2.1 Proposed Action	4-7
4.3.2.2 Alternative Action	4-7
4.3.2.3 No Action Alternative	4-8
4.3.2.4 Cumulative Impacts.....	4-8
4.3.2.5 Measures to Reduce Impacts.....	4-8
4.3.3 Earth Resources	4-8
4.3.3.1 Proposed Action	4-8
4.3.3.2 Alternative Action	4-9
4.3.3.3 No Action Alternative	4-9

4.3.3.4 Cumulative Impacts.....	4-9
4.3.3.5 Measures to Reduce Impacts.....	4-10
4.3.4 Water Resources	4-10
4.3.4.1 Surface Water	4-10
4.3.4.1.1 Proposed Action.....	4-10
4.3.4.1.2 Alternative Action	4-11
4.3.4.1.3 No Action Alternative.....	4-12
4.3.4.1.4 Cumulative Impacts	4-12
4.3.4.1.5 Measures to Reduce Impacts	4-12
4.3.4.2 Groundwater	4-13
4.3.4.2.1 Proposed Action.....	4-13
4.3.4.2.2 Alternative Action	4-13
4.3.4.2.3 No Action Alternative.....	4-13
4.3.4.2.4 Cumulative Impacts	4-13
4.3.4.2.5 Measures to Reduce Impacts	4-14
4.3.5 Hazardous Materials and Wastes	4-14
4.3.5.1 Proposed Action	4-14
4.3.5.2 Alternative Action	4-15
4.3.5.3 No Action Alternative	4-15
4.3.5.4 Cumulative Impacts.....	4-15
4.3.5.5 Measures to Reduce Impacts.....	4-16
4.3.6 Biological Resources	4-16
4.3.6.1 Proposed Action	4-16
4.3.6.1.1 Vegetation and Wildlife.....	4-16
4.3.6.1.2 Threatened and Endangered Species	4-16
4.3.6.1.3 Wetlands	4-17
4.3.6.1.4 Floodplains	4-17
4.3.6.2 Alternative Action.....	4-21
4.3.6.3 No Action Alternative	4-21
4.3.6.4 Cumulative Impacts	4-21
4.3.6.5 Measures to Reduce Impacts	4-21
4.3.7 Utilities and Infrastructure	4-21
4.3.7.1 Electricity and Natural Gas	4-22
4.3.7.1.1 Proposed Action.....	4-22
4.3.7.1.2 Alternative Action	4-22
4.3.7.1.3 No Action Alternative.....	4-23
4.3.7.1.4 Cumulative Impacts	4-23
4.3.7.1.5 Measures to Reduce Impacts	4-23
4.3.7.2 Potable Water	4-23
4.3.7.2.1 Proposed Action.....	4-23
4.3.7.2.2 Alternative Action	4-23
4.3.7.2.3 No Action Alternative.....	4-24
4.3.7.2.4 Cumulative Impacts	4-24

FINAL

Contents

Installation Development Lackland Air Force Base, Texas

4.3.7.2.5 Measures to Reduce Impacts	4-24
4.3.7.3 Solid Waste Management.....	4-24
4.3.7.3.1 Proposed Action.....	4-25
4.3.7.3.2 Alternative Action	4-26
4.3.7.3.3 No Action Alternative.....	4-26
4.3.7.3.4 Cumulative Impacts	4-26
4.3.7.3.5 Measures to Reduce Impacts	4-27
4.3.7.4 Wastewater	4-27
4.3.7.4.1 Proposed Action.....	4-27
4.3.7.4.2 Alternative Action	4-27
4.3.7.4.3 No Action Alternative.....	4-28
4.3.7.4.4 Cumulative Impacts	4-28
4.3.7.4.5 Measures to Reduce Impacts	4-28
4.3.7.5 Transportation	4-29
4.3.7.5.1 Proposed Action.....	4-29
4.3.7.5.2 Alternative Action	4-29
4.3.7.5.3 No Action Alternative.....	4-30
4.3.7.5.4 Cumulative Impacts	4-30
4.3.7.5.5 Measures to Reduce Impacts.....	4-31
4.3.7.6 Stormwater Drainage.....	4-31
4.3.7.6.1 Proposed Action.....	4-31
4.3.7.6.2 Alternative Action	4-31
4.3.7.6.3 No Action Alternative.....	4-31
4.3.7.6.4 Cumulative Impacts	4-31
4.3.7.6.5 Measures to Reduce Impacts	4-32
4.3.8 Socioeconomics	4-32
4.3.8.1 Proposed Action	4-32
4.3.8.2 Alternative Action	4-33
4.3.8.3 No Action Alternative	4-33
4.3.8.4 Cumulative Impacts.....	4-33
4.3.8.5 Measures to Reduce Impacts.....	4-33
4.3.9 Air Quality	4-33
4.3.9.1 Methodology	4-33
4.3.9.2 Proposed Action	4-34
4.3.9.2.1 Construction Emissions	4-34
4.3.9.2.2 Operational Emissions	4-36
4.3.9.2.3 Indirect Emissions	4-36
4.3.9.2.4 Total Emissions	4-36
4.3.9.3 Alternative Action	4-36
4.3.9.3.1 Construction Emissions	4-36
4.3.9.3.2 Operational Emissions	4-37
4.3.9.3.3 Indirect Emissions	4-38
4.3.9.3.4 Total Emissions	4-38

FINAL

*Installation Development
Lackland Air Force Base, Texas*

Contents

4.3.9.4 No Action Alternative	4-38
4.3.9.5 Cumulative Impacts.....	4-39
4.3.9.6 Measures to Reduce Impacts.....	4-39
 Chapter 5 List of Preparers	 5-1
 Chapter 6 Persons and Agencies Consulted.....	 6-1
6.1 Federal Agencies	6-1
6.2 State Agencies	6-1
 Chapter 7 References	 7-1
 APPENDICES	
A Public Notification and Interagency and Intergovernmental Coordination for Environmental Planning	
B Capability Analysis	
C Air Quality Calculations	
D Notice of Availability	

FIGURES	Page
Figure 1-1 Site Location Map	1-5
Figure 2-1 Locations of Proposed Action, Lackland Training Annex, Lackland Air Force Base, Texas	2-13
Figure 2-2 Locations of Proposed Action, Main Base and Kelly Field Annex, Lackland Air Force Base, Texas	2-14
Figure 2-3 Potentially Developable Parcels, Lackland Air Force Base, Texas	2-17
Figure 3-1 Typical A-weighted Sound Levels	3-4
Figure 3-2 Baseline Noise Contours, Lackland Air Force Base	3-7
Figure 3-3 Land Use, Lackland Air Force Base, Texas	3-13
Figure 3-4 Environmental Restoration Program and Area of Concern Site Locations Lackland Training Annex, Lackland Air Force Base, Texas	3-19
Figure 3-5 Environmental Restoration Program and Area of Concern Site Locations Lackland Main Base and Kelly Field Annex, Lackland Air Force Base, Texas	3-20
Figure 3-6 Wetlands and Floodplain Lackland Training Annex, Lackland Air Force Base, Texas	3-25
Figure 3-7 Wetlands and Floodplain Lackland Main Base and Kelly Field Annex, Lackland Air Force Base, Texas	3-26
Figure 4-1 Noise Contours with Sensitive Receptors Lackland AFB, Alternative Action	4-5

TABLES

	Page
Table 1-1 Potentially Required Federal Permit, License, or Entitlement	1-6
Table 2-1 Project List, Proposed Action	2-5
Table 2-2 Mission-Related Population Change, Proposed Action.....	2-15
Table 2-3 Maximum Developable Acreage, Alternative Action	2-18
Table 2-4 Summary of Environmental Effects	2-23
Table 3-1 Subjective Effects of Changes in Sound Pressure Level.....	3-3
Table 3-2 Current Daily Aircraft Operations at Lackland AFB	3-6
Table 3-3 Land Areas Exposed to Elevated Noise Levels Baseline Conditions.....	3-6
Table 3-4 Noise Exposure at Sensitive Receptors, Current Conditions.....	3-8
Table 3-5 Existing Land Use Categories and Acreage	3-10
Table 3-6 Stormwater Runoff by Basin	3-32
Table 3-7 Enrollment in School Districts near Lackland AFB	3-33
Table 3-8 Federal Ambient Air Quality Standards	3-35
Table 3-9 Baseline Emissions Inventory, AQCR 217	3-39
Table 3-10 Baseline Emissions Inventory, Bexar County	3-39
Table 4-1 Heavy Equipment Noise Levels at 50 Feet.....	4-3
Table 4-2 Projected Daily Aircraft Operations at Lackland AFB.....	4-4
Table 4-3 Land Areas Exposed to Elevated Noise Levels.....	4-4
Table 4-4 Noise Levels at Sensitive Receptors, Alternative Action.....	4-6
Table 4-5 Summary of Impervious Cover Impacts within 100-year Floodplain, Proposed Action	4-20
Table 4-6 Solid Waste Generation for Construction and Demolition Activities, Proposed Action	4-25
Table 4-7 Solid Waste Generation, Cumulative Impacts.....	4-28
Table 4-8 Levels of Service Classifications and Conditions	4-30
Table 4-9 Total Emissions, Proposed Action.....	4-35
Table 4-10 Total Emissions, Alternative Action	4-37

Chapter 1

Purpose of and Need for Action

CHAPTER 1

PURPOSE OF AND NEED FOR ACTION

The Commander, 37th Training Wing (37 TRW) proposes to implement the requirements of the Base Realignment and Closure (BRAC) program as it relates to Lackland Air Force Base (AFB), and perform other installation development activities based on the current Capital Improvements Program (CIP). This Environmental Assessment (EA) consists of seven chapters covering the purpose and need for the proposed action, a detailed description of the proposed action and alternatives, a discussion of baseline environmental conditions, the environmental analysis, a list of preparers, the agencies and individuals contacted, and the documents used for this EA. This chapter of the document presents the purpose of and need for the action, a description of the location, a description of the scope of the environmental review, an overview of environmental requirements, an introduction to the organization of this document, and a summary of public involvement.

1.1 PURPOSE OF AND NEED FOR ACTION

The Air Force must maintain the highest level of quality education and training for its force structure. Air Education and Training Command (AETC) is the Air Force's major command responsible for training and educating its personnel. Lackland AFB is known as the "Gateway to the Air Force" and is unique because it is the only Air Force basic training installation. All enlisted personnel begin their Air Force military service at Lackland AFB. Lackland AFB provides basic military, professional, technical, and English language training for the Air Force. Lackland AFB also provides training for members of the other branches of the armed forces, government agencies, and allied countries. The installation serves as a major mobility center for air expeditionary activities and is home to key associated organizations that are vital to national security.

Lackland AFB's ability to maintain heavily used and outdated facilities has been precluded by recent BRAC actions, which will result in increased activities at Lackland AFB. The purpose of this action is to upgrade, replace, or supplement facilities that have been in place over several years and no longer function as originally intended.

In accordance with the *National Environmental Policy Act* (NEPA) of 1969 (42 *United States Code* [USC] 4321-4347), Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 *Code of Federal Regulations* [CFR] §§ 1500-1508), and 32 CFR 989, the 37 TRW is preparing an EA that will consider the potential consequences to the human and natural environment that may result from the proposed installation development. 32 CFR 989 addresses Air Force implementation of NEPA and directs Air Force officials to consider the environmental consequences of any proposal as part of the decision making process.

The proposed action is necessary because there are currently shortfalls in availability of adequate facilities at Lackland AFB. The proposed action would provide the necessary facilities to efficiently accomplish the continuously evolving mission of the 37 TRW.

1.2 LOCATION

Lackland AFB is located in Bexar County in south-central Texas, approximately 8 miles southwest of downtown San Antonio, Texas. In 1995, the BRAC Commission recommended the closure of the adjacent Kelly AFB and realigned the runway and some Air Force functions to Lackland AFB. Subsequently, the main portion of the former Kelly AFB aircraft maintenance depot and logistics functions was closed, and the land and facilities were transferred to the San Antonio Port Authority (SAPA). Selected portions of the former base were realigned to Lackland AFB as the Kelly Field Annex in July 2001. Currently, Lackland AFB consists of the Main Base, Kelly Field Annex (KFA), and Lackland Training Annex (LTA) (also known as Medina Base) (Figure 1-1).

1.3 SCOPE OF THE ENVIRONMENTAL REVIEW

This EA identifies, describes, and evaluates the potential environmental impacts that may result from implementation of the BRAC program and the CIP (the proposed action), implementation of the potential development alternative (the alternative action), and the no action alternative. As appropriate, the affected environment and environmental consequences of the proposed action and alternatives may be described in terms of site-specific descriptions or regional overview. Finally, the EA identifies measures that would prevent or minimize environmental impacts.

The resources that could be impacted and will therefore be analyzed in the EA include noise, land use, earth resources, water resources, hazardous materials and wastes, biological resources, utilities and infrastructure, socioeconomics, and air quality. Assessment of safety and health impacts is not included in this document; all contractors would be responsible for compliance with applicable *Occupational Safety and Health Act* regulations concerning occupational hazards and specifying appropriate protective measures for all employees. A Memorandum of Agreement (MOA) between the Air Force and the Texas State Historic Preservation Officer was signed for Building 400 on Lackland Training Annex, a structure eligible for listing on the National Register of Historic Places. The MOA indicated Historic American Buildings Survey (HABS) documentation was suitable mitigation for demolition of the structure; the HABS was completed in August 2006 allowing the demolition of this structure without further consultation under Section 106. Therefore, cultural resources will not be evaluated further or discussed in this EA. However, this EA is not intended to replace any Section 106 consultation requirements; in cases when consultation has not been completed, no structures will be demolished without first consulting with the State Historic Preservation Officer.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the President on February 11, 1994. In the EO, the President instructed each federal agency to make “achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” The Federal Interagency Working Group on Environmental Justice defines ‘adverse’ as “having deleterious effects on human health or the environment that is significant, unacceptable, or above generally accepted norms.” Based on

analysis of impacts in this EA, a determination on significance of impacts will be made in a decision document. If anticipated impacts would be significant, either the Air Force would prepare an Environmental Impact Statement (EIS) or they would not implement the proposal. If impacts would not be significant, a Finding of No Significant Impact (FONSI) would be prepared. Accordingly, Environmental Justice will be addressed either in a FONSI or in a Record of Decision based on an EIS.

Other actions or potential actions both on and off the installation could contribute to cumulative impacts. The environmental impacts of these other actions are addressed in this EA only in the context of potential cumulative impacts, if any. A cumulative impact, as defined by the Council on Environmental Quality (40 CFR 1508.7), is the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

1.4 APPLICABLE REGULATORY REQUIREMENTS

Regulatory requirements potentially applicable to the proposed action and alternatives are presented in Table 1-1.

1.5 INTRODUCTION TO THE ORGANIZATION OF THE DOCUMENT

This EA is organized into seven chapters. Chapter 1 contains a statement of the purpose of and need for action, the location of the proposed action, a summary of the scope of the environmental review, identification of applicable regulatory requirements, and a description of the organization of the EA, and a public involvement summary.

Chapter 2 contains a brief introduction, a description of the history of the formation of alternatives, describes the alternatives eliminated from further consideration, provides a detailed description of the proposed action, identifies other action alternatives, summarizes other known actions for Lackland AFB, identifies mitigation requirements (if required), and provides a comparison matrix of environmental effects for all alternatives.

Chapter 3 contains a general description of the biophysical resources that potentially could be affected by the proposed action or alternatives. Chapter 4 is an analysis of the environmental consequences. Chapter 5 lists preparers of this document. Chapter 6 lists persons and agencies consulted in the preparation of this EA. Chapter 7 is a list of source documents relevant to the preparation of this EA.

Appendix A contains all correspondence to and from the public and regulatory agencies regarding the information included in this EA. The Capability Analysis on which the potential development alternative was based is included in Appendix B. Appendix C provides the air quality calculation spreadsheets.

1.6 PUBLIC INVOLVEMENT SUMMARY

On June 6, 2006, copies of the description of proposed action and alternatives were sent to seven regulatory agencies with accompanying letters requesting their review and comments (Appendix A). No comments were received from the regulatory agencies in response to the request for comments regarding the proposed action and alternatives. The Draft EA was placed in the San Antonio Main Library to provide public access to the document during the 30-day public comment period, which began on 29 October 2006 and ended on 28 November 2006. Notification of the 30-day public comment period that detailed the availability of the document for public review was made in both the San Antonio *Express-News* and *La Prensa* newspapers. Copies of the Draft EA with letters requesting review and comment were sent to eight regulatory agencies (Appendix A). No comments on the Draft EA were received from the public or from any of the regulatory agencies.

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Purpose of and Need for Action

*Installation Development
Lackland Air Force Base, Texas*

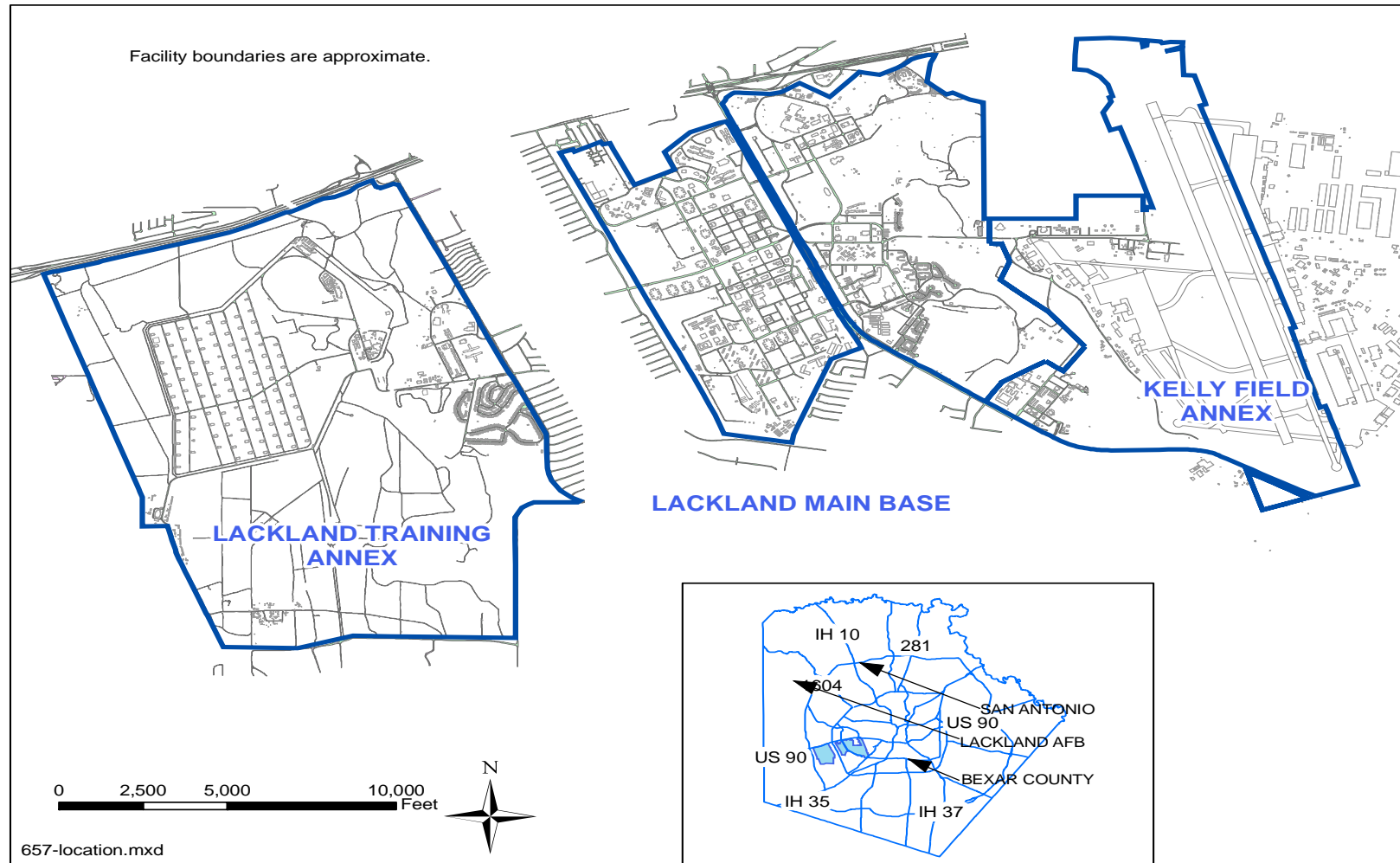


Figure 1-1 Site Location Map

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Purpose of and Need for Action

*Installation Development
Lackland Air Force Base, Texas*

Table 1-1 Potentially Required Federal Permit, License, or Entitlement

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Title V permit under the Clean Air Act (CAA)	<p>Sources subject to the Title V permit program include:</p> <p>Any major source:</p> <p>(1) A stationary source that emits or has the potential to emit 100 tons per year (tpy) of any pollutant (major source threshold can be lower in nonattainment areas),</p> <p>(2) A major source of air toxics regulated under Section 112 of Title III (sources that emit or have the potential to emit 10 tpy or more of a hazardous air pollutant or 25 tpy or more of any combination of hazardous air pollutants).</p> <p>Any “affected source” as defined in Title IV (acid rain) of the CAA.</p> <p>Any source subject to New Source Performance Standards under Section 111 of the CAA.</p> <p>Sources required to have new source or modification permits under Parts C [Prevention of Significant Deterioration (attainment areas)] or D [New Source Review (nonattainment areas)] of Title I of the CAA.</p> <p>Any source subject to standards, limitations, or other requirements under Section 112 of the CAA.</p> <p>Other sources designated by United States Environmental Protection Agency (USEPA) in the regulations.</p>	Title V of CAA, as amended by the 1990 CAA Amendments	USEPA; Texas Commission on Environmental Quality (TCEQ)
National Pollutant Discharge Elimination System permit	Discharge of pollutant from any point source into navigable waters of the United States.	§ 402 of Clean Water Act (CWA); 33 <i>United States Code</i> (USC), §1342	USEPA; TCEQ
CAA	Clean Air Act	USC	<i>United States Code</i>
CWA	Clean Water Act	USEPA	United States Environmental Protection Agency
TCEQ	Texas Commission on Environmental Quality	USFWS	United States Department of the Interior – Fish and Wildlife Service
tpy	tons per year		

FINAL

Purpose of and Need for Action

*Installation Development
Lackland Air Force Base, Texas*

Table 1-1, Continued

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Endangered Species Act § 7 consultation	Taking endangered or threatened wildlife species; engaging in certain commercial trade of endangered or threatened plants or removing such plants on property subject to federal jurisdiction.	§ 7 of Endangered Species Act, 16 USC § 1539; 50 Code of Federal Regulations 17 Subparts C, D, F, and G	United States Department of the Interior - Fish and Wildlife Service (USFWS), Texas Parks and Wildlife Department
Clean Water Act § 404 permit	Actions to reduce the risk of flood loss to minimize the impact of floods on human safety, health, and welfare; to restore and preserve the natural and beneficial values served by floodplains; actions to minimize destruction, loss, or degradation of wetlands; and to preserve and enhance the natural and beneficial values of wetlands.	Executive Orders 11988 and 11990, § 404 of CWA, 33 USC § 1251	United States Army Corps of Engineers, USFWS
CAA	Clean Air Act	USC	<i>United States Code</i>
CWA	Clean Water Act	USEPA	United States Environmental Protection Agency
TCEQ	Texas Commission on Environmental Quality	USFWS	United States Department of the Interior – Fish and Wildlife Service
tpy	tons per year		

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Purpose of and Need for Action

*Installation Development
Lackland Air Force Base, Texas*

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Chapter 2

Description of Proposed Action and Alternatives

CHAPTER 2

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter is composed of eight sections: an introduction, a brief history of the formulation of alternatives, identification of alternatives eliminated from further consideration, a detailed description of the proposed action, a detailed description of other action alternatives, a description of the no action alternative, a general description of other projects that may have the potential to impact the region when cumulative effects are considered, and a comparison matrix that summarizes the environmental effects of all alternatives.

2.2 HISTORY OF THE FORMULATION OF ALTERNATIVES

The alternatives that have been developed for the proposed action at Lackland AFB are meant to capture the range of possible development and activity levels at Lackland AFB, from the no action alternative to the potential development alternative. The Capability Analysis (Appendix B) projected an expansion of the current mission activity level to identify the maximum sustainable level, quantifying the maximum growth potential of Lackland AFB. Based on this analysis, three viable alternatives were identified:

- No Action Alternative – Continue use of existing facilities at Lackland AFB, and continue technical training and aircraft operations at the same level as is currently occurring.
- Proposed Action – Implement the BRAC program as it relates to Lackland AFB; implement construction to accomplish the CIP; demolition of facilities that are either dilapidated or in the footprint of proposed CIP construction.
- Potential Development Alternative – Develop facilities to the maximum capability of the installation as defined in the Capability Analysis (Appendix B) plus items in the proposed action and conduct technical and flying operations at maximum sustainable levels as quantified in the Capability Analysis.

2.3 IDENTIFICATION OF ALTERNATIVES ELIMINATED FROM CONSIDERATION

No additional alternatives were considered given that the three alternatives identified provide the full range of potential impacts: from no development (the no action alternative) to the maximum development potential of Lackland AFB (the alternative action).

2.4 NO ACTION ALTERNATIVE

Under the no action alternative, there would be no increase in personnel at Lackland AFB and there would be no construction or demolition accomplished in support of the CIP. This alternative would not allow Lackland AFB to accomplish congressionally mandated mission changes as a result of the 2005 BRAC findings. It would also limit the base's ability to conduct its mission successfully and to maintain wartime readiness and training.

2.5 DETAILED DESCRIPTION OF THE PROPOSED ACTION

Under the Proposed Action, the 37 TRW at Lackland AFB proposes to implement the requirements of the BRAC program as it relates to Lackland AFB, and perform other installation development activities based on the current CIP. The components of the CIP would include new building construction and alteration, replacement of old buildings, and demolition of selected existing facilities.

The implementation of the BRAC program would consist of the construction of 486,800 square feet of new space and the construction of 100,000 square feet of pavements. 30,700 square feet of facilities would be demolished, and 323,350 square feet of existing space would be vacated (no related demolition). New construction (and in some cases, related demolition) would be required to accommodate the following BRAC-related gaining missions and to accommodate relocating missions: Common Delivery of Installation Services Administrative Center, Air Force Center for Environmental Excellence, Air Force Real Property Agency, Air Force Outreach Program Office, Dental Clinic, Air Force Medical Support Agency, Air Force Medical Operations Agency, Other Medical Administrative Support Agencies, Intelligence Operations Center, and Recreational Vehicle and Boat Storage.

Existing facilities (the basement, first, second, and fourth floors of the Wilford Hall Medical Center) would be renovated to accommodate the Ambulatory Care Center, a gaining mission. Existing facilities would be vacated, but not demolished, as the following losing missions are completely or partially relocated: Apprentice and Craftsman Traffic Management Courses under Transportation Management Flight, Base Level F-110 Intermediate Maintenance (Air National Guard), Vacate Munitions Facility, Lackland Air Force Base Correctional Facility, Culinary Management Training

The Lackland AFB CIP includes the construction of 3,275,922 square feet of new space and the construction or upgrade of 1,141,970 square feet of pavements. Approximately 824,332 square feet of facilities would be demolished, and 174,100 square feet of existing space would be vacated (no related demolition). Approximately 365,120 square feet of pavements would also be demolished. Major components of the CIP include projects supporting the Recruit Housing and Training Replacement Plan,

which has the goal of consolidating basic training activities (including housing, training, and support activities) in a pedestrian campus. Construction of a Military Working Dogs campus that would support the training of military working dogs for all branches of Department of Defense (DoD) is also a component of the CIP. The CIP projects on Kelly Field Annex are necessary to upgrade roadways that are currently impassable during flood events, rendering portions of the installation inaccessible. Construction of the Security Hill CIP projects would create a campus composed of secure facilities. A consolidated training facility focusing on outdoor training would be constructed by the Lackland Training Annex CIP projects.

Although the majority of the facilities addressed under the proposed action would not be located within the 100-year floodplain, several projects would be constructed in the floodplain.

The replacement and construction of the three bridges and Range Road above the floodplain are necessary to alleviate current flooding issues:

- Construction and replacement of two new elevated bridges over Leon Creek at Kelly Drive that would be built above the 100-year floodplain contour of Leon Creek. The construction of a new Hall Street bridge would be built above the 25-year floodplain contour.
- Upgrade of Range Road (the road would be raised to meet the 25-year floodplain contour).

Several projects are located in outdoor areas currently in the floodplain. The following projects provide upgrades to current facilities that would take advantage of these facilities:

- Completion of the Kelly Field Golf Course Outdoor Recreational Area (no new facilities would be constructed during the conversion of the existing traditional 18-hole golf course).
- Construction of a parking lot to support the 1.5-mile running track (no new facilities would be constructed during the addition of the parking area).
- Construction of a 0.5-mile addition to the existing 1-mile clay running track (no new facilities would be constructed during the addition to the running track).

The following projects include demolition and construction in the floodplain at two existing facilities to support current mission requirement in the immediate area, reducing the safety hazards associated with transporting students between classroom and training facilities:

- Construction of a new Combat Arms and Crew Service facility to support like training missions in a central area.

- Construction of an addition to Building 468 to ensure adequate space would be available for the increase in students associated with the Military Working Dog Handler Course.

All programmed projects with identified locations (including major construction, minor construction, and pavement projects) are summarized in Table 2-1. Figures 2-1 and 2-2 show the project construction and demolition locations with environmental constraints identified.

The implementation of the BRAC program would consist of a change in population based on gaining and losing missions at Lackland AFB. The relocation of missions would result in a net change of approximately 117 additional personnel. Table 2-2 summarizes BRAC mission-related population changes.

2.6 POTENTIAL DEVELOPMENT (ALTERNATIVE ACTION)

The alternative action consists of the development of Lackland AFB to its maximum potential. This alternative action is based on the maximum development potential quantified in the Lackland AFB Capability Analysis (Appendix B) plus the CIP and BRAC projects included in the proposed action.

The maximum development potential (through the planning period of 2011) was determined in the Capability Analysis as follows: (1) calculated maximum available land, (2) determined basis for sustainable population growth through the end of the planning period, (3) evaluated maximum developable land and sustainable populations with respect to potentially limiting factors such as potable water resources and other utility system resources, and (4) evaluated noise environment surrounding the Lackland AFB airfield and training airspace to determine the maximum growth potential for the flying mission.

2.6.1 Maximum Sustainable Population

Lackland AFB currently supports a baseline population of approximately 41,726 military, military dependent, student, and civilian personnel. Based on an analysis of potential land use and new facilities including administrative, training, and housing structures (see Appendix B), it has been determined that the base could accommodate an additional 6,484 working personnel (military and civilian), 4,020 students, and 1,211 resident dependents, resulting in a projected population of 53,441.

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-1 Project List, Proposed Action

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
RECRUIT HOUSING AND TRAINING (RH&T) REPLACEMENT PLAN						
1	Reconstruct Airman Gate/Valley Hi Gate (Main Base)	CIP	107,500 pavement 1,000 building	65,000 pavement 1,000 building		Gate would be being upgraded to new anti-terrorist force protection standards. A guard shack/visitors' center of approximately 1,000 square feet would be constructed, and approximately 107,500 square of pavement would be replaced (2007).
2	300-room Student Dormitory/Tech Training (Main Base)	CIP	202,400 building 108,000 pavement	38,200		Construct 202,400-square foot facility with 108,000 square feet of associated roadways. The facility would consist of one four-story student dormitory, Tech Training facility, and associated parking area. Prior to construction of the new facility, an estimated 38,200 square feet of demolition (Buildings 10656 and 10650) would occur (2009).
3	Relocation of the Apprentice and Craftsman Traffic Management Courses under Transportation Management Flight (losing mission) (Main Base)	BRAC			60,550	Approximately 60,550 square feet of building space located in portions of Buildings 10800, 10900, and 10902 currently housing tech training classrooms, high bay tech training facilities, and tech training support would be vacated. There would be no demolition associated with the off-site relocation of this mission (2007-2011).
4	RH&T Reception Center (Main Base)	CIP	66,982 building 145,000 pavement	100,000 pavement	29,600	Vacate Building 2246 and construct a 66,982-square foot facility to support the Basic Military Training mission (2010). Approximately 145,000 square feet of pavements (parade drill pad, associated parking, and new pedestrian troop walks would be constructed along with the demolition of approximately 100,000 square feet of roads.
5	RH&T Warehouse (Drum and Bugle) (Main Base)	CIP	24,000			Construct a 24,000-square foot warehouse to support the Drum and Bugle Corps (2010).
BRAC	Base Realignment and Closure					
CIP	Capital Improvements Program					
MILCON	Military Construction					
RH&T	Recruit Housing and Training					

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
RECRUIT HOUSING AND TRAINING (RH&T) REPLACEMENT PLAN						
6	RH&T Complex (Main Base)	CIP				The RH&T Complex would be constructed to consolidate basic training and basic trainee housing in a campus setting to eliminate the need for transportation of basic trainees to educational facilities.
	2008		385,635 building 294,620 pavement	246,575 building 187,120 pavement		The FY2008 phase of the project would include the construction of one 231,895-square foot dormitory, a 66,822-square foot central kitchen and auditorium, and an 86,916-square foot satellite kitchen and classrooms. The outdoor/recreation component of the project would include the construction of two 36,250-square foot running tracks/exerciser pads, two 67,500-square foot drill pads/war skills pads, and two baseball fields comprising 87,120 square feet. The demolition portion of the project would include the demolition of Buildings 6146, 6149, 6150, 6151, 6152, 6163, 6351, 6659, 7012, 7206, 7214, 9020, 9028, 9030, 9034, 9038, 9050, 9060; 100,000 square feet of outdoor facilities such as drill pads and tracks; and two baseball fields that total 87,120 square feet (2008).
	2009		231,895 building 220,500 pavement	13,000 pavement		The FY2009 phase of the project would include the construction of one 231,895-square foot dormitory. The outdoor/recreation component of the project would include the construction of two 36,250-square foot running tracks/exerciser pads, two 67,500-square foot drill pads/war skills pads, and three tennis courts comprising 13,000 square feet. The demolition portion of the project would include the demolition of three tennis courts that total 13,000 square feet (2009).
	2010		550,708 building	197,657 building		The FY2010 phase of the project would include the construction of two 231,895-square foot dormitories and an 86,916-square foot satellite kitchen and classrooms. The demolition portion of the project would include the demolition of Buildings 9210 and 6359 (2010).
	2011		550,708 building 103,750 pavement	179,220 building		The FY2011 phase of the project would include the construction of two 231,895-square foot dormitories and an 86,916-square foot satellite kitchen and classrooms. The outdoor component of the project would include the construction of a 36,250-square foot running track/exerciser pad and a 67,500-square foot drill pad/war skills pad. The demolition portion of the project would include the demolition of Building 9310 (2011).
BRAC	Base Realignment and Closure					
CIP	Capital Improvements Program					
MILCON	Military Construction					
RH&T	Recruit Housing and Training					

FINAL

Description of Proposed Action and Alternatives

Installation Development
Lackland Air Force Base, Texas

Table 2-1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
RECRUIT HOUSING AND TRAINING (RH&T) REPLACEMENT PLAN						
7	RH&T Troop Overpass - Truemper and Barnes (Main Base)	CIP	11,000			Construct an 11,000-square foot troop overpass to provide access to the Basic Military Training support areas. This would be the final pedestrian overpass to be constructed, and would allow pedestrian access throughout the RH&T Complex campus area (2005).
8	Basic Military Training Admin Support & Military Training Instructor Training Center (Main Base)	CIP	30,000			Construct 30,000-square foot administrative facility. This center would help replace administrative office space displaced by the new RH&T Complexes (2011).
9	Expand Base Library (Main Base)	CIP	6,000			Construction of 6,000-square foot addition. The addition would alleviate crowding due to expanding service and customer usage (2006).
MILITARY WORKING DOGS CAMPUS						
10	Construct Military Working Dogs Campus Roadway and Training Surface (Main Base)	CIP	360,150			Construct 360,150 square feet of roadway and training surfaces. This construction would support the safe movement of dogs through the training campus (2011).
11	Construct Military Working Dogs 747 Aircraft Training Fuselage (Main Base)	CIP	12,600 Fuselage			Construct foundation footing to support a 747 fuselage. The fuselage would be approximately 12,600 square feet in size. The foundation footing would only be required at landing wheel locations. This effort would support the Transportation Administration training of dogs (2006).
BRAC	Base Realignment and Closure					
CIP	Capital Improvements Program					
MILCON	Military Construction					
RH&T	Recruit Housing and Training					

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
ADMINISTRATIVE AREA						
12	Common Delivery of Installation Services Administrative Center (gaining mission) (Main Base)	BRAC	52,400	15,000		Construct 52,400-square foot multi-story facility and demolish Buildings 5450 and 5460 totaling 15,000 square feet. This center would be constructed to consolidate common installation support facilities (2008).
13	Headquarters Administrative Center Air Force Center for Environmental Excellence (gaining mission) Air Force Real Property Agency (gaining mission) Air Force Outreach Program Office (gaining mission) (Main Base)	BRAC	148,400			Construct 148,400-square foot multi-story facility that would include administrative support space, a special compartmented information facility, general storage, and associated parking areas. This center would be constructed to house relocating missions (2009).
14	Dental Clinic-BRAC (gaining mission) (Main Base)	BRAC	15,000	15,700		Construct 15,000-square foot dental clinic and associated parking over the existing footprint of B3550. Approximately 15,700 square feet of demolition would be associated with B3550. This facility would support a consolidated oral surgery residency training program (2009).
15	Dental Clinic-MILCON (Main Base)	CIP	60,000	33,700		Construct a 60,000-square foot facility to provide dental services. Buildings 3662, 3664, 3744, 3746, and 3748 would be demolished. Approximately 33,700 square feet of demolition would be associated with the project (2009).
16	Ambulatory Care Center (gaining mission) (Main Base)	BRAC	184,000 (Renovation)			Renovate 184,000 square feet of the basement, first, second, and fourth floors of the Wilford Hall Medical Center. The ambulatory center would support the delivery of health care services (2007-2011).
BRAC Base Realignment and Closure CIP Capital Improvements Program MILCON Military Construction RH&T Recruit Housing and Training						

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
ADMINISTRATIVE AREA						
17	Medical Administrative Center Air Force Medical Support Agency (gaining mission) Air Force Medical Operations Agency (gaining mission) Other Medical Administrative Support Agencies (gaining mission) (Main Base)	BRAC	46,600			Construct 46,600-square foot single-story facility that would include administrative support space, general storage, and associated parking areas.
KELLY FIELD ANNEX						
18	Construct/Replace Two New Elevated Bridges at Leon Creek. The bridges are located at Kelly Drive. The other bridge is located at Hall Street and Leon Creek. (Main Base; Kelly Field Annex)	CIP	9,200	6,200		Demolition of 6,220 square feet of both existing bridges and construction of 9,200 square feet of bridges. The Kelly Drive bridge would be built above the 100-year floodplain line of Leon Creek. The Hall Street bridge would be built above the 25-year floodplain line. Both projects would require raising the roads above the associated flood line. Current conditions prevent access between Security Hill, the flightline, and Lackland Main Base during flood events. Both projects are within the 100-year floodplain (2010).
19	Base Level F-110 Intermediate Maintenance (Air National Guard) (losing mission) (Kelly Field Annex)	BRAC			14,400	Vacate 14,400 square feet. Approximately one-third of the mission would be relocated (2007).
BRAC	Base Realignment and Closure					
CIP	Capital Improvements Program					
MILCON	Military Construction					
RH&T	Recruit Housing and Training					

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
KELLY FIELD ANNEX						
20	Upgrade Range Road (Kelly Field Annex)	CIP	90,000			Approximately 60,000 square feet of pavement would be replaced, and approximately 30,000 square feet of gravel roadway would be paved during the upgrade of the Range Road to bring it above the 25-year floodplain. This part of the project is sited in the 100-year floodplain. The project is necessary to provide on-base access to Security Hill during flood events. Project is near several capped Environmental Restoration Program sites (2008).
21	Kelly Field Golf Course Outdoor Recreational Area (Kelly Field Annex)	CIP				Convert the existing traditional 18-hole golf course into a Frisbee golf course, paintball course, bicycle motocross course, and general outdoor recreational area with amenities. No new facilities would be constructed. Part of this project is sited in the floodplain (2008).
SECURITY HILL						
22	Air Force Information Warfare Center (Security Hill)	CIP	205,000		117,500	Construct a new 205,000-square foot complex to accommodate the entire Air Force Information Warfare Center. The location would be west of Security Hill. This project would require the cleanup of the former skeet range. Approximately 117,500 square feet of building space would be vacated (Buildings 171, 178, and 179) (2011).
23	33rd Information Operations Squadron (Security Hill)	CIP	65,600			Construct 65,600-square foot facility. The complex would be constructed to consolidate and accommodate various missions located at other facilities on base (2008).
24	Cryptologic Systems Group Administration Support (Security Hill)	CIP	53,000			Construct 53,000-square foot facility. The complex would be constructed to consolidate and accommodate various missions located at other facilities on base (2011).
25	Intelligence Operations Center (68th Information Operations Squadron and 710th Information Operations Flight) (gaining mission) (Security Hill)	BRAC	40,400			Construct a 40,400-square foot single-story facility that would include administrative support space, a special-compartmented information facility area, general storage, and associated parking areas and roadways. This project would require the cleanup of the former skeet range. An alternate site would be chosen if no BRAC funding is received (2009).
BRAC	Base Realignment and Closure					
CIP	Capital Improvements Program					
MILCON	Military Construction					
RH&T	Recruit Housing and Training					

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
LACKLAND TRAINING ANNEX						
26	Demolish Abandoned Shop at Building 400 (Lackland Training Annex)	CIP		10,500		Building 400 (a 10,500-square foot facility) would be demolished, but the concrete foundation would remain in place for use as a missile launch mockup for training. An Memorandum of Agreement between the Air Force and the Texas State Historic Preservation Officer was signed for Building 400, a structure eligible for listing on the National Register of Historic Places. The MOA allowed the demolition of the structure without further consultation under Section 106 (2006).
27	Construct Parking Lot to support 1.5-mile Running Track (Lackland Training Annex)	CIP	10,500			Construct 10,500-square foot parking area. This project is sited in the floodplain (2007).
28	Construct Army and Air Force Exchange Service Mini-mall (Lackland Training Annex)	CIP	150,000	5,980		Construct 150,000-square foot mini-mall, to include such services as barbershop, cleaners, Army-Air Force Exchange Service convenience store, bank, service station, etc. (2007).
29	Construct 0.5-mile Addition to Existing 1-mile Clay Running Track (Lackland Training Annex)	CIP				The existing 1.0-mile clay running track would be extended by approximately 0.5 mile (15,900 square feet of clay track). Part of the running track addition is sited in the 100-year floodplain (2007).
30	Career Enlisted Aviator Center of Excellence (gaining mission) (Lackland Training Annex)	CIP	9,200	105,300		Construct 9,200-square foot facility. Building 147 and 150 would be demolished (approximately 105,300 square feet). Students would be consolidated from five other buildings on the base (2006).
31	Basic Expeditionary Airmen Skills Training Management (Lackland Training Annex)	CIP	167,350			Construct 167,350 square feet of facilities. Facilities consist of 48 tent pads, tornado shelter, instructors' observation tower, restroom facilities, airstrip (constructed of base material). Utilities (water, sewer, and upgraded electrical service) would be provided to the area (2008).
32	Confidence Course (Lackland Training Annex)	CIP	150,000 pavement 5,144 building			Construct 21 obstacles within 150,000 square feet of paved lanes. 5,144 square feet of support facilities would be constructed (2007).
BRAC	Base Realignment and Closure					
CIP	Capital Improvements Program					
MILCON	Military Construction					
RH&T	Recruit Housing and Training					

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
LACKLAND TRAINING ANNEX						
33	Recreational Vehicle and Boat Storage (gaining mission) (Lackland Training Annex)	BRAC	100,000 (pavement)			Construct a 100,000-square feet of parking storage area paved with base material to provide additional space to accommodate increased use of the facility (2007).
34	Vacate Munitions Facility (losing mission) (Lackland Training Annex)	BRAC			210,400	Vacate 67 munitions storage facilities totaling 210,400 square feet (2007).
35	Lackland Air Force Base Correctional Facility (losing mission) (Lackland Training Annex)	BRAC			16,000	Vacate Buildings 180, 181, 183, and 187 totaling 16,000 square feet due to the relocation of the correctional facility off base (2008).
36	Culinary Management Training (losing mission) (Lackland Training Annex)	BRAC			22,000	Vacate 22,000 square feet due to the relocation of the facility off base (2010).
37	Relocation of Combat Arms and Crew Service (Lackland Training Annex)	CIP	27,000		27,000	Vacate 27,000-square foot facility on Main Base and construct replacement 27,000-square foot facility on the Lackland Training Annex. This project is sited in the floodplain (2011).
38	Building 468 (Lackland Training Annex)	CIP	3,450			Construct a 3,450-square foot addition to Building 468 to meet increased training production requirements for the Military Working Dog Handler Course. Building 468 is located in the 100-year floodplain (2007).
Total			3,762,722 (building space) 1,241,970 (pavements)	855,032 (building space) 365,120 (pavements)	497,450	
BRAC Base Realignment and Closure CIP Capital Improvements Program MILCON Military Construction RH&T Recruit Housing and Training						

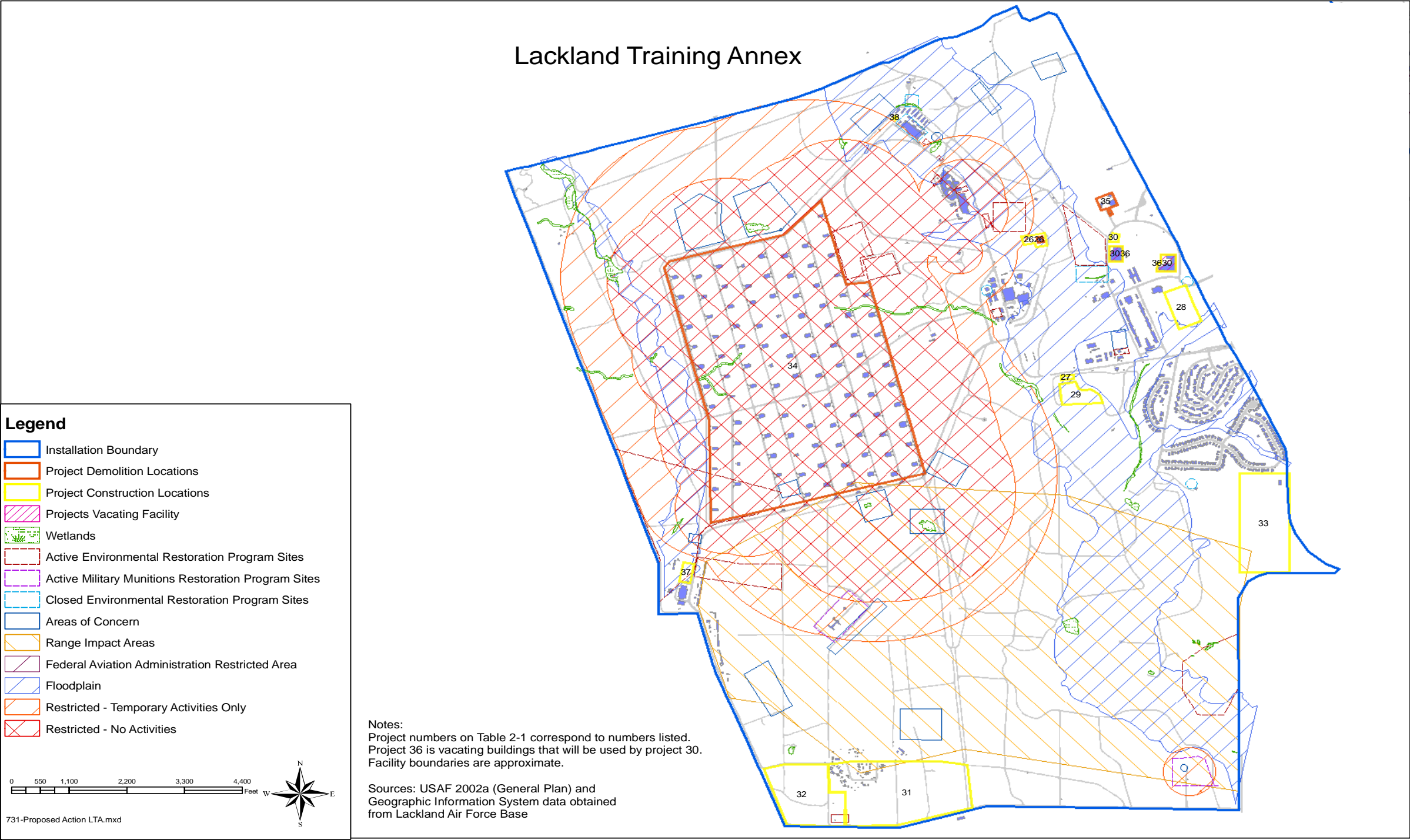


Figure 2-1 Locations of Proposed Action, Lackland Training Annex, Lackland Air Force Base, Texas

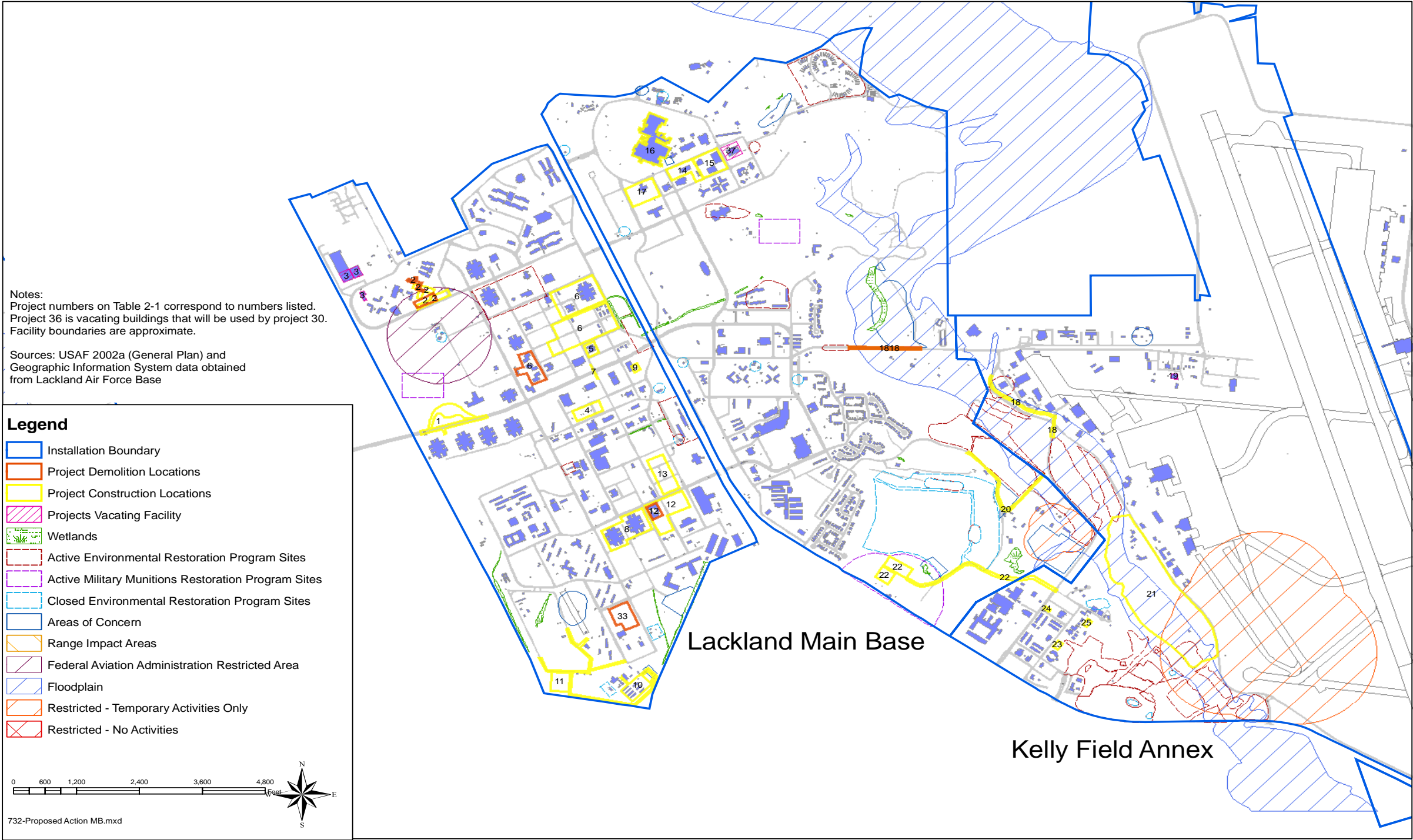


Figure 2-2 Locations of Proposed Action, Main Base and Kelly Field Annex, Lackland Air Force Base, Texas

FINAL

Description of Proposed Action and Alternatives

*Installation Development
Lackland Air Force Base, Texas*

Table 2-2 Mission-Related Population Change, Proposed Action

Project Number	Description/Location	Personnel	Support Personnel	Average Daily Student Load
NA	Wilford Hall	-4,000	0	0
3	Relocation of the Apprentice and Craftsman Traffic Management Courses under Transportation Management Flight (losing mission) (Main Base)	-13	-2	0
12	Common Delivery of Installation Services Administrative Center (gaining mission) (Main Base)	250	16	0
13	Headquarters Administrative Center Air Force Center for Environmental Excellence (gaining mission) Air Force Real Property Agency (gaining mission) Air Force Outreach Program Office (gaining mission) (Main Base)	448 173 149	36 7 0	0 0 0
16	Ambulatory Care Center (gaining mission) (Main Base)	2,000	0	0
17	Medical Administrative Center Air Force Medical Support Agency (gaining mission) Air Force Medical Operations Agency (gaining mission) Other Medical Administrative Support Agencies (gaining mission) (Main Base)	202	15	0
19	Base Level F-110 Intermediate Maintenance (Air National Guard) (losing mission) (Kelly Field Annex)	-5	0	0
Note: Project number is associated with the project number listed in Table 2-1. NA not applicable				

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-2, Continued

Project Number	Description/Location	Personnel	Support Personnel	Average Daily Student Load
25	Intelligence Operations Center (68th Information Operations Squadron and 710th Information Operations Flight) (gaining mission) (Security Hill)	158	12	0
30	Career Enlisted Aviator Center of Excellence (gaining mission) (Lackland Training Annex)	51	4	16
31	Basic Expeditionary Airmen Skills Training Management (Lackland Training Annex)	0	0	1,000
34	Vacate Munitions Facility (losing mission) (Lackland Training Annex)	-99	-8	0
35	Lackland Air Force Base Correctional Facility (losing mission) (Lackland Training Annex)	-17	-1	0
36	Culinary Management Training (losing mission) (Lackland Training Annex)	-57	-7	-211
Total		-760	72	805
Total Change in Population based on Proposed Action		117		
Note: Project number is associated with the project number listed in Table 2-1. NA not applicable				

2.6.2 Maximum Developable Acreage

Based on an analysis of the existing and future land use plans and eliminating parcels that have building constraints associated with them, there are 83 individual parcels totaling 523 acres of land available for development (Figure 2-3). Table 2-3 identifies acreage per land use category that has been identified as developable. Based on the current development ratios per land use category, the square footage of building and pavements that can be accommodated within these developable areas can be estimated. As shown by the calculations in Appendix B, Lackland AFB can accommodate an additional 3,666,829 square feet of building space, with an accompanying 57 acres (2,482,929 square feet) of pavements, which would include roadways, sidewalks, and parking areas. To determine the total building space and impervious cover for the alternative action, these maximum development values are combined with those associated with the proposed action (3,762,722 square feet of building space and 1,241,970 square feet of impervious cover), resulting in 7,429,551 square feet of building space and 3,724,899 square feet of impervious cover for the alternative action.

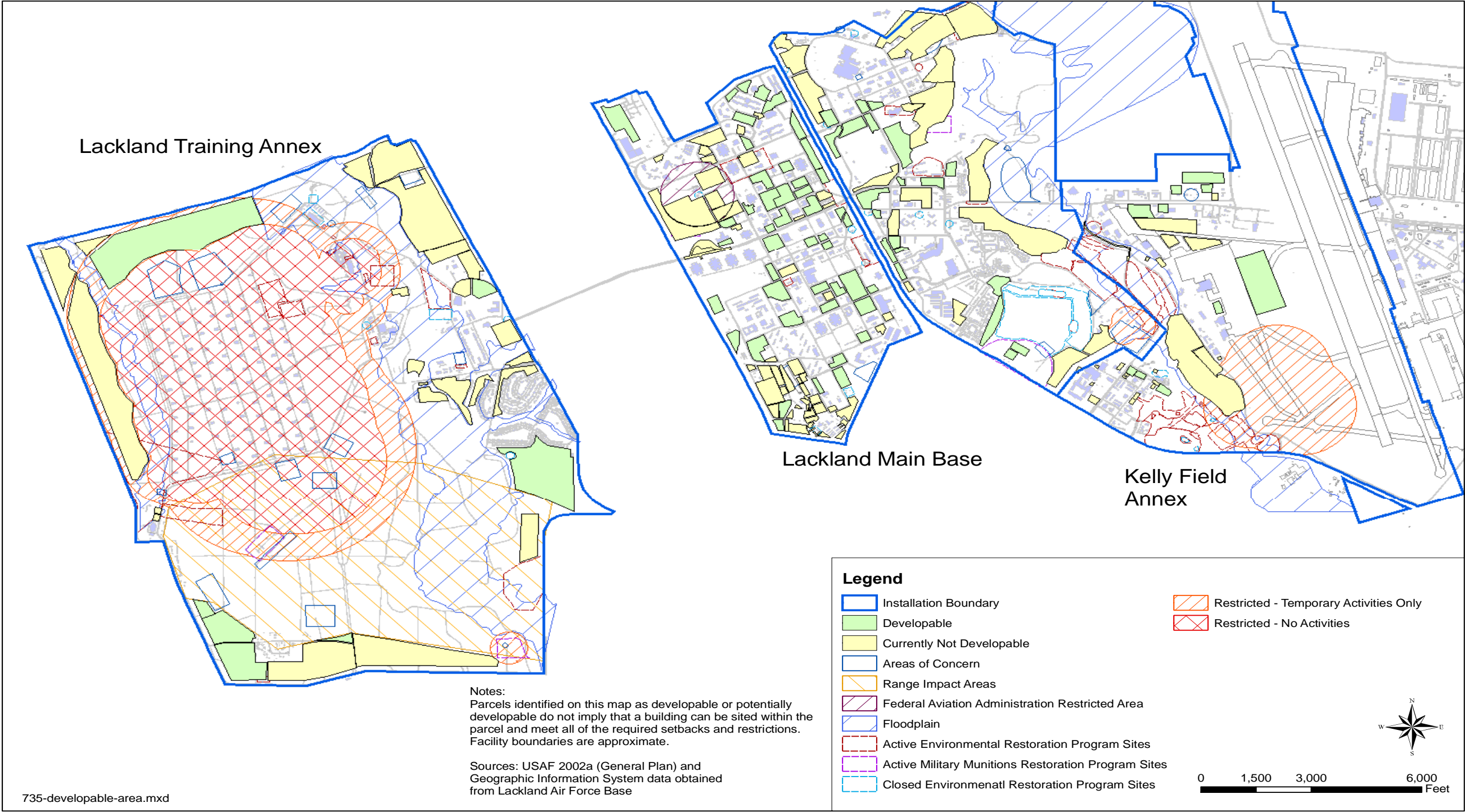


Figure 2-3 Potentially Developable Parcels, Lackland Air Force Base, Texas

Table 2-3 Maximum Developable Acreage, Alternative Action

Land Use Category	Total (acres)	Undevelopable Parcel (acres) ¹	Developable Parcel (acres)
Administrative	51	4	47
Aircraft Maintenance	0	0	0
Airfield Open Areas	0	0	0
Airfield Pavements	35	0	35
Community - Commercial	43	25	18
Community - Services	15	12	3
Housing - Accompanied	19	0	19
Housing - Unaccompanied	51	24	27
Industrial	41	9	32
Medical	10	10	0
Open Space	642	403	239
Outdoor Recreation	97	84	13
Training - Indoor	31	15	16
Training - Outdoor	393	319	74
Total	1,428	905	523
¹ Appendix B presents the individual constraint(s) associated with each undevelopable parcel.			

2.6.3 Maximum Sustainable Flying Mission Levels

Lackland AFB currently supports approximately 146,816 aviation operations annually. To assess the potential for the expansion of C-5 and F-16 operations at Lackland AFB, C-5 and F-16 flights were incrementally increased and evaluated (Appendix B). The resulting noise levels were assessed using the Federal Aviation Administration (FAA) Regulations codified in 14 CFR § 150.21(d) (1):

- Capacity would be reached when a previously compatible land use became incompatible.
- Capacity would be reached when noise levels measured at any one location, where the current land use is incompatible to the existing noise level, increases by more than 1.5 decibel.

These criteria are met when levels of operations conducted by based aircraft are increased by 15 percent. This equates to performing approximately 160,023 annual or 467 daily operations at the installation. Air operations analysis is documented in Appendix B.

2.7 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS IN THE REGION OF INFLUENCE

Cumulative impacts to environmental resources result from the incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects in the region of influence. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, or local) or individuals. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the near future is required. Past actions, both those on and within the region of influence (ROI), are included in the baseline conditions. Specific projects that have the potential to cumulatively impact activities at Lackland AFB, both on and within the ROI, are described in the sections below.

2.7.1 Expansion of the Security Forces Officer Course and Security Forces Apprentice Course and Construction of a Mission Rehearsal Area

Under this proposed project, the Air Force would extend the current 60-day Security Forces Officer Course to 78 days and the current 51-day Security Forces Apprentice Course to 81 days. The average daily student load would increase by 125 students, and permanently assigned personnel would increase by 70. Additionally, the Air Force would construct approximately 150,000 square feet of new facilities including a Mission Rehearsal Area consisting of a Mock City, Mock Airfield, and Mock Weapons Storage Area in the northeast corner of the LTA (USAF 2004a).

2.7.2 Upgrade of Existing and Construction of New Sanitary Sewer Lift Station

An existing sanitary sewer lift station would be upgraded and a new sanitary sewer lift station would be constructed to support the proposed Mission Rehearsal Area on LTA (USAF 2004a).

2.7.3 Construction of Munitions Transport Rest Area

The Air Force would construct a rest stop area for munitions transport truckers to park and rest between arrivals and departures (approximately 10,000 square feet of pavement and 2,000 square feet of facilities). The rest stop area would be located near the existing munitions storage area on the LTA (USAF 2004a).

2.7.4 Relocation of C-5 Formal Training Unit

The Air Force is proposing to relocate the C-5 formal training program from Altus AFB, Oklahoma to Lackland AFB. The proposed relocation was addressed in the *Environmental Impact Statement for the Relocation of the C-5 Formal Training Unit from Altus Air Force Base, Oklahoma to Lackland Air Force Base, Texas* (USAF 2005a). Approximately

110,420 square feet of new construction is associated with the project and an approximate increase of 320 personnel.

2.7.5 Construction of Security Forces Operations Facility

The proposed Security Forces Operations Facility is planned to be a 33,000-square feet single-story facility on Lackland Main Base within the boundaries of the overpass at Southwest Military Drive, Bong Avenue, Kelly Drive, and Kenly Avenue. Construction is planned for 2008. The current Security Forces buildings would be demolished. No changes in personnel are anticipated (USAF 2005a).

2.7.6 Construction of Student Dormitories

Lackland AFB proposes to construct two student dormitories on LTA in 2008 and 2009. Each dormitory building would be three stories and have 200 rooms to hold 400 students. The new buildings would each be approximately 110,000 square feet (USAF 2005a).

2.7.7 Implementation of the Medina Regional Security Operations Center Community Plan

The Medina Regional Security Operations Center Community Plan involves the replacement of several failing facilities (approximately 110,000 square feet of construction), an increase of 341 personnel, improved antenna reception capabilities, military formation and recreation areas, and the establishment of Heritage Park. The total timeline for this action is from 2003 to 2012. The Medina Regional Security Operations Center is in LTA (USAF 2005a).

2.7.8 Outdoor Recreational Complex

This project involves the replacement of four baseball fields with new fields. One baseball field from KellyUSA and three fields from Lackland AFB would all be consolidated into one area near the radar tower. Lights from the field would not shadow the radar location at the new site. The baseball complex would encompass approximately 2,300 square feet.

2.7.9 Basic Military Training Demolition Projects Phase I

Phase I Basic Military Training Demolition Projects includes the demolition of Buildings 6146, 6147, 6148, 6149, 6150, 6152, 6236, 6239, 6351, 6359, 6475, and 6659. Approximately 86,700 square feet of building space is associated with the 12 buildings. All of the buildings were built in the 1940s and 1950s. Any materials considered hazardous would be disposed of according to *Resource Conservation and Recovery Act* (RCRA) regulations prior to any demolition activities.

2.7.10 Basic Military Training Demolition Projects Phase II

Phase II Basic Military Training Demolition Projects includes the demolition of Buildings 9020, 9050, and 9060. Approximately 168,700 square feet of building space is

associated with the three buildings. All of the buildings were built in the 1960s. Any materials considered hazardous would be disposed of according to RCRA regulations prior to any demolition activities.

2.7.11 Basic Military Training Demolition Projects Phase III

Phase III Basic Military Training Demolition Projects includes the demolition of Buildings 6329 and 6629. Approximately 32,350 square feet of building space is associated with the two buildings. Any materials considered hazardous would be disposed of according to RCRA regulations prior to any demolition activities.

2.7.12 Basic Military Training Demolition Projects Phase IV

Phase IV Basic Military Training Demolition Projects includes the demolition of Building 6275, the Old Basic Military Training Squadron. Approximately 220,900 square feet of building space is associated with the building. Any materials considered hazardous would be disposed of according to RCRA regulations prior to any demolition activities.

2.7.13 Construction of Kelly Parkway East of Lackland AFB

The proposed Kelly Parkway would be east of Lackland AFB, between KellyUSA and KellyUSA East (the privatized portions of former Kelly AFB and East Kelly AFB). The parkway would extend approximately 8.8 miles (approximately 3,000,000 square feet of pavements) from United States (US) Highway 90 on the north end to State Highway 16 in southwest San Antonio, Bexar County, Texas. The Kelly Parkway is a component of the SAPA's strategy to support economic development and provide efficient mobility and safe access into and around KellyUSA by 2006 (USAF 2005a).

2.8 COMPARISON MATRIX OF ENVIRONMENTAL EFFECTS OF ALL ALTERNATIVES

Table 2-4 summarizes the impacts of the proposed and alternative actions. No significant impacts are expected from either the proposed or the alternative action. The impacts for the no action alternative are the same as baseline conditions.

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Description of Proposed Action and Alternatives

*Installation Development
Lackland Air Force Base, Texas*

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Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-4 Summary of Environmental Effects

Resource	No Action Alternative	Proposed Action	Alternative Action
Noise	Same as for baseline conditions as presented in Section 3.3.1.2. Cumulative impacts to sensitive receptors for the no action alternative action and ongoing actions would not occur.	Acreage in the vicinity of Lackland Air Force Base (AFB) exposed to a day-night average sound level of 65 A-weighted decibels or higher would not change. Cumulative impacts to sensitive receptors for the proposed and ongoing actions are not expected.	About 1,893 acres of land exposed to elevated noise levels (greater than 65 A-weighted decibels) at Lackland AFB would be added under the alternative action. Cumulative impacts to sensitive receptors for the proposed and ongoing actions are not expected.
Land Use	Same as for baseline conditions as presented in Section 3.3.2. Cumulative impacts to land use for the no action alternative action and ongoing actions would not occur.	The land on which the projects currently occur would be recategorized (as necessary) to accommodate the new facilities based on the future land use plan. Cumulative impacts to land use are not expected.	Impacts to land use would be the same as for the proposed action. Cumulative impacts to land use are not expected.
Earth Resources	Same as for baseline conditions as presented in Section 3.3.3. Cumulative impacts to earth resources from the no action alternative and ongoing actions are not expected.	Soil disturbance impacts would be minimized through observance of Texas Pollutant Discharge Elimination System requirements. The amount of impervious cover would increase by 5 percent. Cumulative impacts to earth resources from the proposed and ongoing actions are not expected.	Soil disturbance impacts would be minimized through observance of Texas Pollutant Discharge Elimination System requirements. The amount of impervious cover would increase by 13.7 percent. Cumulative impacts to earth resources from the alternative and ongoing actions are not expected.
Water Resources	Same as for baseline conditions as presented in Section 3.3.4. Cumulative impacts to water resources from the no action alternative and ongoing actions are not expected.	The construction of the proposed facilities would add 87 acres of impervious (impenetrable) cover at Lackland AFB. This is expected to have a minimal impact on the total amount of impervious cover (5 percent) and on the total volume of storm water runoff (2 percent). The construction associated with the proposed action and addition projects at Lackland AFB ongoing actions are expected to cumulatively increase surface cover.	The construction of the proposed facilities would add 228 acres of new impervious (impenetrable) cover at Lackland AFB. This is expected to have a minor impact on the total amount of impervious cover (13.7 percent) and on the total volume of storm water runoff (5 percent). The construction associated with the alternative and ongoing actions are expected to cumulatively increase surface cover.
Hazardous Materials and Hazardous Waste	Same as for baseline conditions as presented in Section 3.3.5. Cumulative impacts to hazardous materials, hazardous waste, asbestos, and lead-based paint are not expected from the no action alternative and ongoing actions.	Hazardous materials consumption and hazardous waste generation would increase under the proposed action. Increased regulation would not occur. Lead-based paint and asbestos, if encountered, would be managed and disposed according to existing plans and procedures. Cumulative impacts to hazardous materials, hazardous waste, asbestos, and lead-based paint are not expected from the proposed and ongoing actions.	Hazardous materials consumption and hazardous waste generation would increase under the alternative action. Increased regulation would not occur. Lead-based paint and asbestos, if encountered, would be managed and disposed according to existing plans and procedures. Cumulative impacts to hazardous materials, hazardous waste, asbestos, and lead-based paint are not expected from the alternative and ongoing actions.

FINAL

Description of Proposed Action and Alternatives

Installation Development Lackland Air Force Base, Texas

Table 2-4, Continued

Resource	No Action Alternative	Proposed Action	Alternative Action
Biological Resources	<p>Same as for baseline conditions as presented in Section 3.3.6.</p> <p>Cumulative impacts to biological resources from the no action alternative and ongoing actions are not expected.</p>	<p>Measurable impacts to vegetative resources would not occur. No impacts to wildlife resources would occur. The proposed action would have no impact on federal and state listed endangered and threatened species, as they are not known to occur on or near Lackland AFB. The construction activities associated with the proposed action would not occur in wetland areas. Seven projects associated with the proposed action would be located within or adjacent to the 100-year floodplain.</p> <p>The proposed and ongoing actions would not contribute to cumulative impacts on biological resources.</p>	<p>Same as for the proposed action.</p> <p>The alternative and ongoing actions would not contribute to cumulative impacts on biological resources.</p>
Utilities and Infrastructure	<p>Same as for baseline conditions as presented in Section 3.3.7.</p> <p>Cumulative impacts to infrastructure and utilities from the no action alternative and ongoing actions are not expected.</p>	<p>The quantity of wastewater generated would increase 3 percent, potable water consumption would increase by 3 percent, electricity and natural gas demand would increase by 18 percent, and about 315 tons per year (tpy) of solid waste would be generated from the addition of personnel at Lackland AFB. A one-time generation of approximately 16,089 tons of solid waste would result from construction and demolition activities. Impervious cover at Lackland AFB would increase by 87 acres. Additional vehicles would pass through the main gate each day; however, slight impacts to transportation would be expected.</p> <p>Cumulative impacts to infrastructure and utilities are not expected from implementation of proposed and ongoing actions.</p>	<p>The quantity of wastewater generated would increase 33 percent, potable water consumption would increase by 33 percent, electricity and natural gas demand would increase by 33 to 45 percent, and 4,224 tpy of solid waste would be generated from the addition of personnel at Lackland AFB. A one-time generation of 25,122 tons of solid waste would result from construction activities.</p> <p>Cumulative impacts to infrastructure and utilities are not expected from implementation of alternative and ongoing actions.</p>
Socioeconomics	<p>Same as for baseline conditions as presented in Section 3.3.8.</p> <p>Cumulative impacts to socioeconomics resulting from the no action alternative and ongoing actions are not expected.</p>	<p>The proposed construction activities would be in line with previous years' construction budgets and would generate an economic benefit for the local community. Slight benefits would result from the increased construction and demolition projects to the local economy.</p> <p>Cumulative impacts to socioeconomics resulting from the implementation of the proposed action and ongoing actions are not expected. Slight benefits would result from the increased construction and demolition projects.</p>	<p>Same as for the proposed action.</p> <p>Cumulative impacts to socioeconomics resulting from the implementation of the alternative and ongoing actions are not expected. Slight benefits would result from the increased construction and demolition projects.</p>
Air Quality	<p>Same as for baseline conditions as presented in Section 3.3.9.</p> <p>The cumulative emissions of all pollutants would be less than 10 percent of the regional inventory; therefore, the no action alternative would not significantly impact air quality.</p>	<p>Emissions of all pollutants would be less than 10 percent of the regional inventory within AQCR 217; therefore, the proposed action would not significantly impact air quality.</p> <p>The cumulative emissions of all pollutants would be less than 10 percent of the regional inventory; therefore, the proposed and ongoing actions would not significantly impact air quality.</p>	<p>Same as for the proposed action.</p> <p>The cumulative emissions of all pollutants would be less than 10 percent of the regional inventory; therefore, the alternative and ongoing actions would not significantly impact air quality.</p>
AFB Air Force Base AQCR Air Quality Control Region tpy tons per year			

Chapter 3

Affected Environment

CHAPTER 3

AFFECTED ENVIRONMENT

The affected environment is the baseline against which potential impacts caused by the proposed action are assessed. This chapter focuses on the human environment that has the potential to be affected by the proposed implementation of the BRAC program as it relates to Lackland AFB, construction to accomplish the CIP, and demolition of facilities that are either dilapidated or in the footprint of the proposed CIP construction. As stated in 40 CFR §1508.14, the human environment potentially affected is interpreted comprehensively to include the natural and physical resources and the relationship of people with those resources. The approach to defining the environmental baseline was to first identify potential issues and concerns of the proposed action, as discussed in Section 4.0. From this information, the relevant resources are described.

3.1 INTRODUCTION

This chapter provides baseline data for the man-made and natural environmental elements that could potentially be affected by the proposed action and alternatives at Lackland AFB. Information is presented in this section to the level of detail necessary to support the analysis of potential impacts in Chapter 4, Environmental Consequences.

3.2 INSTALLATION LOCATION, HISTORY, AND CURRENT MISSION

Lackland AFB Main Base is located about 8 miles southwest of the center of downtown San Antonio and the LTA is located one mile to the west of the main base and is separated from it by Loop 410. The total acreage of Lackland AFB is approximately 9,525 acres (USAF 2004b).

The Main Base portion of Lackland AFB was once part of Kelly Field and was used as a bombing range in the 1920s and 1930s. However, in June 1942, the War Department separated the two installations and established what in 1947 would be known as Lackland AFB. The newly formed installation was then named the San Antonio Aviation Cadet Center. Starting with only 62 structures, the base grew quickly to support the war effort. After 1946, Lackland AFB became the primary installation for basic Air Force training and for military indoctrination of officer candidates. In July 1947, the installation was named in honor of Brigadier General Frank D. Lackland, who established the original aviation cadet reception and training center at Kelly Field. Through the 1950s and 1960s, Lackland AFB's training capacity was tested through support of the Korean and Vietnam wars. With a surge of new recruits, dormitories and tent cities were quickly constructed to accommodate the volume of students. Lackland AFB's training mission was further cemented during the 1990s in support of Desert Storm, and then again with the relocation of the Inter-American Air Forces Academy (IAAFA) from Homestead AFB (USAF 2004c).

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Known as the “Gateway to the Air Force,” Lackland AFB is the home of the 37 TRW and tenant organizations. Lackland AFB has four primary training missions that graduate approximately 75,000 students annually. These training missions include:

- Providing basic military training for civilian recruits entering the Air Force, Air National Guard, and the Air Force Reserve.
- Conducting courses in basic support functions.
- Providing English language training for international students.
- Conducting professional, operations, and management training in Spanish to military forces and government agencies from Latin American and Caribbean nations (USAF 2004c).

These training missions are accomplished by six organizations including:

- 37th Training Group – technical training;
- 737th Training Group – basic military training;
- Defense Language Institute, English Language Center – English language training;
- IAAFA – training to international students;
- 37th Logistics Group – supply, contracting, and transportation services; and
- 37th Support Group – base-operating support.

In addition to the primary training functions accomplished on base, Lackland AFB hosts 11 major non-training tenant organizations. These organizations provide various functions in support of the Air Force mission and include:

- 59th Medical Wing, Wilford Hall Medical Center,
- 820th Security Forces Group,
- Medina Regional Signal Intelligence Operations Center,
- 651st Munitions Squadron,
- 369th Recruiting Group,
- 93rd Intelligence Squadron,
- Air Education and Training Command “Band of the West,”
- 433rd Airlift Wing,
- 149th Fighter Wing,
- Air Intelligence Agency, and
- Cryptologic Systems Group (USAF 2004c).

3.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.3.1 Noise

Noise is usually defined as unwanted sound, a definition that includes both the psychological and physical nature of the sound as defined by the American Industrial Hygiene Association (AIHA) (AIHA 1986). Under certain conditions, noise may cause hearing loss, interfere with human activities at home and work, and may affect human health and well-being in various ways.

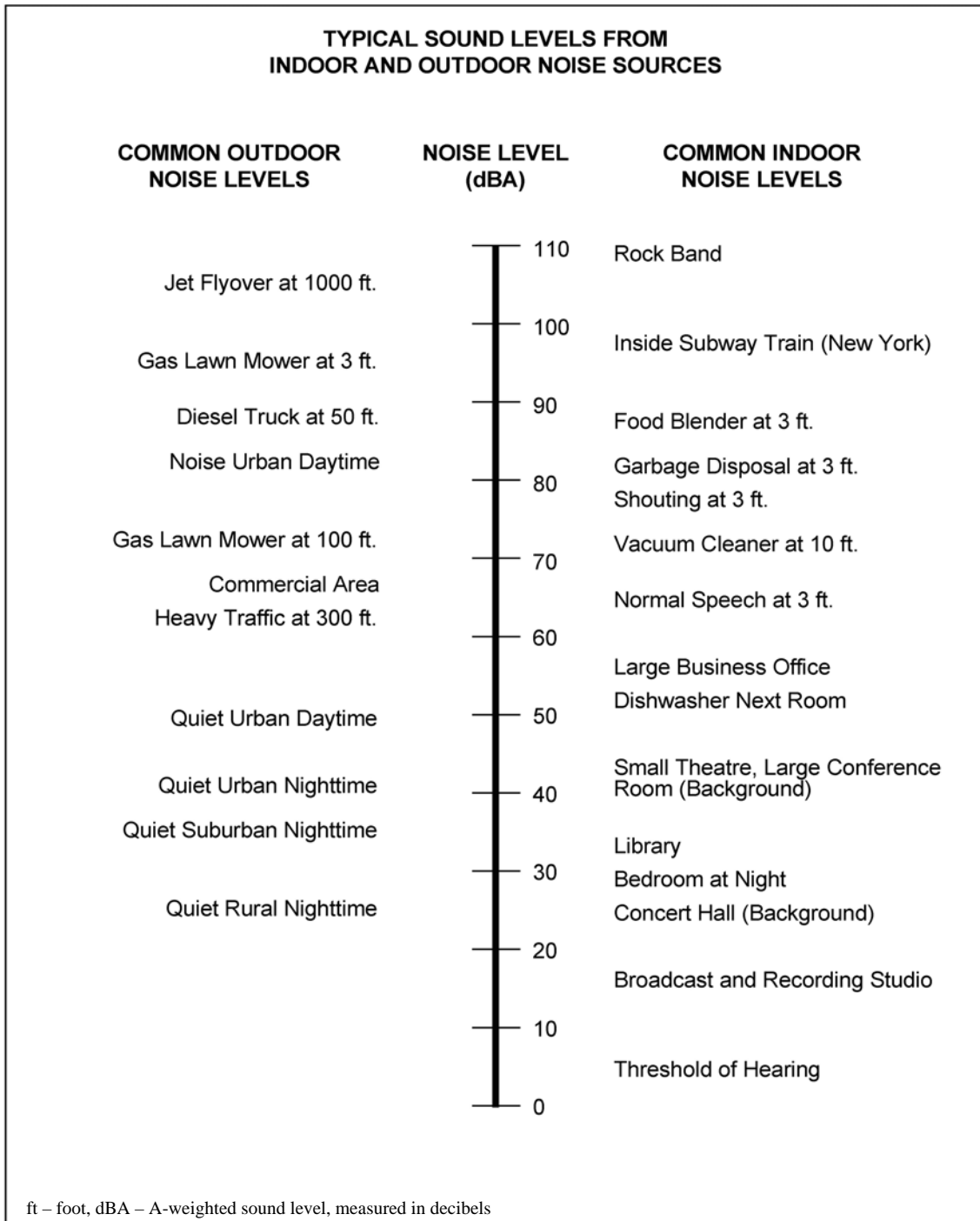
Sound pressure level (Lp) can vary over an extremely large range of amplitudes. The decibel (dB) is the accepted standard unit for measuring the amplitude of sound because it accounts for the large variations in amplitude and reflects the way people perceive changes in sound amplitude. Sound levels are easily measured, but the variability is subjective and physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation by subjective terms such as “loudness” or “noisiness.” Table 3-1 presents the subjective effect of changes in sound pressure level.

Table 3-1 Subjective Effects of Changes in Sound Pressure Level

Change in Sound Level (dB)	Change in Power		Change in Apparent Loudness
	Decrease	Increase	
3	1/2	2	Just perceptible
5	1/3	3	Clearly noticeable
10	1/10	10	Half or twice as loud
20	1/100	100	Much quieter or louder
dB – decibel			
Source: Bies and Hansen 1988			

Different sounds contain different frequencies. When describing sound and its effect on a human population, A-weighted (dBA) sound levels are typically used to account for the response of the human ear. The term “A-weighted” refers to a filtering of the noise signal, which emphasizes frequencies in the middle of the audible spectrum and de-emphasizes low and high frequencies in a manner corresponding to the way the human ear perceives sound. This filtering network was established by the American National Standards Institute (American National Standards Institute 1983). The A-weighted noise level has been found to correlate well with people’s judgments of the noisiness of different sounds and has been used for many years as a measure of community noise. Figure 3-1 shows the typical A-weighted sound levels for various sources.

Community noise levels usually change continuously during the day. However, community noise exhibits a daily, weekly, and yearly pattern. Several descriptors have been developed to compare noise levels over different time periods. One descriptor is the equivalent sound level (L_{eq}). The L_{eq} is the equivalent steady-state A-weighted sound level that would contain the same acoustical energy as the time-varying A-weighted sound level during the same time interval.



Source: Harris 1991

Figure 3-1 Typical A-weighted Sound Levels

Another descriptor, the day-night average sound level (L_{dn}), was developed to evaluate the total daily community noise environment. L_{dn} is the average A-weighted acoustical energy for a 24-hour period with a 10 dB upward adjustment added to the nighttime levels (10:00 p.m. to 7:00 a.m.). This adjustment is an effort to account for the increased sensitivity of most people to noise in the nighttime hours. The L_{dn} has been adopted by the United States Environmental Protection Agency (USEPA), the FAA, and the Department of Housing and Urban Development (HUD) as the accepted unit for quantifying human annoyance to general environmental noise.

3.3.1.1 Effects of Noise Exposure

Annoyance is the primary human response to intermittent environmental noise that includes relatively long intervals of quiet (AIHA 1986). The degree of annoyance has been found to correlate well with the L_{dn} . A comparison of the L_{dn} with the percentage of the exposed population that is “highly annoyed” in combination with the estimated population exposed to L_{dn} levels greater than 65 dBA provides an estimate of the number of persons “highly annoyed” by aircraft noise. These levels of annoyance are based on long-term exposure. Annoyance for short-term activities, such as construction noise and new flight patterns, can be influenced by many factors, including habituation and attitude toward the activity creating the noise. Nonetheless, a comparison of this type provides the best available information to predict reactions to a new noise exposure.

3.3.1.2 Baseline Noise

Noise associated with activities at Lackland AFB is characteristic of that associated with most Air Force installations with a flying mission. During periods of no aircraft activity, noise associated with base operations results primarily from maintenance and shop activities, ground traffic movement, occasional construction, and similar sources. The resultant noise is almost entirely restricted to the base itself and is comparable to that which might occur in adjacent community areas. It is only during periods of aircraft ground or flight activity that the situation changes. As Lackland AFB is primarily a training base, most operations are conducted during daylight hours and on weekdays. Due to airfield operations, existing noise levels are typical of an urban residential area near a major airport.

Under baseline conditions, Lackland AFB supported approximately 146,816 annual aviation operations. This equates to approximately 427 daily operations (Table 3-2) (USAF 2005a). Considering all types of flight activities, a scenario representing an “average day’s” operations was developed. The operations considered include arrivals (landings), departures (takeoffs), and closed patterns (which include touch-and-gos and low-level flybys). Noise calculations consider the frequency of flight operations, runway utilization, and the flight tracks and flight profiles flown by each aircraft.

Table 3-2 Current Daily Aircraft Operations at Lackland AFB

Aircraft	Baseline
C-5	78
F-16	188
Other Aircraft	161
Total	427
Source: USAF 2005a	

These levels and types of activity are then combined with information on climatology, maintenance activities, and aircraft flight parameters, and processed through the Air Force's BASEOPS/NOISEMAP computer models to calculate the L_{dn} (Moulton 1990). Once noise levels are calculated, they are plotted on a background map in 5-decibel increments from 65 dBA to 85 dBA, as applicable. Noise contours associated with baseline activities at Lackland AFB are shown in Figure 3-2. The land areas (in acres) encompassed by each contour are shown in Table 3-3.

**Table 3-3 Land Areas Exposed to Elevated Noise Levels
Baseline Conditions**

Noise Level (in L_{dn})	Land Area (in Acres) ¹
65 – 69	9,544.0
70 – 74	6,144.7
75 – 79	2,196.8
80 – 84	888.12
> 85	921.38
Source: Wasmer et al 2002	
¹ Area shown is for applicable noise levels. Total land area exposed to L_{dn} 65 or greater is 19,695 acres.	
L_{dn} day-night average sound level	

In order to further assess noise exposure from aviation activity, 18 locations around the base were selected for specific analysis. These points represent land uses that could be potentially sensitive to elevated noise levels. Figure 3-2 reflected these points, and Table 3-4 defines the points and shows noise exposure under current conditions.

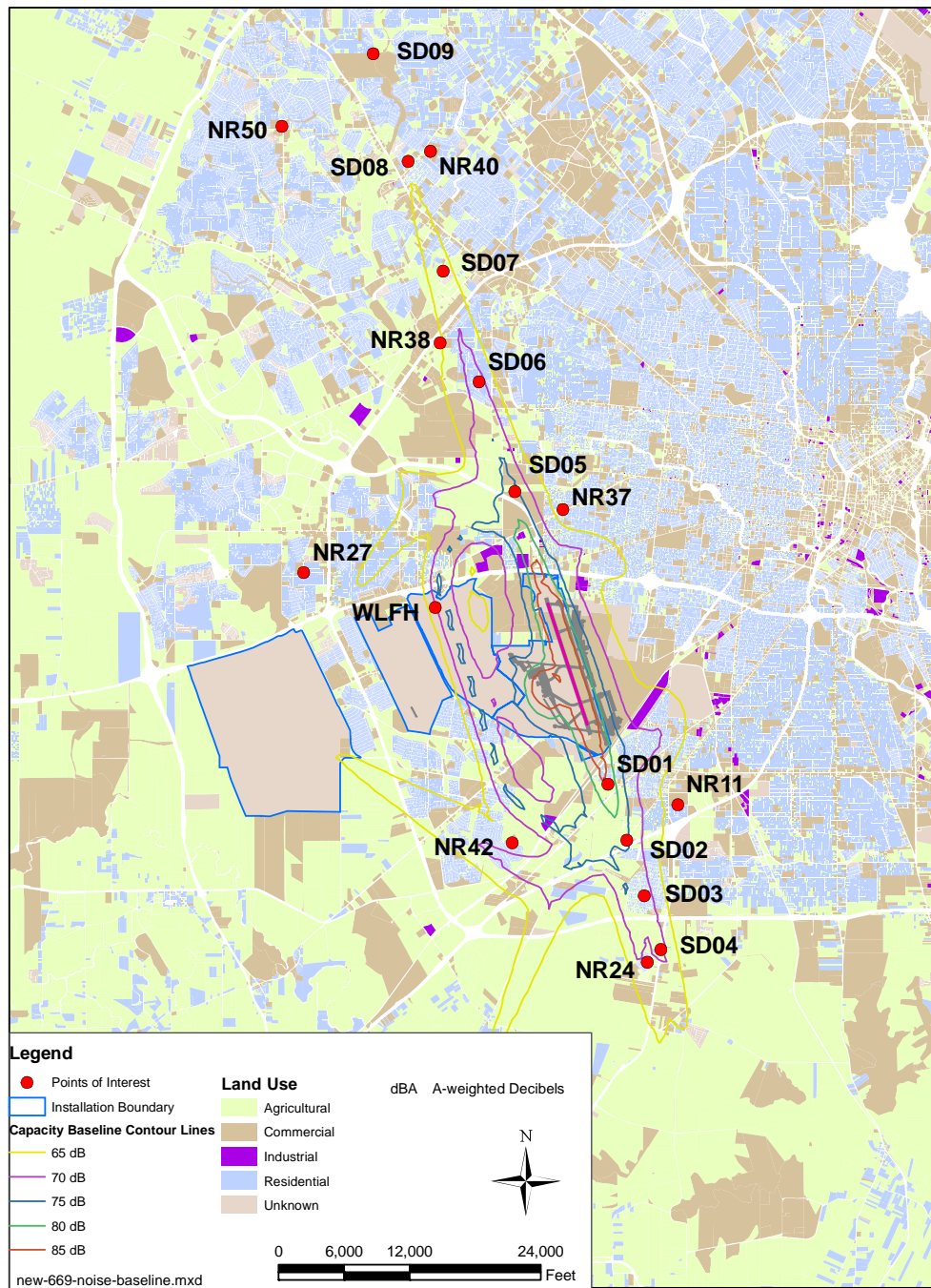


Figure 3-2 Baseline Noise Contours, Lackland Air Force Base

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Lackland Air Force Base, Texas*

Table 3-4 Noise Exposure at Sensitive Receptors, Current Conditions

Point Identification	Location	Noise Level in L_{dn}
SD01	Residential Area (Quintana Road and Southwest Military Drive)	85.3
SD02	Residential Area (Golden Community Park)	75.9
SD03	Residential Area (Palo Alto)	73.7
SD04	Residential Area (North Spicewood Park)	72.8
SD05	Residential Area (Van De Walle Park)	76.6
SD06	Residential Area (Ingram and Callaghan Roads)	72.0
SD07	Residential Area (South Leon Valley)	67.5
SD08	Residential Area (Huebner and Bandera Roads)	64.5
SD09	Residential Area (South O.P. Schnabel Park)	62.3
NR11	Kindred School/South San Antonio High School	63.3
NR24	Residential Area (South Spicewood Park)	69.0
NR27	John Glenn School	52.1
NR37	Lincoln School	62.8
NR38	Oliver W. Holmes High School	64.5
NR40	John Marshall High School	58.0
NR42	Residential Area/School Southeast Pearsall Road	67.3
NR50	Stevenson Middle School	47.9
WLFH	Wilford Hall Hospital	69.2
Source: Moulton 1990		
L _{dn} day-night average sound level		

3.3.1.3 Noise Complaints

The current body of evidence indicates that complaints are an inadequate indicator of noise effects on a population. Nonetheless, the Air Force has a strong commitment to address the concerns of the public in its effort to maintain excellent relations with the communities surrounding its installations. The 37 TRW has a well-established and well-publicized noise complaint process to educate the local community, create goodwill, and promote openness between the base and the community.

The Public Affairs Office processes each noise complaint by completing a noise complaint form using information provided by the complainant, logging the complaint, and then referring the incident to the 37 TRW Operations Group for investigation. The Public Affairs Office will respond to the complainant with the results of the investigation via telephone call, personal visit, or in writing. The noise complaint form was specifically designed for Lackland AFB and prompts the recipient of the complaint to collect information to obtain a complete description of the noise incident and other pertinent information.

3.3.2 Land Use

Land use comprises natural conditions or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed use areas. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas. The ROI for land use includes only those areas in the vicinity of the proposed construction and demolition activities.

Visual resources are the natural and man-made features that give a particular environment its aesthetic qualities. In undeveloped areas, landforms, water surfaces, and vegetation are the primary components that characterize the landscape. Man-made elements such as buildings, fences, and streets may also be visible. These may dominate the landscape or be relatively unnoticeable. In developed areas, the natural landscape is more likely to provide a background for more obvious man-made features. The size, forms, materials, and functions of buildings, structures, roadways, and infrastructure will generally define the visual character of the built environment. These features form the overall impression that an observer receives of an area or its landscape character. Attributes used to describe the visual resource value of an area include landscape character, perceived aesthetic value, and uniqueness. The ROI for visual resources includes only those areas that would be directly impacted by the proposed construction and demolition activities.

The scenic quality of some special areas are protected by laws (such as the Wilderness Act or the National Wild and Scenic Rivers Act). Federal land managers also clarify the scenic value of lands in accordance with federal land management regulations. In urban areas, there may be ordinances or zoning provisions that guide physical development.

The Air Installation Compatible Use Zone (AICUZ) program is an ongoing DoD program designed to promote compatible land uses in the areas around military airfields. The purpose of the AICUZ program is:

- To minimize the effects of flying operations on land uses adjacent to installations.
- To prevent incompatible development in high noise exposure and accident potential zones.
- To maintain operational capability through compatible land use planning and control.

The objectives of the AICUZ program are achieved primarily through encouraging local government officials to implement land use planning favoring compatible land uses. The AICUZ program also is supported through federal agencies such as HUD.

3.3.2.1 Existing Conditions

Land use (*The General Plan* [USAF 2002a] and subsequent document *The 2030 Plan* [USAF 2005b]) and transportation plans provide direction for the development and improvement of Lackland AFB. A major part of land use planning involves combining compatible land uses and separating incompatible land uses. Fourteen land use categories currently exist at Lackland AFB. Table 3-5 provides a brief description of each land use category and the amount of acres for each land use type on Lackland AFB.

Table 3-5 Existing Land Use Categories and Acreage

Land Use Category	Typical Facilities and Features	Acres	Percent Distribution
Administrative	Headquarters, civilian personnel, education center, law center, security operations.	181	2%
Aircraft Maintenance	Aircraft maintenance hangars, shops, docks, base operations, control tower, fire station, flight training.	84	1%
Airfield Open Areas	Open spaces associated airfield clearances and safety zones.	1,337	14%
Airfield Pavements	Runways, taxiways, aprons	352	4%
Community-Commercial	Commissary, exchange, club, dining hall, recreation center, gym, theater.	194	2%
Community-Service	Post office, library, chapel, childcare center, education center.	80	1%
Housing-Accompanied	Family housing, Temporary Lodging Facility, and support.	321	3%
Housing-Unaccompanied	Housing for singles, visitors' housing.	256	3%
Industrial	Base engineering, maintenance shops, storage, warehousing, utilities.	910	10%
Medical	Hospital, clinic, medical storage.	135	1%
Open Space ¹	Grazing area, conservation area, buffer space.	4,169	44%
Outdoor Recreation	Outdoor courts and fields, swimming pools, ranges, riding stables, golf course.	712	7%
Training-Indoor	Classroom buildings, hangars and other facilities used for instructional purposes.	164	2%
Training-Outdoor	Outdoor open areas used for instructional purposes.	630	7%
Total		9,525	100%
¹ A variance in acreage of approximately 5 percent of the total base area was found between information obtained from <i>Facts and Stats</i> (USAF 2004b) and existing and future land use area obtained from base geographical information system data. To correct the variance, acreage was added to open space for existing and future land use to obtain the total acres provided by <i>Facts and Stats</i> . Source: <i>The General Plan</i> (USAF 2002a), <i>The 2030 Plan</i> (USAF 2005b), <i>Facts and Stats</i> (USAF 2004b)			

Currently, Open Space (4,169 acres), Airfield (1,337 acres), Industrial (910 acres), Outdoor Recreation (712 acres), and Training – Outdoor (630 acres) are the five largest land use categories on Lackland AFB. As listed, these categories represent approximately 44 percent, 14 percent, 10 percent, 7 percent, and 7 percent of the total area on Lackland AFB. The land use categories with the smallest areas include Community – Service (80 acres), Aircraft Operations and Maintenance (84 acres), and Medical (135 acres). The distribution of land use categories on Lackland AFB is representative of and consistent with the predominant missions of the base (USAF 2002a, 2004b, and 2005b). Figure 3-3 depicts the existing land use on Lackland AFB.

3.3.3 Earth Resources

3.3.3.1 Geology

Geologic units below Lackland AFB range in age from Cretaceous to Quaternary. Surface outcrops at the installation consist of local Quaternary-aged alluvial deposits, the Tertiary-aged Midway Group, and the Cretaceous-aged Navarro Group. Quaternary alluvium consisting of clay, silt, sand, and gravel is present locally in current and former stream channels. The Midway Group outcrops consist of arenaceous (sandy) clay with sandy and calcareous nodules. The Navarro Group, a thick sequence of clay and marl formations, outcrops at Lackland AFB where the younger sedimentary units are absent (USAF 2005c).

Geologic units present beneath Lackland AFB were logged to a depth of over 1,500 feet at well number 3 located at Luke Drive and Military Drive. The following lists, in descending order, the formations encountered beneath the surface at this location and their thicknesses. The Midway group is approximately 160 feet thick and is underlain by a combined thickness of 765 feet of shale, clay, and marl of the Navarro Group and the Taylor Marl. Beneath this relatively impermeable sequence of sedimentary rocks, Anacacho Limestone, Austin Chalk, Eagle Ford Shale, Buda Limestone, and Grayson Shale/Del Rio Clay are present. The Edwards Limestone was encountered in this well at a depth of almost 1,500 feet below the ground surface (USAF 2005c).

Lackland AFB lies within the Balcones Fault Zone. In this area, there are several northeast trending normal faults. One of these faults crosses both Lackland Main Base and LTA dropping the younger Midway Group down in relation to the older Navarro Group (USAF 2005c).

3.3.3.2 Topography

The topography of Lackland AFB is somewhat varied. While most of the base is generally flat (slopes of 1 to 3 percent), the land drastically drops on the eastern boundary along Leon Creek. Elevations vary from 792 feet above mean sea level (msl) in the northwest corner to 634 feet above msl along Leon Creek. The topographic relief along Leon Creek, which reaches 90 feet, is the prominent physiographic feature at Lackland AFB (USAF 2005c).

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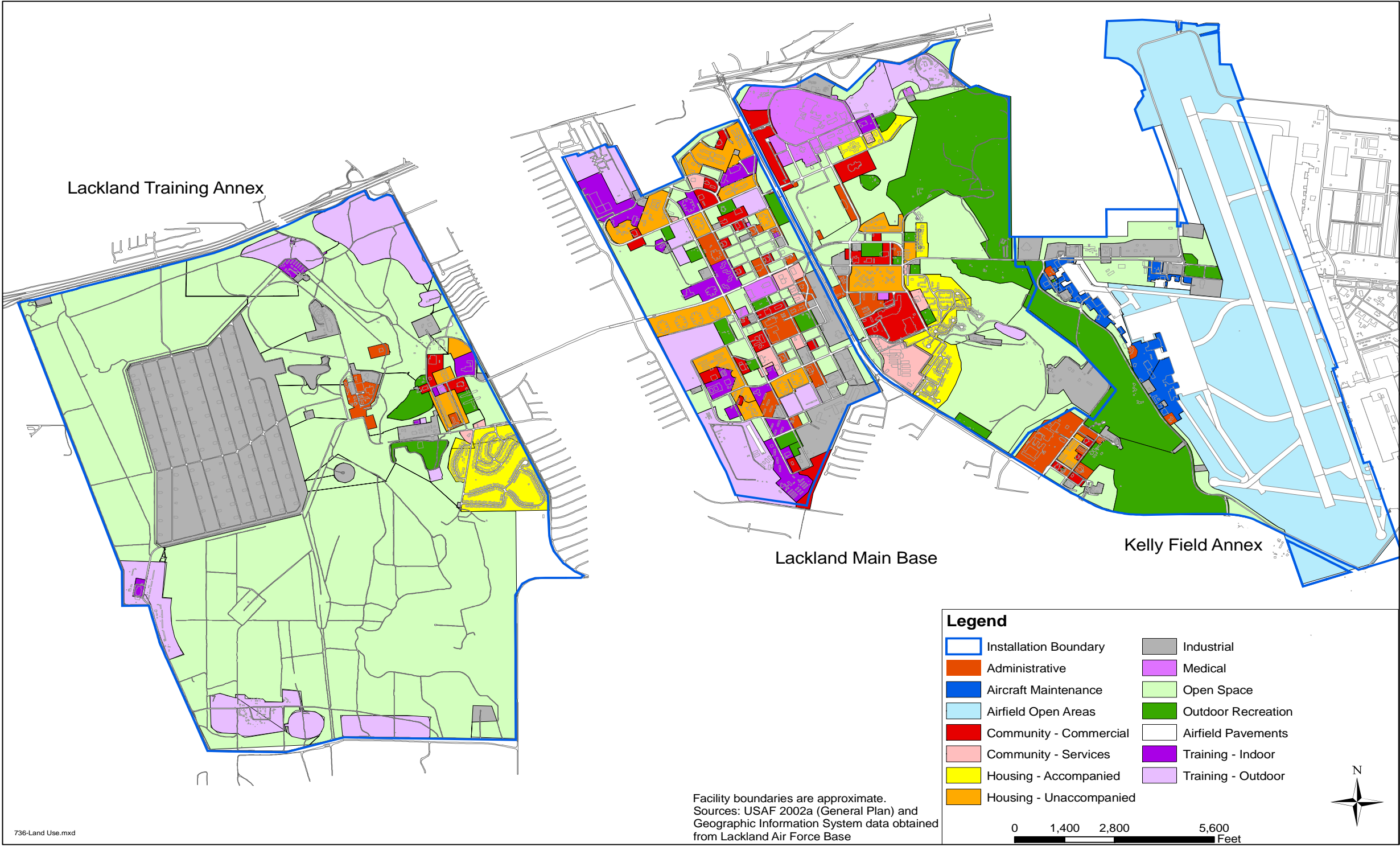


Figure 3-3 Land Use, Lackland Air Force Base, Texas

The topography of LTA is considered flat to gently rolling. Elevations at LTA range from 768 feet above msl in the northwest corner to 637 feet above msl in the southwest corner (USAF 2005c). The major topographic feature at this location is Medio Creek, which runs along the eastern side of LTA and drains the area. Medio Creek flows from the north to the south. United States Geological Survey maps indicate the area encompassing the proposed action is gently sloping to hilly. The site is approximately 700 feet above msl (USAF 2001).

3.3.3.3 Soils

Soils at Lackland AFB are primarily Houston black clays with areas of Houston Black gravelly clay. In addition, Lewisville, Venus, Patrick, Frio, and Trinity soils are also present on Lackland Main Base and LTA, but are limited in distribution (USAF 2002a).

The primary soil association on Lackland Main Base is the Houston Black gravelly clay with a 1 to 3 percent slope. This soil association is characterized by black, silty clay with 8 to 18 percent gravel content at the surface. The erosion potential of this soil association is classified as none to slight, mainly due to the flat slope and the relatively large proportion of gravel at the surface. The runoff of this soil is slow to medium and when dry, forms large cracks. There is a large shrink and swell potential in this soil association (USAF 2005c). The lesser soil associations include the Houston Black gravelly clay with slopes of 3 to 5 percent, Houston Black gravelly clay with slopes of 5 to 8 percent, and Lewisville Silty Clay with slopes of 0 to 1 percent (USAF 2002a).

For LTA, there are three soil associations that are part of the Houston Black series. The Houston Black gravelly clay with slopes of 1 to 3 percent, Houston Black gravelly clay with slopes of 3 to 5 percent, and Houston Black gravelly clay with slopes of 5 to 8 percent.

Of the remaining soil types found on Lackland Main Base and LTA, the Lewisville silty clay with slopes of 0 to 1 percent occurs most often. Soil thickness typically ranges between 0 and 62 inches. Lewisville silty clay series is generally characterized by deep, dark-colored alluvial soils that range from silty clay to gravelly loam in texture and contain various quantities of lime. Beds of gravel may occur at the base of the alluvium. Lewisville soils, which are crumbly when moist, have slow or medium surface drainage and have a severe hazard for water erosion on sloping land; however, nearly level areas present only a slight hazard (USDA 1962).

Venus soils occur on terraces and alluvial fans along Medio Creek. The Venus soils have a friable, grayish-brown, strongly calcareous surface layer that is clay loam or loam in texture and 7 to 20 inches thick. A thin, light-colored crust may form on the surface. The subsurface layer ranges from loam to sand clay loam in texture and often has lime concretions. It is friable to firm and has a granular structure. Underlying material consists of deep beds of loamy earth that may be several feet thick. Venus soils are well drained and have medium internal drainage. The capacity to hold water is good and erosion can be a hazard (USAF 2005c).

Patrick soils occur mostly on low terraces with Venus soils and have beds of limestone gravel within 3 feet of the surface. Patrick soils have slow to rapid surface drainage and medium internal drainage. They have limited capacity to hold water and are subject to erosion in sloping areas (USAF 2005c).

3.3.4 Water Resources

3.3.4.1 Surface Water

Surface water in San Antonio and the surrounding areas consists of rivers and perennial or intermittent streams. These streams are natural watercourses; however, in many cases their paths have been altered by activities such as rerouting flow pathways, reinforcing stream banks, etc. Although these streams are relatively small (the width of a typical waterway ranges from 0 to 10 feet during most seasons), they, like most other waterways in the region, are subject to severe flash flooding during heavy rains. Surface water in the region (excepting portions of the larger rivers and reservoirs) is not used for drinking water and is rarely used for recreation. The smaller waterways within San Antonio mainly serve the public as stormwater conveyances.

Lackland AFB consists of approximately 9,525 acres. Most of Lackland Main Base drains into Leon Creek. The southwest portion of Lackland Main Base drains into Indian Creek. Approximately two-thirds of the eastern portion of LTA drains into Medio Creek. The remaining one-third or the western portion of LTA drains into Long Hollow Creek and unnamed tributaries of the Medina River. These streams flow into the Medina River, which eventually flows into the San Antonio River. Aside from deeply dissected portions along Leon Creek, Lackland AFB is a gently rolling plain (USAF 2005c).

Stormwater runoff for Lackland AFB is transported by stormwater collection systems from developed portions of the base to outfalls in Leon Creek, Indian Creek, and Medio Creek. The stormwater lines are located below the surface in the developed parts of the base. In remote or less developed areas of the base (such as LTA), the stormwater drainage occurs via open and natural channels (USAF 2005c). One hundred-year flood plains (those areas with a one percent probability of flooding in any given year) transect the base; generally, these areas coincide with low-lying areas along the banks of natural watercourses. There are two separate flood plains on LTA and one on Lackland Main Base and KFA.

The amount of impervious cover currently on Lackland AFB has a direct impact on the amount of stormwater runoff generated during a storm event. Of the 9,525 acres occupied by Lackland AFB, 1,667 acres or 17.5 percent of the installation is covered by impervious materials and structures. Appendix B contains additional information about impervious surfaces at Lackland AFB.

A 25-year rain event in Bexar County has a 4 percent chance of occurrence and would release approximately 7.83 inches of rain in a 24-hour period. This amount of rainfall spread over 9,525 acres of land would equate to approximately 6,215 acre-feet (ac-ft) of water.

Fortunately, most of this water infiltrates, and only a fraction has the potential to runoff as surface water. The fraction that has the potential to runoff can be estimated using a rough order of approximation associated with the amount of impervious surfaces located on Lackland AFB. Using runoff coefficients of 0.95 for all paved surfaces and 0.30 for all unpaved surfaces, a weighted average runoff coefficient of 0.41¹ is estimated for the entire base under the existing conditions. As a result, it is estimated that 2,162 ac-ft of surface water runoff would leave Lackland AFB within 24 hours during a 25-year storm event.

3.3.4.2 Groundwater

The Edwards Aquifer is the primary source of drinking water for 1.5 million people in south-central Texas (including Lackland AFB). Lackland Main Base, KFA, and LTA are all located over the reservoir zone of the Edwards Aquifer. The Edwards Aquifer is characterized by rapid recharge through karst features and surface runoff through fractures in the vadose zone, relatively high groundwater velocities, and large spring and well yields. In 1975, the Edwards Aquifer became the first aquifer in the country to be designated as a sole-source aquifer by the USEPA (USAF 2002b).

The Edwards Aquifer occurs in the San Antonio region as an arcuate (curved) belt 180 miles long and 5 to 40 miles wide. Bounded on the north by the Balcones Fault Zone and to the south by the feature known as the “bad water line,” the Edwards Aquifer zone extends from Kinney County in the west to Hays County in the east. The bad water line represents the demarcation within the aquifer between fresh water and brackish (having total dissolved solids concentrations equal or greater to 1,000 milligrams per liter) water. Fresh water is located upgradient (generally north) of the line and saline water is located down gradient (generally south) of the line. The location of the bad water line varies based on aquifer recharge and discharge. Lackland AFB is located over the fresh water portion of the aquifer (USAF 2005c).

The Edwards Aquifer is under artesian conditions in the vicinity of Lackland AFB. It is separated from the ground surface by a thick overburden of alluvium, clay, marl, chalk, and sandstone formations. Recharge to the Edwards Aquifer in this area occurs when water enters the formation in the outcrop area (recharge zone) in northern Bexar County and west of Bexar County where there are extensive exposures of the Edwards Formation (USAF 2005c).

The USEPA has classified the Edwards Aquifer as a sole source aquifer. Additionally, there are several threatened and endangered species associated with this regional body of water. In 1999, the United States Fish and Wildlife Service (USFWS) issued a Biological Opinion (BO) related to water withdrawals from the Edwards Aquifer by all active military installations in the San Antonio area excluding Brooks AFB (i.e., former Kelly AFB,

¹ Runoff coefficients indicate the fraction of water that is not retained by a given surface condition. $[(0.95)*(1,667 \text{ impervious acres})+(0.30)*(7,858 \text{ vegetated acres})]$ divided by 9,525 total acres is equivalent to 0.41, which indicates an estimated 41 percent of the stormwater that falls on Lackland AFB becomes runoff and 59 percent of the stormwater is retained within current surface features.

Lackland AFB, Randolph AFB, and Fort Sam Houston). A new Biological Assessment (BA) was submitted to the USFWS in early 2005, and a new BO is presently under consideration to replace the present BO. The DoD maximum annual withdrawal from the Edwards Aquifer is presently 8,400 acre-feet per year (ac-ft/yr), based on the current DoD allocation of 2.1 percent of the out-year aquifer limit of 400,000 ac-ft/yr. Of the DoD withdrawal, Lackland AFB has been allocated approximately 4,100 ac-ft/yr. The recently submitted 2005 BA report indicates projected usage for Lackland AFB in 2005 and 2010 to be 2,470 ac-ft/yr and 2,856 ac-ft/yr, respectively (USAF 2005d). Additional information about potable water resources and consumptive use at Lackland AFB can be found in Appendix B.

As part of the regional management of the Edwards Aquifer, the Edwards Aquifer Authority (EAA), created in 1993 by the Texas legislature, replaced the Edwards Underground Water District. The EAA's primary mission is the conservation and regulation of Edwards Aquifer resources.

In April 1998, the EAA initiated its Critical Period Management Rules, which defined Critical Period Management Reduction Stages corresponding to water levels in area wells. Aquifer levels in the San Antonio area are monitored by the J-17 well, located on Fort Sam Houston. Lackland AFB implements the water conservation stages during applicable periods of water restriction.

Shallow groundwater is present beneath Lackland AFB at depths of 5 to 15 feet below ground surface (bgs). This alluvial aquifer is recharged primarily by precipitation and lawn irrigation and is present within alluvial sediments above confining low-permeability soil formations. The confining formations that separate the shallow alluvial aquifer from the Edwards Aquifer begin at a depth of approximately 25 feet bgs and extend downward to a depth of over 1,200 feet bgs. The shallow groundwater beneath Lackland AFB is not used as a potable water supply either on or off base (USAF 2005c).

3.3.5 Hazardous Materials and Wastes

3.3.5.1 Hazardous Materials

Hazardous materials minimization efforts at Air Force installations are established primarily by Air Force Instruction (AFI) 32-7080, *Pollution Prevention Program*, which incorporates the requirements of all federal regulations, AFIs, and DoD Directives for the reduction of hazardous material uses and purchases. The primary hazardous materials addressed by AFI 32-7080 are ozone depleting substances and the 17 chemicals listed under the USEPA Industrial Toxics Program (EPA 17 chemicals) (USAF 2002b). EO 12088, *Federal Compliance with Pollution Control Standards*, under the authority of the USEPA, ensures that necessary actions are taken for the prevention, management, and abatement of environmental pollution from hazardous materials or hazardous waste due to federal facility activities. Lackland AFB developed a pollution prevention management plan in 1994 (*Source Reduction and Waste Minimization Plan*) that requires compliance by all Lackland AFB activities (USAF 2002c).

3.3.5.2 Hazardous Waste

Management of hazardous waste is governed by RCRA Subtitle C (40 CFR Parts 260 through 270) regulations, which are administered by the USEPA which has subsequently delegated regulatory authority to the State of Texas. The regulations require hazardous waste to be handled, stored, transported, disposed of, or recycled in compliance with applicable regulations.

Lackland AFB generated approximately 68,000 pounds of hazardous waste in 2005 (Cooper 2006). Wastes are initially accumulated at satellite accumulation points (SAP) before being transferred to a 90-day accumulation point. Currently, Lackland AFB operates approximately 160 SAPs for hazardous, non-hazardous waste, and universal wastes. Lackland AFB holds Texas Commission on Environmental Quality (TCEQ) hazardous waste registration numbers 69006, 75569, 87058, and 87060, and USEPA hazardous waste identification numbers TX4571524129, TX450099933, TXR000048801, and TXR000048819, respectively. Hazardous waste generated at the base includes flammable waste, lead-contaminated materials, and cleaning solvents. The waste is managed according to the guidelines established in the base's Hazardous Waste Management Plan (USAF 2002c).

3.3.5.3 Environmental Restoration Program

The DoD implemented the Environmental Restoration Program (ERP) to identify the locations and contents of past toxic and hazardous material disposal and spill sites and to eliminate the hazards to public health in an environmentally responsible manner. The objectives of the ERP are to identify and fully evaluate any areas suspected to be contaminated with hazardous materials caused by past Air Force operations and to eliminate or control any hazards to the public health, welfare, or the environment. The ERP is the basis for response actions on Air Force installations under provisions of the Comprehensive Environmental Response, Compensation, and Liability Act and the Superfund Amendments and Reauthorization Act of 1986, as clarified by EO 12580, Superfund Implementation.

Sixty-seven ERP sites have been identified on Lackland AFB, of which 29 sites require no further action (i.e., closed sites) and 38 sites are active sites. Basewide Preliminary Assessments have also identified 26 Areas of Concern (AOC), some of which may require further studies to determine the nature and extent of contamination. In addition to ERP sites and AOCs described above, Lackland AFB also has 14 Military Munitions Response Program sites, which are currently undergoing a Phase I study (Ravichandran 2006). ERP sites at the LTA and Lackland AFB are depicted on Figures 3-4 and 3-5, respectively.

3.3.5.4 Lead-based Paint and Asbestos

Lead-based paint management at Lackland AFB is established in the Air Force policy and guidance on lead-based paint in facilities. The policy incorporates by reference the requirements of 29 CFR 1910.1025, 29 CFR 1926, 40 CFR 50.12, 40 CFR 240 through 280, the Clean Air Act (CAA), Public Law 102-550, and other applicable federal regulations.

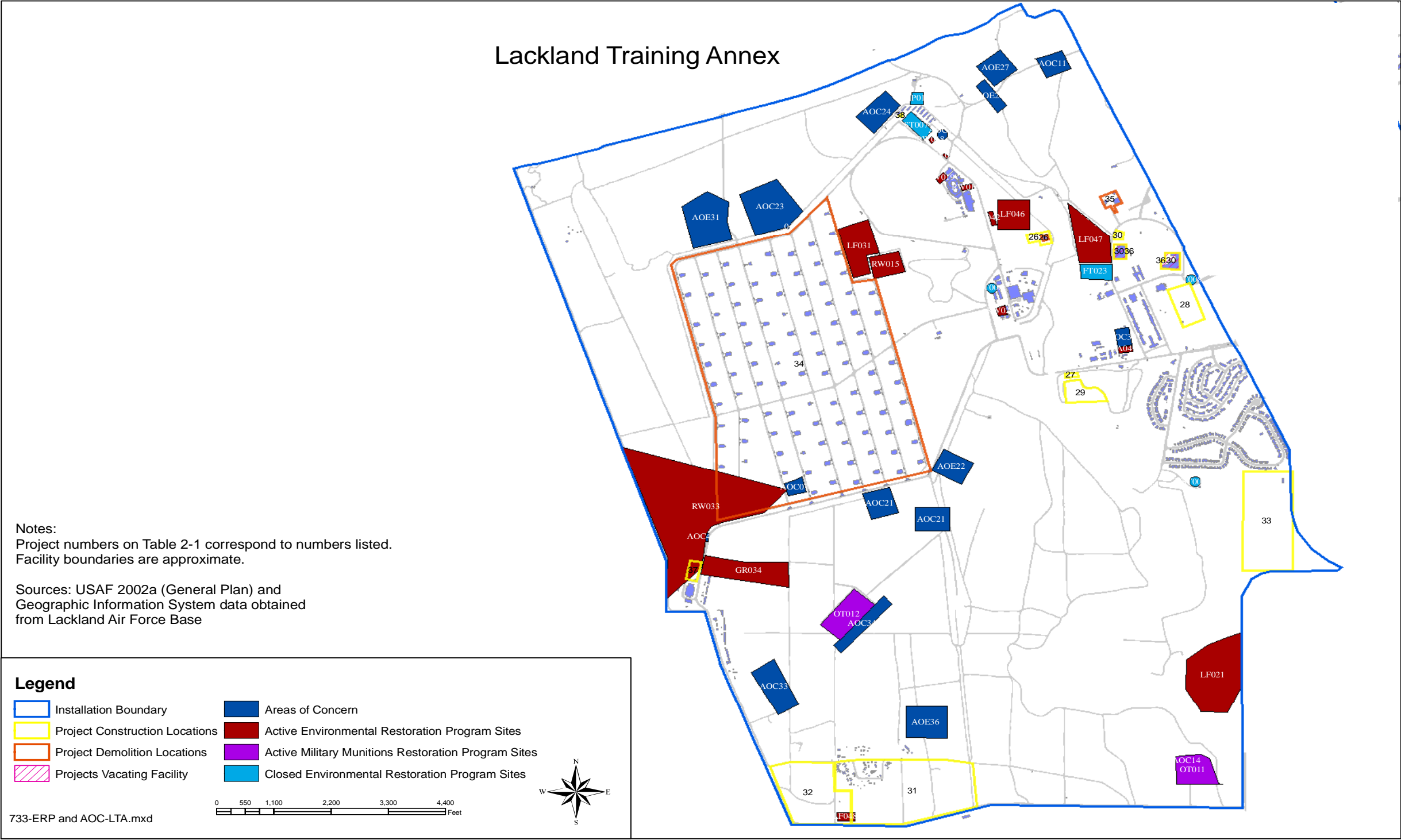


Figure 3-4 Environmental Restoration Program and Area of Concern Site Locations Lackland Training Annex, Lackland Air Force Base, Texas

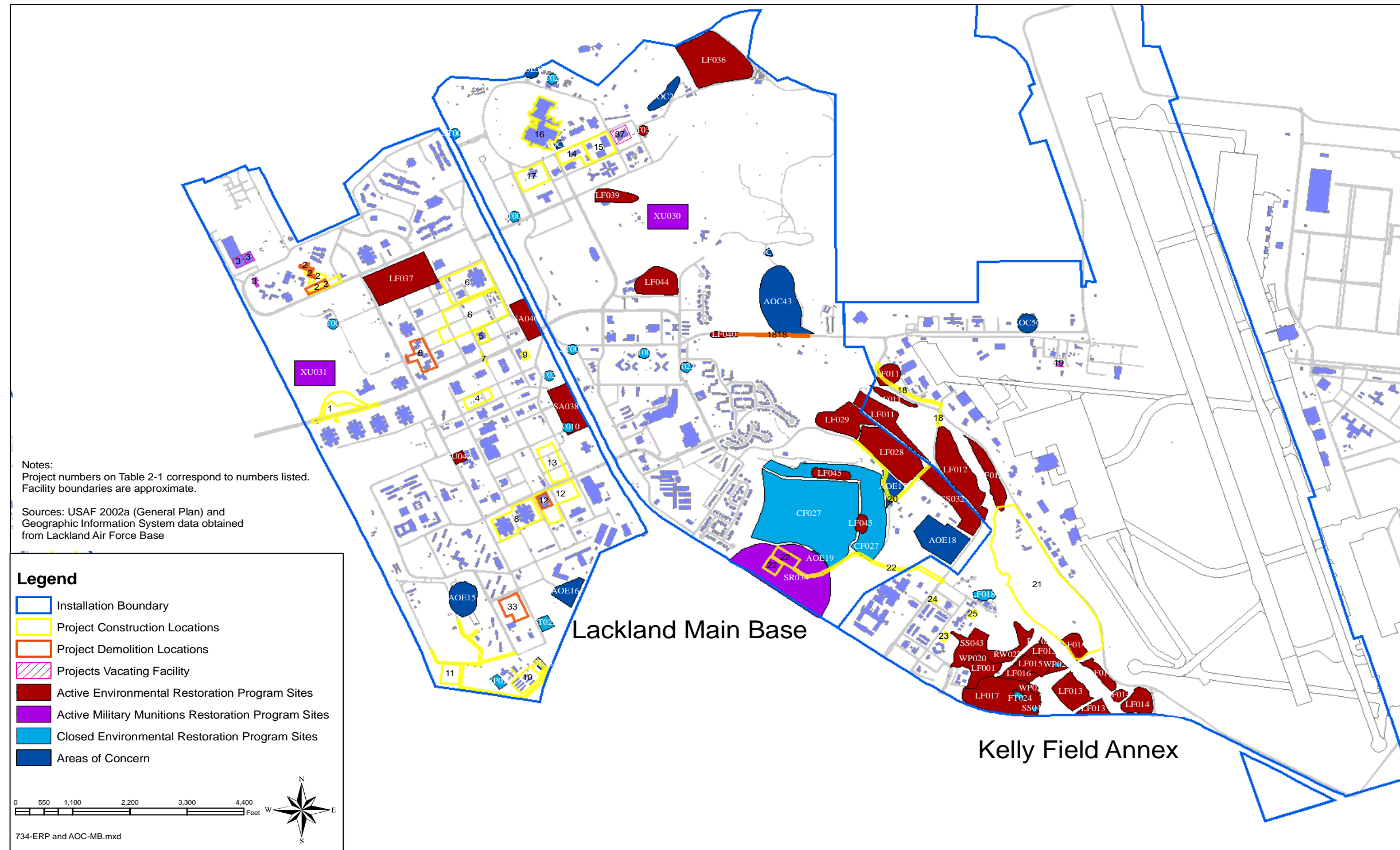


Figure 3-5 Environmental Restoration Program and Area of Concern Site Locations Lackland Main Base and Kelly Field Annex, Lackland Air Force Base, Texas

This policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating lead-based paint hazards (USAF 1993).

A basewide lead-based paint survey of Lackland AFB buildings was completed in 1992. The survey indicated that lead-based paint was widely used on buildings prior to 1980. Additional survey activities have been implemented in specific areas throughout the installation. Based on the history of buildings built in the same era and style that tested positive for lead-based paint, the buildings scheduled for demolition are suspected to have this hazard. The USEPA and Occupational Safety and Health Administration (OSHA) regulate asbestos. Emissions of asbestos to ambient air are controlled under Section 112 of the CAA. Identification of asbestos-containing material in base facilities is governed by OSHA under the authority of the *Occupational Safety and Health Act*, 29 USC §§ 669 et seq. The USEPA has a policy that addresses leaving asbestos in place if its disturbance or removal could pose a health threat.

Asbestos management at Air Force installations is established in AFI 32-1052, *Facility Asbestos Management*. AFI 32-1052 incorporates by reference applicable requirements of:

- 29 CFR 669 et seq.
- 29 CFR 1910.1025.
- 29 CFR 1926.58.
- 40 CFR 61.140.
- Section 112 of the CAA.
- Other applicable AFIs and DoD Directives.

AFI 32-1052 requires installations to develop an asbestos management plan for the purposes of maintaining a permanent record of the current status and condition of all asbestos-containing material in the installation facility inventory and documenting all asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operations plan that details how the installation will conduct asbestos-related projects.

Asbestos on Lackland AFB is managed in accordance with the installation's Asbestos Management Plan. The plan specifies the procedures for the removal, encapsulation, enclosure, and repair activities associated with asbestos-containing material abatement projects and is designed to protect base personnel and residents from exposure to airborne asbestos fibers. The plan also ensures that the installation remains in compliance with all federal, state, and local regulations pertaining to asbestos. The asbestos-containing material in structures on Lackland AFB were surveyed and classified in 1992. Since that time,

updates to the asbestos survey have been accomplished in specific areas across the installation.

3.3.6 Biological Resources

3.3.6.1 Vegetation and Wildlife

The Main Base encompasses approximately 2,753 acres and Kelly Field Annex encompasses approximately 2,799 acres of land located in the southern end of the Blackland Prairie vegetational area, and within the Texan Biotic Province. The majority of vegetation on Lackland AFB is urban in nature, comprised of frequently mown and watered lawns, scattered shade trees, ornamental shrubbery, and flowerbeds. Grassland is the dominant vegetation type with a small amount of savanna/forested vegetation limited to small remnant areas adjacent to Leon Creek. Non-maintained vegetation or unimproved grounds are typically located only on the eastern third of the base. Areas of the base classified as unimproved grounds consist of brushy shrub lands, honey mesquite, hackberry, and Eve's necklace; all of which have replaced the original grassland vegetation (USAF 2005c).

Three general plant communities can be recognized at Lackland AFB. Mostly deciduous shrub lands or woodlands are found on slopes and in upland areas. Deciduous riparian woodlands are found in well-watered soil on creek terraces. Grassland patches are found in almost all areas, but only where mowing occurs on a regular basis and are not considered native. Presently, no special species or natural communities are known to occur at Lackland AFB (USAF 2005c).

Lackland AFB is located within the Texan Biotic Province, and at least 39 species of snakes, five species of urodeles (i.e., newts and salamanders), 18 species of anurans (e.g., frogs and toads), and 49 species of mammals have been recorded for this province. Lackland AFB is a highly urbanized environment. Undeveloped areas on the base are small in size, isolated, and have typically been subjected to various past or ongoing disturbance regimes. Wildlife species, including birds that occur on the base, are urban adapted and disturbance tolerant (USAF 2005c).

The LTA is located approximately 1 mile west of the main base and encompasses 3,973 acres of land, including approximately 1,216 acres classified by the Air Force as improved and semi-improved grounds. However, the area surrounding the LTA has become urbanized through commercial and residential development. The LTA is located in the Blackland Prairie vegetational area of south-central Texas, and within the Texan Biotic Province (USAF 2005c).

The vegetation of the majority of the LTA is primarily composed of a mesquite-dominated succession woodland or diverse shrub land, with honey mesquite and hackberry as major components that have replaced the Blackland Prairie climax vegetation. Four plant communities can be recognized at the LTA. Comparatively well watered terraces along Medio Creek Support mostly deciduous riparian woodlands dominated by hackberry and other hardwoods. Level and poorly drained upland areas support deciduous woodlands

dominated by honey mesquite and huisache. Better drained sloping soil supports mesquite woodland. In any of the upland areas, grassland openings may be present (USAF 2005c).

The LTA, as well as the main base, is located within the Texan Biotic Province. The woodland/shrub land vegetation of the LTA is more likely to contain a relatively larger number and greater diversity of wildlife, compared to the urban habitats of the main base. However, the area surrounding the LTA has become urbanized through commercial and residential development and supports wildlife that are urban adapted and disturbance tolerant (USAF 2005c).

3.3.6.2 Threatened and Endangered Species

Presently, there are no special species, natural communities, or federally listed threatened and endangered species known to occur on Lackland AFB. However, special species, including the widemouth blindcat (*Satan eurystomus*), toothless blindcat (*Trogloglanis pattersoni*), Guadalupe bass (*Micropterus treculi*), Texas salamander (*Eurycea neotenes*), Texas garter snake (*Thamnophis sirtalis annectens*), and big red sage (*Salvia penstemonoides*), may be found outside Lackland AFB, in the vicinity of Leon Creek (USAF 2005c).

Comal and San Marcos Springs are artesian outflows from the Edwards Aquifer located approximately 35 and 50 miles northeast of the City of San Antonio, respectively. The springs provide habitat for the following eight federally listed threatened and endangered species:

- San Marcos salamander - (*Eurycea nana*).
- San Marcos gambusia - (*Gambusia georgei*).
- Fountain darter - (*Etheostoma fonticola*).
- Texas blind salamander - (*Typhlomolge rathbuni*).
- Texas wild rice - (*Zizania texana*).
- Comal Springs riffle beetle - (*Heterelmis comalensis*).
- Comal Springs dryopid beetle - (*Stygoparnus comalensis*).
- Peck's Cave amphipod - (*Stygobromus pecki*).

Of the eight species listed above, only the San Marcos salamander is federally listed as threatened. The remaining seven species are listed as endangered (Military Water Working Group 2005).

As discussed in Section 3.3.4.2, the Air Force began consultation with the USFWS in 1997 with the completion of a BA for the proposed disposal of Kelly. The USFWS issued a BO for the closure of Kelly AFB in the same year. The Air Force completed a separate BA in 1998 to determine the effect of DoD water withdrawal on the Edwards Aquifer; the USFWS subsequently issued a BO in 1999. The 1999 BO concluded that ongoing and proposed actions

at the DoD installations (former Kelly AFB, Lackland AFB, Randolph AFB, and Fort Sam Houston) were not likely to jeopardize the continued existence of threatened and endangered species of the Comal and San Marcos spring systems. The USFWS stated in the BO that it was providing DoD with an incidental take statement for the Texas blind salamander, San Marcos salamander, Comal Springs dryopid beetle, and Peck's Cave amphipod. Since the 1999 BO, the installations have abided by all the USFWS' prudent and reasonable measures and have maintained water use levels at prescribed limits as described in Section 3.3.4.2.

A new BA was submitted to the USFWS in early 2005. It documented that the current and future DoD water draw from the Edwards Aquifer constituted a maximum of 2.1 percent of the overall withdrawal from the aquifer, rather than the 2.63 percent determined by USFWS in the 1999 BO. A new BO is presently under consideration to replace the 1999 BO (Military Water Working Group 2005).

3.3.6.3 Wetlands

Under the authority of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act, the United States Corps of Engineers (USACE) administers the permitting of discharge of dredged or fill materials into waters of the Nation. Waters of the Nation include wetlands. Wetlands determinations can be made by experts in the field; however, the USACE makes the ultimate determination of wetland boundaries for a given property.

In February 2001, wetlands delineation was conducted for the Main Base and the LTA. Within the Main Base, wetlands are found within the floodplain of Leon Creek. Within LTA, wetlands are found along Medio Creek and its tributaries, as well as man-made ditches, swales, and small ponds (USAF 2002a). Based on the 2001 survey, 7.5 acres of vegetated wetlands were delineated on the Main Base and 15 acres of vegetated wetlands were delineated on LTA (USAF 2005c).

There are no wetlands adjacent to the subject projects although project 34 (demolition of 67 munitions buildings) includes one building to be demolished that is located approximately 60 feet from a wetland area. All the other buildings are at least 100 feet from the identified wetlands. The total demolition project encompasses the demolition of 67 munitions buildings. Figures 3-6 and 3-7 show the boundaries of the wetlands identified on Lackland AFB.

3.3.6.4 Floodplains

EO 11988, *Floodplain Management*, May 24, 1977, states that federal agencies "... shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains..." The EO requires that an agency shall avoid undertaking or providing assistance for new construction located in floodplains and that if

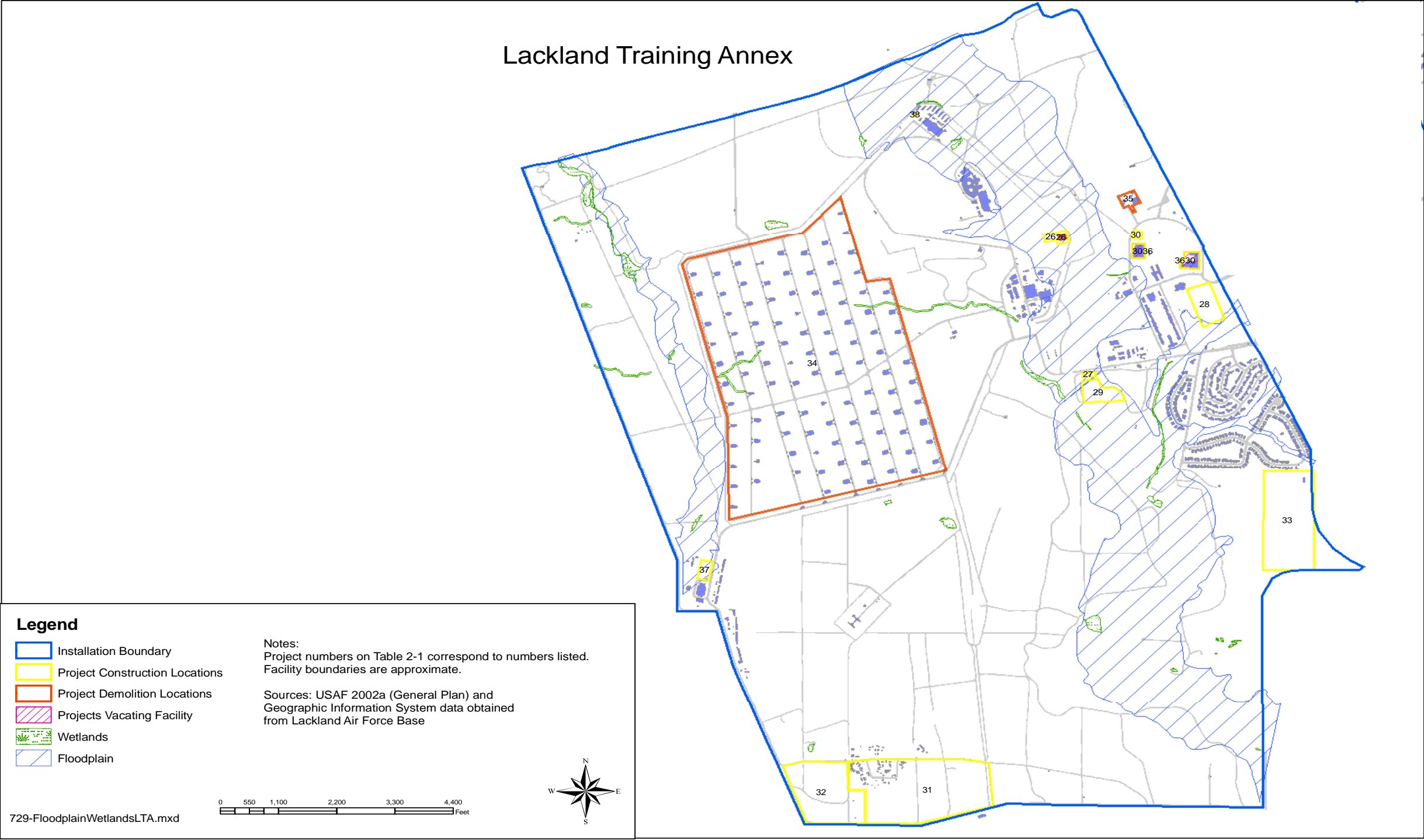


Figure 3-6 Wetlands and Floodplain Lackland Training Annex, Lackland Air Force Base, Texas

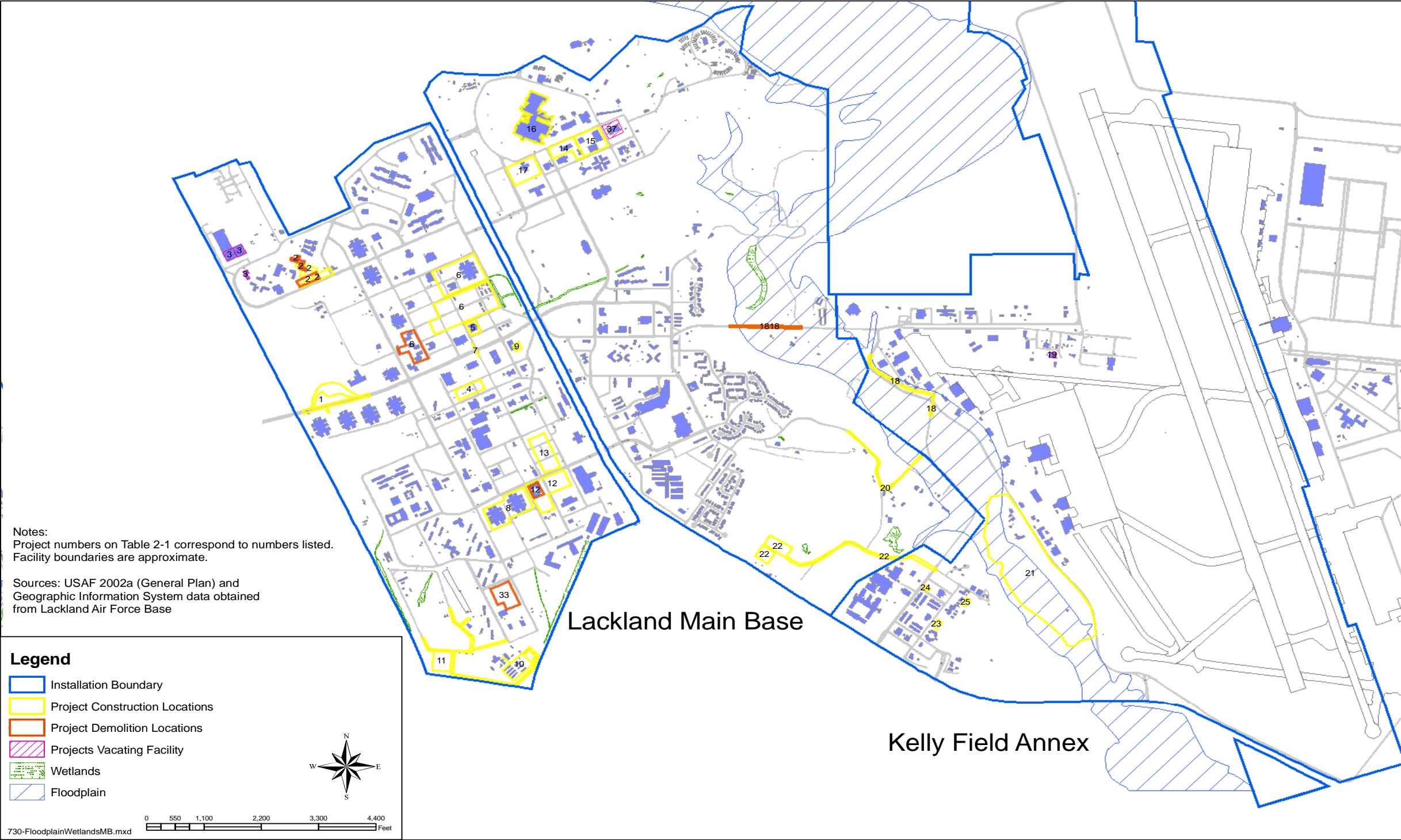


Figure 3-7 Wetlands and Floodplain Lackland Main Base and Kelly Field Annex, Lackland Air Force Base, Texas

the head of the agency finds that there is no practicable alternative to such construction, the proposed action must include all practicable measures to minimize harm to floodplains, which may result from such use (EO 1977).

Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by the Federal Emergency Management Agency, which evaluates the floodplain for 100-year flood events. A 100-year flood is hydrological events of a magnitude expected to be equaled or exceeded once, on the average, during any 100-year period or commonly has a one percent chance of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The 100-year floodplain includes land that, during such an event, would be flooded. Figures 3-6 and 3-7 show the boundaries of the 100-year floodplains on Lackland AFB.

Known flood problem areas on Lackland AFB include the bridge crossing Leon Creek on Kelly Drive and the Hall Street bridge over Leon Creek at General Chappie James Way (project 18) and portions of Range Road that during flood events limit access to Security Hill (project 20). These bridges and roads become impassable during times of flood. Projects 18 and 20 must be sited in the floodplain expressly to alleviate the flooding that renders these bridges and roads impassible. On the LTA, two large floodplain areas have been identified. One running north and south is associated with Medio Creek on the eastern side. The other is associated with Long Hollow Creek, a tributary to the Medina River on the northwest side of LTA (USAF 2002a). These projects would be constructed in the floodplain area to consolidate the training mission in one physical location and to maximize land use.

3.3.7 Utilities and Infrastructure

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as “urban” or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to economic growth of an area. As projects on Lackland AFB are conceptualized and planned, project engineers incorporate into those designs the infrastructure and utility specifications that would be required as part of the project.

3.3.7.1 Electricity and Natural Gas

CPS Energy (CPS) is San Antonio’s municipally owned natural gas and electric company. CPS provides electrical and natural gas service to the Main Base, Kelly Field Annex, and LTA.

Lackland AFB operates a substation located on the west side of the Main Base just off Valley-Hi Road (USAF 2002a). Three incoming feeders from the on-base substation power the Main Base switching station. Two underground lines from the KellyUSA substation east of the airfield supply the Kelly Field Annex. A switching station serving the LTA is located on Eagle Drive near Ray Ellison Drive, on the east side of LTA. The *2030 Plan* indicates that the Eagle

Drive Substation needs upgrading (USAF 2005b). The recently performed capability analysis of the electrical subsystem at Lackland AFB indicates sufficient headroom for moderate growth on Lackland Main Base and KFA. Additional details on the electrical systems at Lackland AFB can be found in Appendix B.

Natural gas is supplied by CPS to the Main Base through an eight-inch pipeline that enters at the south end of the Main Base. The combination loop and radial distribution system contains approximately 41 miles of pipeline. The Main Base has a high pressure, 48 pounds per square inch (psi) distribution loop that circles the western half of the base and a low pressure, 18 psi distribution loop on the east side (USAF 2002a). The natural gas supply for the Lackland Training Annex enters on the eastern side near Valley-Hi Drive. The distribution system at the annex consists of 10 miles of pipeline. A majority of the housing and cantonment areas is served by a 12-psi looped distribution system, and a single non-looped plastic line serves the shooting range area. This system is tied to the Main Base distribution system and is supplied by CPS (USAF 2002a and 2006). In addition to the CPS supply lines, an 8-inch, 250-psi line runs along the northern base boundary to supply the Wilford Hall Medical Center Total Energy Plant. A regulator station provides a second (emergency) feed to the base loop system. The combined natural gas line capacity for the Main Base is 9.254 thousand cubic feet per day (MCF/day) (USAF 2006). CPS owns and maintains the gas service for Kelly Field Annex, which enters the area in a supply line coming under the airfield from KellyUSA. The supply capability of the CPS line is 2.4 MCF/day based on an estimated line capacity (USAF 2006). Additional details on the natural gas distribution systems at Lackland AFB can be found in Appendix B.

3.3.7.2 Potable Water

Potable water is currently supplied to the main base by six Edwards Aquifer wells that have a total designed withdrawal capacity of 13.22 million gallons per day (mgd) (14,808 ac-ft/yr). The water system on the main base includes more than 60 miles of water mains and four elevated tanks that provide a total storage capacity of 1.275 million gallons (3.9 ac-ft). During historical peak withdrawal conditions, the wells operated at 36 percent of total design capacity (approximately 4.76 mgd or 5,332 ac-ft/yr) (USAF 2002a).

The LTA currently obtains potable water from two Edwards Aquifer wells with a combined design capacity of 4.3 mgd (4,817 ac-ft/yr). The water system on the Lackland Training Annex includes more than 15 miles of water mains and two elevated tanks that provide a total storage capacity of 375,000 gallons (1.1 ac-ft). During historical peak withdrawal conditions, the wells operated at 17 percent of total design capacity (approximately 0.74 mgd or 829 ac-ft/yr) (USAF 2002a).

The water system on the Kelly Field Annex is managed separately from the rest of Lackland AFB as a result of the closure of Kelly AFB. As a part of the disposal of Kelly AFB, the water system on the former installation was sold to SAWS. In a contractual arrangement with SAWS, the Air Force retained the water rights for the two Edwards Aquifer wells on former Kelly AFB, as well as the contractual option to purchase additional

water from SAWS in lieu of utilizing the water rights retained by the Air Force. At present, all potable water supplied to the Kelly Field Annex and the leaseback areas on the east side of former Kelly AFB is purchased from SAWS and is not counted against the DoD-assigned withdrawal limit for the installation.

As previously described in the water resources section, potable water obtained from the Edwards Aquifer is a limited resource subject to withdrawal regulation and drought restrictions. Additional information on potable water supplies for Lackland AFB can be found in Appendix B.

3.3.7.3 Solid Waste Management

Municipal solid waste management and compliance at Air Force installations is established in AFI 32-7042, *Solid and Hazardous Waste Compliance*. AFI 32-7042 incorporates by reference the requirements of Subtitle D, 40 CFR Parts 240 through 244, 257, and 258 and all other applicable federal regulations, AFIs, and DoD Directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program to incorporate the following: a solid waste management plan; procedures for handling, storing, collecting, and disposing solid waste; record keeping and reporting; and pollution prevention (USAF 2002d). Source reduction, resource recovery, and recycling of solid waste are addressed in AFI 32-7080, *Pollution Prevention Program*.

Non-hazardous municipal solid wastes generated at Lackland AFB are collected by a private contractor and disposed of off base at the Covell Gardens and Tessman Road Landfills. Tessman Road Landfill is operated under TCEQ Permit Number 1410. The landfill opened in 1981 and receives 2,115 tons of waste per day (USAF 2005c). Tessman Road Landfill is scheduled for closure in 2052. Covell Gardens Landfill (TCEQ Permit Number 2093) opened in 1993 and consists of 370 acres, of which 242 acres are permitted for disposal. It receives an average of 5,000 tons of solid waste per day and has a current life expectancy of 17 years at the current disposal rate. The landfill is currently in the process of expanding to include an additional 305 acres to the south of existing facility. Additionally, the permit application is requesting an additional 50-foot height increase for the disposal. This new expansion would give the landfill an additional 24 years of life (Alamo Area Council of Governments 2003).

Lackland AFB generated 42,257 tons of solid waste in fiscal year 2003. Of this waste generated on Lackland AFB, 12,008 tons were disposed in Covell Gardens Landfill, 61 tons were mulched, 26,941 tons were reused, and 3,247 tons were recycled. These disposal methods represent a 71.6 percent solid waste diversion rate for Lackland AFB (USAF 2004d).

Based on the number of days per year (313 days) Covell Garden Landfill is open for waste disposal and the average waste (5,000 tons) accepted each of those days, the landfill accepts approximately 1,565,000 tons of waste per year. Therefore, the amount of waste Lackland AFB sent to the landfill in fiscal year 2003 equates to less than one percent of the facility's total waste stream.

3.3.7.4 Wastewater

SAWS provides wastewater collection and treatment services to Lackland AFB. Domestic wastewater from the Main Base and KFA is collected in a system that consists of approximately 44 miles of sewer mains. Although the system operates predominantly by gravity flow, lift stations and force mains are used to connect individual facilities to the main system. The collection system eventually discharges to the Leon Creek Wastewater Treatment Plant (WWTP) by gravity flow through connection points into the SAWS sewer line located along the north and east base boundaries (USAF 2002a). Although the designed daily average throughput capacity of the Leon Creek WWTP is 46 mgd, the permitted daily average and daily maximum flows are 36.5 mgd and 92 mgd, respectively (SAWS 2002). The rated capacity of the Lackland Main and KFA sewer mains are 9.79 mgd and 2.32 mgd, respectively (USAF 2006 and SAWS 2002). Wastewater at the LTA is collected by gravity flow and lift stations and conveyed through a two-mile long force main where it is discharged to the Leon Creek WWTP via the SAWS sewer line near the northeast corner of the annex. The Leon Creek WWTP has a current designed daily average throughput capacity of 8.5 mgd. This facility is currently permitted at daily and maximum flow rates of 6.1 mgd and 13 mgd, respectively (USAF 2006 and SAWS 2002). The estimated daily wastewater discharge volume from Lackland Main Base, LTA, and Kelly Field Annex is 1.5 mgd (USAF 2005c). Additional information on the sewer utilities for Lackland AFB can be found in Appendix B.

3.3.7.5 Transportation

Lackland AFB is located in the southwest corner of the San Antonio metropolitan area. Interstate Highway Loop 410 lies to the west. This highway is a beltway around San Antonio that connects major interstates, US highways, and state highway arteries. The nearest major highway interchange to Lackland AFB is US Highway 90 and Loop 410, to the northwest of the installation.

Lackland AFB has approximately 75 miles of asphalt roads. Truemper, Luke, and Selfridge Roads are the primary east-west routes. Truemper Road is the only unimpeded four-lane road that connects the western and eastern sides of the base (across Southwest Military Drive). Two four-lane roads handle north-south traffic: Carswell Road on the western side of the base and Bong Road on the eastern side. Traffic on Lackland AFB is not impeded. Normal traffic on the base can be delayed at any time by troop formations crossing base streets at designated troop crossings. Additionally, some on-base roadways (Kenly Avenue from Luke Boulevard to Tyndall Street, Luke Boulevard from Southwest Military Drive to Bong Avenue, and Wilford Hall Loop from US Highway 90 Gate to Bergquist Gate Road) are at capacity (USAF 2004a).

Access to Lackland AFB is controlled through eight gates located throughout the installation. Truemper Gate is the main gate on the west side of the installation and is open 24 hours a day. In 1989, a transportation survey of Lackland AFB reported the Truemper Street gate handles approximately 15,100 vehicles in a 24-hour period. However, Southwest Military Drive has been recently expanded between US Highway 90 and the Security Hill Area of the KFA. The Texas Department of Transportation (TXDOT) plans more expansion of Southwest Military Drive to Pearsall Road. Moderate to heavy traffic congestion occurs outside the base

perimeter during peak morning and afternoon rush hours. Average vehicle occupancy has remained at approximately 1.17 persons per vehicle since 1987. A traffic study has not been conducted at Lackland AFB since 1989 (USAF 2004a).

The LTA has approximately 70 miles of asphalt roads. Traffic into and out of the LTA is influenced by heavy traffic at peak times when Loop 410 and its primary frontage roads experience increased traffic flow. During non-peak times, the LTA access point and streets handle traffic well. Access to the LTA is controlled through one primary gate, located on Medina Base Road. The 1989 transportation survey of Lackland AFB reported the Medina Base Drive Gate handles approximately 7,200 vehicles in a 24-hour period.

The predominant mode of travel on Lackland AFB is by private automobile. However, Lackland AFB maintains a comprehensive shuttle bus system, which provides access to most of the main base and the LTA. The Medina Shuttle provides transportation between the main base and the LTA for students in training.

3.3.7.6 Drainage

Stormwater systems convey precipitation away from developed sites to appropriate receiving surface waters. A large, sudden flow could scour a streambed and harm biological resources. Stormwater systems may employ a variety of devices to slow the movement of water, while providing the benefit of reducing sediments and other contaminants that would otherwise flow directly into surface waters. Failure to size stormwater systems appropriately to either hold or delay conveyance of the largest predicted precipitation events can lead to downstream flooding, and environmental and economic damages associated with that flooding. High densities of development, such as those found in urban areas, require greater degrees of stormwater management because of the higher proportions of impervious surfaces.

The northeastern portion of Lackland Main Base and all of the KFA drain into Leon Creek, which flows between the two areas. The southwest portion of the main base drains into Indian Creek. Both Leon Creek and Indian Creek then flow into the Medina River, which eventually flows into the San Antonio River. Drainage across the LTA primarily consists of sheet flow across gently rolling terrain that enters one of two major drainage ways. Most (approximately two-thirds, or 2,600 acres) of the LTA drains into Medio Creek. Medio Creek, which is a perennial stream, flows south from its headwaters north of US Highway 90, through the eastern half of the installation, and exits through the southeast corner of the LTA. Long Hollow Creek (an intermittent stream) and unnamed tributaries of the Medina River collect surface runoff from the western portion (approximately one-third) of the LTA (USAF 2003).

Aside from deeply dissected portions along Leon Creek, Lackland AFB is a gently rolling plain. Underground stormwater collection systems serve the developed parts of the base. In remote or less developed areas of the base (such as the LTA), stormwater drainage occurs via open channels and natural channels (USAF 2002a).

The estimated 2,162 ac-ft of surface water runoff that would result in 24 hours from a 25-year storm event at Lackland AFB would leave the base via one of four basins. The portion of

surface water runoff per basin is based on the overall area and topography of each basin. Table 3-6 provides the amount of estimated stormwater runoff for each basin, with Leon Creek and Medio Creek basins collecting the majority of the surface water runoff from Lackland AFB.

Table 3-6 Stormwater Runoff by Basin

Drainage Basin	Percent of Stormwater Runoff	Amount of Stormwater Runoff (ac-ft)
Leon Creek	42	1,071
Indian Creek	13	331
Medio Creek	30	764
Long Hollow Creek	15	382
Note: Fractional volumes from above percentage based estimates totaling 1 ac-ft applied to Leon Creek to correct total base runoff to 2,548 ac-ft. ac-ft acre-feet		

3.3.8 Socioeconomics

3.3.8.1 Population

The San Antonio Metropolitan Statistical Area (MSA) is composed of Bexar, Comal, Guadalupe, and Wilson Counties and encompasses 3,338 square miles. Population growth was almost 20.5 percent in the San Antonio MSA during the 1990s (from 1,327,601 persons in 1990 to 1,599,378 persons in 2000). According to the Bureau of Economic Analysis, the 2000 population for Bexar County was 1,397,933 persons, while the 1990 population was 1,187,775 persons. Thus, the population of Bexar County increased 17.7 percent from 1990 to 2000 (USAF 2005c).

3.3.8.2 Housing

In 2004, Bexar County had 560,820 housing units. In 2000, the home ownership rate for Bexar County was 61.2 percent and the median value of owner-occupied housing units was \$74,100 (United States Census Bureau [USCB] 2004).

Bexar County had 196,839 rental units in 2004. The number of vacant rentals during this time was 17,125, equating to an 8.7 percent vacancy rate. The average rent for all rental units was approximately \$634 (USCB 2004).

3.3.8.3 Education

There are 19 school districts in Bexar County with an estimated enrollment in 2004-2005 of 417,431 students 3 years of age and older. The Lackland Independent School District (ISD) services the elementary and secondary school students of military personnel living on base. In the fall semester of the 2004-2005 academic year, the Lackland ISD had 964 students and 91 teachers, resulting in a student-to-teacher ratio of 11:1 (Lackland Independent School District 2006).

There are four public school districts in the area immediately surrounding Lackland AFB. Table 3-7 summarizes enrollment in these four districts.

Table 3-7 Enrollment in School Districts near Lackland AFB

District	Enrollment
Edgewood Independent School District	12,378
Northside Independent School District	78,104
South San Antonio Independent School District	10,000
Southwest Independent School District	9,621
Total	110,103

Source: Northside Independent School District 2006, South San Antonio Independent School District 2006, Southwest Independent School District 2006, and Edgewood Independent School District 2006

3.3.8.4 Economy

Employment in the San Antonio MSA grew by 35 percent from 1990 to 2000. Employment growth in the San Antonio MSA was higher than statewide growth and exceeded the growth in Bexar County by a slight margin, indicating higher job growth in outlying counties of the metropolitan area. Annual employment growth was highest between 1993 and 1997, ranging from 3.0 percent to 4.0 percent.

In recent years, the growth rate has slowed to a range of 2.0 percent to 2.5 percent. The service sector dominates regional employment, followed by the retail sector. Together, these sectors account for 50 percent of regional employment. Other key regional sectors include state and local government, followed by the federal government (civilian and military) and the finance sector. Construction and manufacturing round out the major sectors. San Antonio continues to add jobs to its manufacturing sector, as Toyota hires additional assembly-line workers in preparation for the upcoming Tundra plant. The plant will employ 2,000 workers when fully operational. At peak production, the facility's regional economic impact is estimated to be 16,000 additional jobs including direct, indirect, and induced impacts (Federal Reserve System 2006).

The major private-sector employers in San Antonio are services, retail and financial services. Unemployment in the San Antonio MSA followed a general downward trend during the 1990s, but has begun to increase in recent years. Nevertheless, unemployment continues to be lower in San Antonio than in Texas as a whole. Similarly, the regional unemployment rate remains below the national average. Economic growth during the 1990s led to large increases in per capita income throughout the region. The annual per capita income in the Lackland AFB Housing Market Area increased from approximately \$16,400 to \$25,800, which exceeds a 57 percent rate of growth over the decade. Average annual growth of 4.7 percent is slightly below the statewide average of 4.8 percent (USAF 2005c).

3.3.9 Air Quality

This section discusses air quality considerations and conditions in the area around Lackland AFB, in Bexar County, Texas. It addresses air quality standards and describes current air quality conditions in the region.

3.3.9.1 Definition of the Resource

3.3.9.1.1 Federal Air Quality Standards

Air quality is determined by the type and concentration of pollutants in the atmosphere, the size and topography of the air basin, and local and regional meteorological influences. The significance of a pollutant concentration in a region or geographical area is determined by comparing it to federal and/or state ambient air quality standards. Under the authority of the CAA, the USEPA established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety.

These federal standards, known as the National Ambient Air Quality Standards (NAAQS), represent the maximum allowable atmospheric concentrations and were developed for six “criteria” pollutants: ozone (O₃), nitrogen dioxide (NO₂), carbon monoxide (CO), respirable particulate matter less than or equal to 10 and 2.5 micrometers in diameter (PM₁₀ and PM_{2.5}, respectively), sulfur dioxide (SO₂), and lead (Pb). The NAAQS are defined in terms of concentration (e.g., parts per million or micrograms per cubic meter) determined over various periods of time (averaging periods). Short-term standards (1-hour, 8-hour, or 24-hour periods) were established for pollutants with acute health effects and may not be exceeded more than once a year. Long-term standards (quarterly or annual periods) were established for pollutants with chronic health effects and may never be exceeded.

Based on measured ambient criteria pollutant data, the USEPA designates areas of the United States as having air quality equal to or better than the NAAQS (attainment) or worse than the NAAQS (nonattainment). Upon achieving attainment, areas are considered to be in maintenance status for a period of 10 or more years. Areas are designated as unclassifiable for a pollutant when there is insufficient ambient air quality data for the USEPA to form a basis of attainment status. For the purpose of applying air quality regulations, unclassifiable areas are treated similar to areas that are in attainment of the NAAQS.

The USEPA recently promulgated attainment designations for the newly established 8-hour O₃ standard effective as of June 15, 2004. The USEPA revoked the 1-hour O₃ standard on June 15, 2005. On December 17, 2004, the USEPA designated areas as attainment or nonattainment for the newly developed standard for particulates less than 2.5 micrometer in diameter (PM_{2.5}), which are fine particulates that have not been previously regulated (USEPA 2005).

FINAL

Affected Environment

*Installation Development
Lackland Air Force Base, Texas*

3.3.9.1.1.1 State Air Quality Standards

Under the CAA, state and local agencies may establish ambient air quality standards (AAQS) and regulations of their own, provided that these are at least as stringent as the federal requirements. For all criteria pollutants, the State of Texas has adopted the NAAQS. A summary of the NAAQS that apply to the proposed project area is presented in Table 3-8.

Table 3-8 Federal Ambient Air Quality Standards

Air Pollutant	Averaging Time	NAAQS																													
		Primary	Secondary																												
Carbon Monoxide (CO)	8-hour 1-hour	9 ppm 35 ppm	--- ---																												
Nitrogen Dioxide (NO ₂)	AAM 24-hour	0.053 ppm ---	0.053 ppm ---																												
Sulfur Dioxide (SO ₂)	AAM 24-hour 3-hour	0.030 ppm 0.14 ppm ---	--- --- 0.50 ppm																												
Particulate Matter (PM ₁₀)	AAM 24-hr	50 µg/m ³ 150 µg/m ³	50 µg/m ³ 150 µg/m ³																												
Particulate Matter (PM _{2.5}) ¹	AAM 24-hour	15 µg/m ³ 65 µg/m ³	15 µg/m ³ 65 µg/m ³																												
Ozone (O ₃) ²	1-hour 8-hour	0.12 ppm 0.08 ppm	0.12 ppm 0.08 ppm																												
Lead (Pb) and Pb Compounds	Calendar Quarter	1.5 µg/m ³	1.5 µg/m ³																												
<p>¹The PM_{2.5} standard (particulate matter with a 2.5 µm diameter or smaller) will be implemented over the next few years. USEPA designated areas as being in attainment or nonattainment of the PM_{2.5} standard in December 2004.</p> <p>On September 21, 2006, USEPA issued final revisions to the particulate matter standards. With regards to PM₁₀, USEPA revoked the annual standard. With regards to the PM_{2.5} standard, USEPA revised the level of the 24-hour standard to 35 µg/m³. With regard to secondary PM standards, EPA is made them identical in all respects to the primary PM standards, as revised. The final rule is effective 60 days after publication in the Federal Register.</p> <p>²The 8-hour O₃ standard replaced the 1-hour standard when the USEPA revoked the 1-hour O₃ standard in June 2005.</p> <table> <tr> <td>AAM</td><td>Annual Arithmetic Mean</td><td>NAAQS</td><td>National Ambient Air Quality Standards</td></tr> <tr> <td>CO</td><td>carbon monoxide</td><td>O₃</td><td>ozone</td></tr> <tr> <td>NO₂</td><td>nitrogen dioxide</td><td>PM₁₀</td><td>particulate matter equal to or less than 10 microns in aerodynamic diameter</td></tr> <tr> <td>PM_{2.5}</td><td>particulate matter equal to or less than 2.5 microns in aerodynamic diameter</td><td>ppm</td><td>parts per million</td></tr> <tr> <td>Pb</td><td>lead</td><td>USEPA</td><td>United States Environmental Protection Agency</td></tr> <tr> <td>SO₂</td><td>sulfur dioxide</td><td>µm</td><td>micrometer</td></tr> <tr> <td>µg/m³</td><td>micrograms per cubic meter</td><td></td><td></td></tr> </table>				AAM	Annual Arithmetic Mean	NAAQS	National Ambient Air Quality Standards	CO	carbon monoxide	O ₃	ozone	NO ₂	nitrogen dioxide	PM ₁₀	particulate matter equal to or less than 10 microns in aerodynamic diameter	PM _{2.5}	particulate matter equal to or less than 2.5 microns in aerodynamic diameter	ppm	parts per million	Pb	lead	USEPA	United States Environmental Protection Agency	SO ₂	sulfur dioxide	µm	micrometer	µg/m ³	micrograms per cubic meter		
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µg/m ³	micrograms per cubic meter																														

3.3.9.1.1.2 State Implementation Plan

For nonattainment regions, the states are required to develop a State Implementation Plan (SIP) designed to eliminate or reduce the severity and number of NAAQS violations, with an underlying goal to bring state air quality conditions into (and maintain) compliance with the NAAQS by specific deadlines. Lackland AFB is located in Bexar County, which is

currently designated “nonattainment-deferred” for O₃ (see Section 3.3.9.2.2). The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS in each state.

3.3.9.1.1.3 Prevention of Significant Deterioration

Section 162 of the CAA further established the goal of prevention of significant deterioration (PSD) of air quality in all international parks; national parks which exceeded 6,000 acres; and national wilderness areas and memorial parks which exceeded 5,000 acres if these areas were in existence on August 7, 1977. These areas were defined as mandatory Class I areas, while all other attainment or unclassifiable areas were defined as Class II areas. Under CAA Section 164, states or tribal nations, in addition to the federal government, have the authority to redesignate certain areas as (non-mandatory) PSD Class I areas, e.g., a national park or national wilderness area established after August 7, 1977, that exceeds 10,000 acres. PSD Class I areas are areas where any appreciable deterioration of air quality is considered significant. Class II areas are those where moderate, well-controlled growth could be permitted. Class III areas are those designated by the governor of a state as requiring less protection than Class II areas. No Class III areas have yet been so designated. The PSD requirements affect construction of new major stationary sources in the PSD Class I, II, and III areas and are a pre-construction permitting system.

3.3.9.1.1.4 Visibility

CAA Section 169A established the additional goal of prevention of further visibility impairment in PSD Class I areas. Visibility impairment is defined as a reduction in the visual range and atmospheric discoloration. Determination of the significance of an activity on visibility in a PSD Class I area is typically associated with evaluation of stationary source contributions. The USEPA is implementing a Regional Haze rule for PSD Class I areas that will address contributions from mobile sources and pollution transported from other states or regions. Emission levels are used as a qualitative assessment of potential impairment to visibility in PSD Class I areas. Decreased visibility may potentially result from elevated concentrations of PM₁₀ and SO₂ in the lower atmosphere.

3.3.9.1.2 General Conformity

CAA Section 176(c), General Conformity, established certain statutory requirements for federal agencies with proposed federal activities to demonstrate conformity of the proposed activities with each state’s SIP for attainment of the NAAQS. Federal activities must not:

- Cause or contribute to any new violation.
- Increase the frequency or severity of any existing violation.
- Delay timely attainment of any standard, interim emission reductions, or milestones in conformity to a SIP’s purpose of eliminating or reducing the severity and number of NAAQS violations or achieving attainment of NAAQS.

General conformity applies only to nonattainment and maintenance areas. Lackland AFB is located in Bexar County, which is currently designated “nonattainment-deferred” for O₃ (see Section 3.3.9.2.2). If the emissions from a federal action proposed in a nonattainment area exceed annual thresholds identified in the rule, a conformity determination is required of that action. The thresholds become more restrictive as the severity of the nonattainment status of the region increases.

3.3.9.1.3 Stationary Source Operating Permits

The TCEQ regulates air permits for stationary air pollution sources in the State of Texas. Air quality permits must be obtained for new or modified sources. Title V of the CAA Amendments of 1990 requires states to issue Federal Operating Permits for major stationary sources. A major stationary source in an attainment or maintenance area is a facility (i.e., plant, base, or activity) that emits 100 tons or more per year (tpy) of volatile organic compound (VOC) or nitrogen oxides (NO_x), both of which are atmospheric precursors to the formation of O₃, 100 tpy or more of any other criteria air pollutant, 10 tpy or more of a hazardous air pollutant (HAP), or 25 tpy or more of any combination of HAPs². These substances include certain VOCs, pesticides, herbicides, and radionuclides that present tangible hazard, based on scientific studies of exposure to humans and other mammals. Texas has specific rules for control of visible emissions and particulate matter on roads, streets, and alleys, from parking lots, and during material handling, construction, and demolition activities (30 Texas Administrative Code §§ 111.143-149).

3.3.9.2 Existing Condition

3.3.9.2.1 Climate

Lackland AFB is located in the south-central part of Texas on the Balcones Escarpment, which is on the edge of the Gulf Coastal Plains. Further, Lackland AFB is located in a climatic area called the humid subtropical region. The climate is characterized by hot, moist summers and moderate, moist winters. The average annual temperature is 69°F. Average monthly temperatures range from 50°F in January to the low 80s during June, July, and August. The highest average daily maximum temperature is 95°F in June, and the lowest average daily minimum temperature is 39°F in January. The average first occurrence of temperatures below freezing is in late November and the average last occurrence is in early March.

Lackland AFB is located between a semi-arid region to the west and a coastal area of heavy precipitation to the east. Average annual rainfall is approximately 29 inches. Precipitation is fairly well distributed throughout the year, with the heaviest amounts occurring in May and September. Approximately 61 percent of the rainfall occurs over the period from April through September, primarily in thunderstorms. During this period, large

² A HAP is a substance that is defined as hazardous in accordance with the 1990 amendments of the Clean Air Act.

amounts of precipitation may fall in a short period. Most of the winter precipitation occurs as light rain or drizzle; however, thunderstorms accompanied by heavy rain have occurred in all months of the year. Measurable snowfall occurs only once in 8 to 10 years.

Northerly winds prevail during most of the winter. Southeasterly winds from the Gulf of Mexico are predominant in the summer but also occur frequently during the winter. The average annual prevailing wind direction is from the southeast, and the average annual wind speed is 9 miles per hour (mph), with monthly averages ranging from 8 mph to 10 mph. The windiest months are March and April; September and October have the least wind (USAF 2002c).

3.3.9.2.2 Regional Air Quality

Lackland AFB is located in Bexar County, Texas. Bexar County, according to 40 CFR 81.40, is part of the Metropolitan San Antonio Intrastate Air Quality Control Region (AQCR Number 217), which includes Atascosa, Bandera, Bexar, Comal, Dimmit, Edwards, Frio, Gillespie, Guadalupe, Karnes, Kendall, Kerr, Kinney, La Salle, Maverick, Medina, Real, Uvalde, Val Verde, Wilson, and Zavala Counties in Texas. A review of federally published attainment status for Texas in 40 CFR 81.344 indicated that this region is designated as attainment or meeting national standards for all criteria pollutants, except for O₃.

Bexar County is part of the San Antonio “Early Action Compact” (EAC) Area for O₃, along with Comal, Guadalupe, and Wilson Counties. Bexar, Comal, and Guadalupe Counties are currently designated “nonattainment-deferred” for O₃, while Wilson County is designated attainment for O₃. An EAC is a USEPA program that gives flexibility to local areas to develop their own approach to meeting the 8-hour O₃ standard, and requires the areas to demonstrate attainment by December 31, 2007. The EAC enables Bexar County to maintain its attainment status with the NAAQS for all pollutants until a specified future date, provided certain air quality parameters are maintained.

Mandatory PSD Class I areas established under the CAA Amendments of 1977 for the state of Texas are listed in 40 CFR 81.429. These are areas where visibility has been determined to be an important issue by the Administrator, in consultation with the Secretary of the Interior. The nearest mandatory PSD Class I area in the region potentially affected by the action is Big Bend National Park, located in Brewster County, Texas. This 708,118-acre area is located approximately 350 miles west of Lackland AFB.

3.3.9.2.3 Current Air Emissions

An emissions inventory is an estimate of total mass emissions of pollutants generated from a source or sources over a period, typically one year. Table 3-9 shows the most recent emission quantities reported for AQCR 217 (year 2002 National Emissions Inventory). Table 3-10 shows the most recent emission quantities reported for Bexar County (year 2002 National Emissions Inventory). The Lackland AFB Air Emissions Inventory Report does not include mobile sources, because tracking of mobile source emissions is not required in areas

FINAL

Affected Environment

*Installation Development
Lackland Air Force Base, Texas*

designated nonattainment-deferred. Therefore, the Lackland AFB Air Emissions Inventory was not included as baseline data.

Table 3-9 Baseline Emissions Inventory, AQCR 217

AQCR 217 ²	Emissions (tons/year)				
	Total CO	Total VOC ¹	Total NO _x	Total SO _x	Total PM ₁₀
Totals	671,870	112,137	111,197	50,221	192,504
¹ VOC is not a criteria pollutant. However, VOC is reported because, as an O ₃ precursor, it is a controlled pollutant. ² Summarized from year 2002 National Emissions Inventory. AQCR Air Quality Control Region PM ₁₀ particulate matter equal to or less than 10 microns in aerodynamic diameter CO carbon monoxide SO _x sulfur oxides NO _x nitrogen oxides VOC volatile organic compound					

Table 3-10 Baseline Emissions Inventory, Bexar County

Bexar County ²	Emissions (tons/year)				
	Total CO	Total VOC ¹	Total NO _x	Total SO _x	Total PM ₁₀
Totals	431,424.49	66,247.05	63,604.04	30,957.94	64,073.29
¹ VOC is not a criteria pollutant. However, VOC is reported because, as an O ₃ precursor, it is a controlled pollutant. ² Summarized from year 2002 National Emissions Inventory. AQCR Air Quality Control Region PM ₁₀ particulate matter equal to or less than 10 microns in aerodynamic diameter CO carbon monoxide SO _x sulfur oxides NO _x nitrogen oxides VOC volatile organic compound					

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Chapter 4

Environmental Consequences

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes potential impacts that could occur if the proposed action or the potential development alternative is implemented at Lackland AFB. Additionally, potential impacts are addressed for the no action alternative and cumulative impacts are analyzed for the additional actions proposed on or around Lackland AFB. Significance criteria used to evaluate potential impacts are discussed at the beginning of each resource area.

4.2 CHANGE IN CURRENT MISSION

The primary missions of Lackland AFB would continue. However, implementation of the proposed action would allow Lackland AFB to meet mission and security requirements more effectively.

4.3 DESCRIPTION OF THE EFFECTS OF ALL ALTERNATIVES ON THE AFFECTED ENVIRONMENT

4.3.1 Noise

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Concerns regarding aircraft noise relate to certain potential impacts such as hearing loss, non-auditory health effects, annoyance, speech interference, sleep interference, and effects on domestic animals, wildlife, structures, terrain, and historic and archaeological sites.

In evaluating noise impacts, several items were examined, including: (1) the degree to which noise levels generated by construction and demolition activities are higher than the ambient noise levels; (2) the noise levels resulting from aircraft operations; (3) the degree to which there is annoyance and/or activity interference; and (4) the proximity of noise-sensitive receptors to the noise source.

The primary means of assessing environmental noise is through computer simulations since direct measurement of noise levels is often impractical, expensive, and inconclusive. Additionally, direct measurement would require actual implementation of the action prior to an analysis and decision that would be impractical and contrary to NEPA. Unlike a topographic contour, noise contours are not intended to be precise representations of the noise zones. Geographic features, meteorology, the receiver's perception of the source,

etc., can influence the impact of noise. Noise contours do not clearly divide noise zones with one side of the line compatible and the other side incompatible. However, the use of noise contour maps has proven to be a reliable planning tool in noise-affected areas.

Noise levels resulting from all aviation activities were modeled using the Air Force's BASEOPS/NOISEMAP model or MR_NMAP model, as appropriate. Noise levels associated with operations in the airfield environment and in the military training airspace resulting from the proposed action and alternatives were calculated and compared with current conditions to assess impacts. Data developed during this process will also support analyses in other resource areas.

Based on numerous sociological surveys and recommendations of federal interagency councils, the most common benchmark referred to is an L_{dn} of 65 dBA. This threshold is often used to determine residential land use compatibility around airports or highways. By extension, it is often used as a criterion in airspace planning. Two other average noise levels are also useful:

- An L_{dn} of 55 dBA was identified by the USEPA as a level "...requisite to protect the public health and welfare with an adequate margin of safety" (USEPA 1974). Noise may be heard, but there is no risk to public health or welfare.
- An L_{dn} of 75 dBA is a threshold above which effects other than annoyance may occur. It is 10 to 15 dBA below levels at which hearing damage is a known risk (OSHA 1983). However, it is also a level above which some adverse health effects cannot be categorically discounted.

Public annoyance is the most common impact associated with exposure to elevated noise levels. When subjected to L_{dn} of 65 dBA, approximately 12 percent of persons so exposed will be "highly annoyed" by the noise. At levels below 55 dBA, the percentage of annoyance is correspondingly lower (less than three percent). The percentage of people annoyed by noise never drops to zero (some people are always annoyed), but at levels below 55 dBA it is reduced enough to be essentially negligible.

4.3.1.1 Proposed Action

Vehicles and equipment involved in demolition, facility construction, and finishing work would generate the primary noise from the proposed action. The typical noise levels generated by these activities range from 75 to 89 dBA at 50 feet from the source. Assuming that noise from the heavy equipment radiates equally in all directions, the sound intensity diminishes inversely as the square of the distance from the source. Therefore, in a free field (no reflections of sound), the L_p decreases 6 dB with each doubling of the distance from the source. Under most conditions, reflected sound will reduce the attenuation due to distance. Therefore, doubling the distance may only result in a decrease of 4 to 5 dB (AIHA 1986). Construction noise would be intermittent and short-term in duration. The nearby facilities would experience muffled construction noise during the workday. Noise generation would last only for the duration of demolition and construction

activities and could be reduced through the use of equipment exhaust mufflers. Assuming a maximum noise level of 89 dBA measured 50 feet from the source, the distances from each of the project areas to off-base sensitive receptors would be sufficient to allow noise levels to attenuate to levels within existing conditions at the installation naturally. Because the noise environment on and in the vicinity of Lackland AFB is dominated by military aircraft operations, noise produced by demolition and construction activities would not affect sensitive receptors on or off the base. Table 4-1 shows the anticipated sound pressure levels at a distance of 50 feet for miscellaneous heavy equipment.

Table 4-1 Heavy Equipment Noise Levels at 50 Feet

Equipment Type ¹	Number Used ¹	Generated Noise Levels, L _p (dBA) ²
Bulldozer	1	88
Backhoe (rubber tire)	1	80
Front Loader (rubber tire)	1	80
Dump Truck	1	75
Concrete Truck	1	75
Concrete Finisher	1	80
Crane	1	75
Flat-bed Truck (18-Wheel)	1	75
Scraper	1	89
Trenching Machine	1	85
¹ Estimated number in use at any time. ² Source: Construction Engineering Research Laboratory 1978 dBA A-weighted sound level, measured in decibels L _p sound pressure level		

Construction activities would be expected to occur between 7:30 a.m. and 4:30 p.m. Noise levels at residences in the vicinity of the construction activities would be less than 65 dBA. Minor annoyances to on-base sensitive receptors in the vicinity of the demolition and construction activities associated with exposures to noise exceeding 65 dBA would be of short duration. No changes in aircraft operations are anticipated from implementation of the proposed action. Long-term noise impacts would not be anticipated.

4.3.1.2 Alternative Action

Noise impacts associated with the alternative action would include the construction and demolition impacts as described for the proposed action. In addition, flying activities would be increased by 15 percent. This equates to performing approximately 160,023 annual (or 467 daily) operations at the installation (Table 4-2). The noise contours associated with these increased activity levels are shown in Figure 4-1, and the land areas exposed to elevated noise levels are compared with current conditions in Table 4-3.

Table 4-2 Projected Daily Aircraft Operations at Lackland AFB

	Current Baseline	Capability Scenario
Aircraft	2005	2011
C-5	78	90
F-16	188	216
Other Aircraft	161	161
Total	427	467

Source: Appendix B (Capability Analysis)

Table 4-3 Land Areas Exposed to Elevated Noise Levels

Noise Level (L _{dn})	Land Area, in Acres, Exposed To Elevated Noise ¹			
	Current Operations	Expanded Operations	Change (Acres)	Percent Change
65 – 69	9,544.0	10,367.0	+ 823.0	+ 9
70 – 74	6,144.7	6,614.4	+ 469.7	+ 8
75 – 79	2,196.8	2,618.5	+ 421.7	+ 19
80 – 84	888.1	961.3	+ 73.2	+ 8
> 85	921.4	1,026.8	+ 105.4	+ 11

¹Area shown is for applicable noise levels.
Total land area exposed to L_{dn} 65 or greater increases from 19,695 acres to 21,588 acres, an approximate 10 percent increase.
Source: Appendix B (Capability Analysis)
L_{dn} day-night average sound level

The changes to noise exposure at the sensitive receptors are identified in Table 4-4. As shown, noise exposure at points SD08 (Residential Area) and NR38 (Oliver W. Holmes High School) change from previously-compatible to non-compatible land uses if aircraft operations were increased by greater than 15 percent.

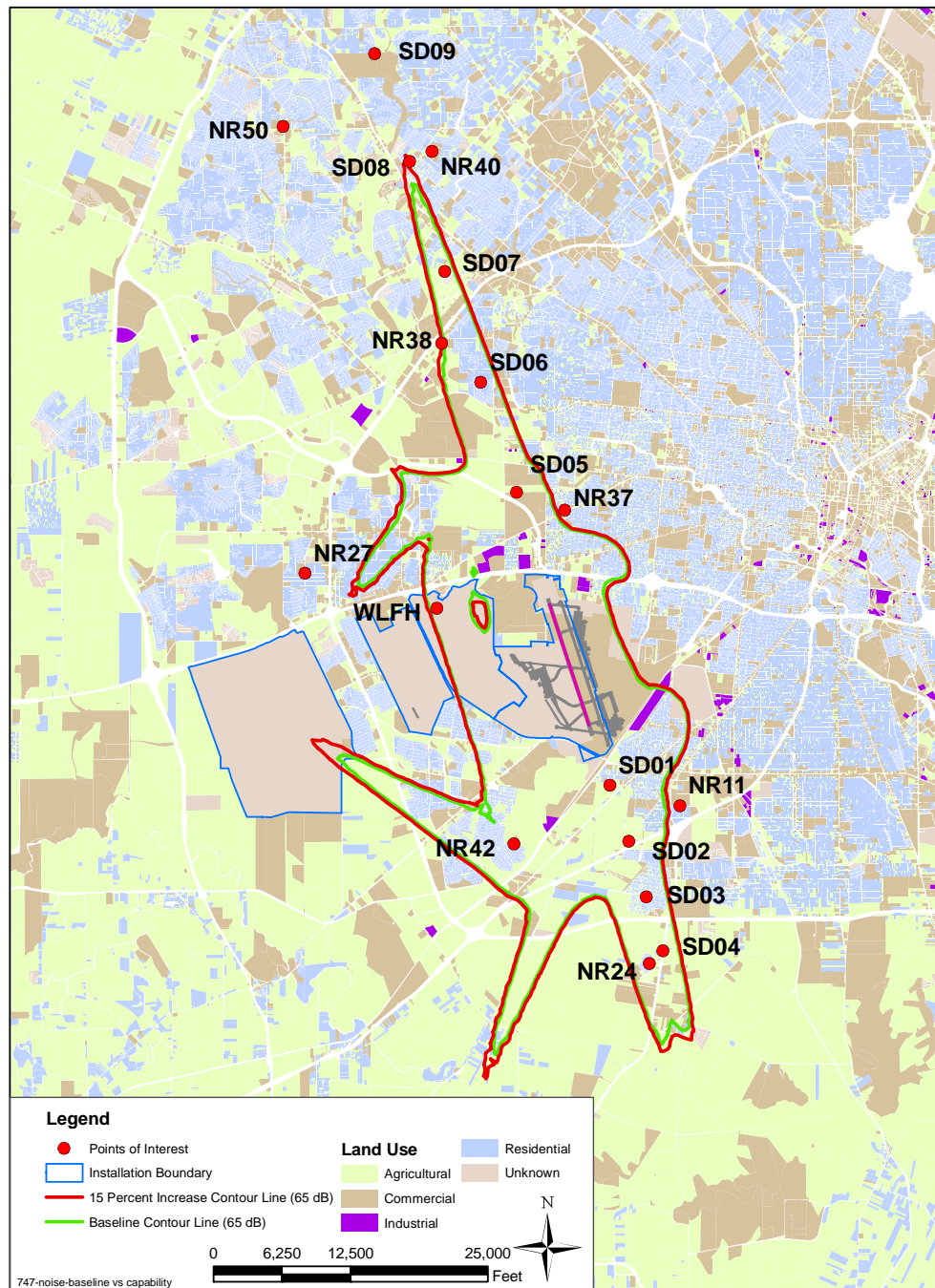
4.3.1.3 No Action Alternative

Under the no action alternative, there would be no change from the baseline conditions described in Section 3.3.1.

4.3.1.4 Cumulative Impacts

Past, present, and reasonably foreseeable future proposals in the ROI have the potential to create noise impacts. For the projects identified, noise would result from construction activities and other modified or added aviation activities.

Noise on construction sites normally results from the use of heavy equipment and other vehicular movement. Demolition projects also have the potential to generate elevated noise levels from the same sources. Construction and/or demolition would occur as part of the implementation of projects identified in Section 2.7. Elevated noise levels resulting from construction and demolition are usually sporadic and transitory, are relatively confined to the immediate vicinity of the construction site, and, of course, cease at the completion of the project. Considering the usual levels of sound created by these activities in comparison to aviation-related noise in the same areas, there should not be a noticeable impact. While construction-related sound may be heard in close proximity to the project, it is not usually excessive and noise from aircraft operations would be expected to continue to dominate the acoustic character of the ROI.



**Figure 4-1 Noise Contours with Sensitive Receptors
Lackland AFB, Alternative Action**

Table 4-4 Noise Levels at Sensitive Receptors, Alternative Action

Point ID	Location	Noise Level (L _{dn})		
		Current	Capability Scenario	Change
SD01	Residential Area (Quintana Road and Southwest Military Drive)	85.3	85.9	0.6
SD02	Residential Area (Golden Community Park)	75.9	76.4	0.6
SD03	Residential Area (Palo Alto)	73.7	74.2	0.5
SD04	Residential Area (North Spicewood Park)	72.8	73.4	0.6
SD05	Residential Area (Van de Walle Park)	76.6	77.1	0.5
SD06	Residential Area (Ingram and Callaghan Roads)	72.0	72.6	0.6
SD07	Residential Area (South Leon Valley)	67.5	68.1	0.6
SD08	Residential Area (Huebner and Bandera Roads)	64.5	65.0	0.5
SD09	Residential Area (South O.P. Schnabel Park)	62.3	62.8	0.5
NR11	Kindred School / South San Antonio High School	63.3	63.8	0.5
NR24	Residential Area (South Spicewood Park)	69.0	69.6	0.6
NR27	John Glenn School	52.1	52.7	0.6
NR37	Lincoln School	62.8	63.2	0.4
NR38	Oliver W. Holmes High School	64.5	65.0	0.5
NR40	John Marshall High School	58.0	58.5	0.5
NR42	Residential Area / School Southeast Pearsall Road	67.3	67.9	0.6
NR50	Stevenson Middle School	44.2	44.5	0.3
WLFH	Wilford Hall Hospital	47.9	48.4	0.5
Source: NOISEMAP (Moulton 1990) L _{dn} day-night average sound level				

4.3.1.5 Measures to Reduce Impacts

Existing baseline noise levels at Lackland AFB would not be significantly increased from the implementation of the proposed action or alternative. Noise levels would be temporarily increased from the demolition and construction projects. Measures to reduce impacts would not be required for the proposed action or alternative action.

Noise-generating construction equipment at the project site should be equipped with the manufacturer's standard noise control devices (i.e., mufflers, baffling, and/or engine enclosures). All equipment should be properly maintained to assure that no additional noise from worn or improperly maintained equipment parts is generated. Occupational exposure to noise from construction equipment could be reduced by requiring construction workers to wear appropriate hearing protection, and hearing protective devices such as ear plugs or ear muffs should be worn at all locations where workers may be exposed to high noise levels.

4.3.2 Land Use

The level of potential land use impacts is based on the amount for land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be adverse if it met the following criteria:

- Was inconsistent or in noncompliance with existing land use plans or policies.
- Precluded the viability of existing land use.
- Precluded continued use or occupation of an area.
- Was incompatible with adjacent land use to the extent that public health or safety is threatened.
- Conflicted with planning criteria established to ensure the safety and protection of human life and property.

4.3.2.1 Proposed Action

Lackland AFB has identified the need for construction, demolition, or renovation of facilities for 38 projects. The proposed action would have no direct effect on land use. The proposed construction, renovation, and demolition projects may modify the existing land use patterns on Lackland AFB, though future land use classifications, identified in the General Plan, were taken into consideration during base planning of the proposed projects (USAF 2002a). No additional land would be needed to accommodate the activities associated with the proposed action.

4.3.2.2 Alternative Action

Under the alternative action, no direct effect on land use resources is anticipated. This alternative would reduce the amount of open space on the installation, although acreage

constrained by environmental factors (i.e., wetlands, floodplains, safety easements, etc.) would remain open. As with the proposed action, it is anticipated that no additional land would be needed to accommodate the activities associated with the alternative action. Therefore, the analysis and conclusions for the proposed action would apply to the alternative action.

4.3.2.3 No Action Alternative

Under the no action alternative, there would be no change in the management of land use from the baseline conditions described in Section 3.3.2.

4.3.2.4 Cumulative Impacts

Under the cumulative condition, other facilities would be constructed on Lackland AFB and some would be in the general areas associated with the proposed and alternative actions. As with the proposed action facilities, the other facility actions would be compatible with the *General Plan* (USAF 2002a). Thus, the facility construction anticipated under the cumulative conditions would be consistent with existing and future land use plans and programs identified in the *General Plan* (USAF 2002a).

4.3.2.5 Measures to Reduce Impacts

Land use impacts would not be anticipated at Lackland AFB for the proposed action or the alternative action. Therefore, mitigation measures to protect human health and welfare would not be required at any of the locations.

4.3.3 Earth Resources

Protection of geologic features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential impacts of a proposed action. Generally, impacts can be avoided or minimized by incorporating proper construction techniques, erosion control measures, and engineering practices into project development. In evaluating impacts on earth resources, several items were examined, including (1) the degree to which the proposed action and alternatives could potentially disrupt the ground surface and destroy the soil profile through excavation and removal of rock and soil in the construction of facilities; and (2) the degree to which the proposed action and alternatives could potentially increase erosion caused by the disturbance of the ground surface during the construction and demolition of facilities.

4.3.3.1 Proposed Action

Under the proposed action, approximately 115 acres of land surface would be disturbed as a result of new building footprints, associated pavements, and demolition activities. Construction and demolition activities such as grading, excavating, and recontouring of the soil would result in soil disturbance. Geology would not change as a result of the proposed action in areas previously disturbed. Geology (clay soil with high shrink-swell potential) in previously undisturbed locations could cause damage to

buildings and foundations. Proper foundation engineering would be used to construct new facilities to avoid damage from swelling soil.

Construction projects on Lackland AFB would be located in both previously disturbed and undisturbed areas. Impacts to soil would be minimized by use of standard engineering practices (e.g., application of water for dust control) that reduce wind erosion or silt fences that reduce runoff erosion. Earthwork would be planned and conducted in such a manner to minimize the duration of exposure to unprotected soil. Side slopes and back slopes would be protected immediately upon completion of rough grading. Protection would be provided by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Slopes too steep for stabilization by other means would be stabilized by hydroseeding, mulch anchored in place, anchored netting, sod, or such combination of these and other methods as may be necessary for effective erosion control. Use of best management practices such as rock berms, silt fences, and single point constructions entries would minimize erosion during demolition and construction. Grass and other landscaping would be reestablished in the disturbed areas immediately after completion of construction, thereby reducing the potential for erosion.

4.3.3.2 Alternative Action

Under the alternative action, the underlying geology of the area would not change. Project design would ensure that appropriate foundation techniques are employed so that the shrink-swell potential of the underlying formations would have no adverse affects on building structures. Under this alternative, it is estimated that a total of approximately 256 acres would be disturbed as a result of construction and pavement activities. While this area is larger than the proposed action, not all the construction activity would occur during the same timeframe. Construction would occur as need arises and funds become available. It is unlikely that more than 10 percent (26 acres) of this construction activity would occur at any one time. Well-maintained silt fences, wetting of the construction site, daily site inspections, and other best management practices would be used to limit or eliminate soil movement, stabilize runoff, and control sedimentation. Following construction, disturbed area not covered with impervious surfaces would be reestablished with appropriate vegetation and managed to protect against future erosion. Given the relatively small area potentially disturbed at any given time, and the employment of engineering practices that would minimize potential erosion, impacts to earth resources are expected to be minor. .

4.3.3.3 No Action Alternative

Under the no action alternative, soil disturbances would not occur. Therefore, there would be no change from the baseline conditions described in Section 3.3.3.

4.3.3.4 Cumulative Impacts

Demolition and construction of facilities anticipated under the proposed and other actions or alternative and other actions would not involve extensive modification of surface features. Potential cumulative impacts to soils would include increased soil erosion during

the construction periods. However, these cumulative impacts would be minimized by use of standard engineering practices (e.g., application of water for dust control) that reduce wind erosion or silt fences that reduce runoff erosion.

4.3.3.5 Measures to Reduce Impacts

Only minor soil erosion from wind and stormwater runoff would be expected during construction activities. Accepted containment procedures, including adequate watering, would be implemented during the construction phases to minimize sediment runoff from the disturbed area. Therefore, given the current conditions and the proposed plans and actions, no mitigation measures are required. However, for the proposed and alternative actions, best management practices should be incorporated into the project development and include specific sediment and erosion control plans to prevent soil disturbance, capture and contain loose soil, and slow the movement of stormwater during heavy rains.

4.3.4 Water Resources

In evaluating impacts on water resources, several items were considered, including: (1) the degree to which the proposed action and alternatives change impermeable surface areas; (2) the degree to which the proposed action and alternatives degrade surface water quality; (3) the degree to which the potential decline in groundwater levels results in a substantial depletion of water resources; and (4) the potential for the proposed action to violate established water resource laws or regulations.

4.3.4.1 Surface Water

4.3.4.1.1 Proposed Action

As detailed in Table 2-1, approximately 115 acres of land would be disturbed resulting in approximately 87 acres of new net impervious (impenetrable) surfaces under the proposed action. Table 2-1 describes additional details on individual projects listed in the proposed action.

The proposed action would add to the impervious surfaces associated with Lackland AFB. In general, increases in impervious surfaces act to increase peak discharge volume and speed delivery of water to nearby streams and waterways, which ultimately increases chances for flooding. In undeveloped land, rainfall and snowmelt collect and are stored in vegetation, in the soil column, or in topographic depressions. Water is then utilized by plants and is respired, or it moves slowly into groundwater and/or eventually to surface water bodies where it slowly moves through the hydrologic cycle. Removal of vegetation decreases infiltration into the soil column and thereby increases the quantity and timing of runoff. Replacement of vegetation with an impervious surface eliminates any potential for infiltration and speeds up delivery of the water to nearby drainage and stream channels. With less storage capacity in the soil column and vegetation, urban streams rise more quickly during storm events and have higher peak discharge rates, which both increase the potential for flooding.

There are currently approximately 1,667 acres of impervious cover on Lackland AFB; implementation of the proposed action would increase total impervious cover by approximately 5 percent. Subsequently, the total volume of stormwater runoff would increase by an estimated 2 percent, based on the increase in the site-wide weighted average runoff coefficient from 0.41 to 0.42³. The curbs and gutters installed during any street and off-street parking construction would be connected to the existing stormwater system. An additional 53 acre-feet of site-wide stormwater detention capacity would be a consideration for mitigating any perceived off-site impacts, which would be minimal.

Because construction and demolition activities would require the disturbance of more than one acre, regulatory coverage under the Texas Pollutant Discharge Elimination System (TPDES) Construction Stormwater General Permit would be required for each construction activity. An appropriate Stormwater Pollution Prevention Plan (SWP3) would be prepared and executed, as appropriate. The SWP3 would address all the elements of the proposed action before initiating activities. The plan would include erosion and sediment control techniques that would be used during demolition and construction to minimize erosion. Additionally, the SWP3 may include diversion ditches that would be constructed to retard and divert runoff to protect drainage courses.

The construction associated with the proposed action would increase impervious surfaces on Lackland AFB. During large rainfall events, impervious surfaces increase the speed at which water flows into receiving surface water bodies by removing natural barriers and reducing infiltration into the ground. The potential for stormwater to carry contaminants that could flow directly into surface waters is also a concern when impervious areas increase. Compliance with the TPDES permits would ensure that there would be no significant adverse effects from contaminant-laden stormwater resulting from the proposed action. It is anticipated that implementation of the proposed action, in compliance with TPDES requirements, should prevent violations of water quality laws or regulations. Therefore, minor adverse effects on surface water would be expected as a result of the proposed action.

4.3.4.1.2 Alternative Action

Approximately 256 acres of land would be temporarily disturbed for the maximum development, resulting in approximately 141 acres of new net impervious (impenetrable) surfaces to be added to the 87 new acres from the CIP and BRAC projects (the proposed action). The alternative action impervious cover total of 228 acres would increase total impervious cover by approximately 13.7 percent. Subsequently, the total volume of stormwater runoff would increase by an estimated 5 percent, based on the increase in the

³ Runoff coefficients used are the same as those to describe the current condition, only the amount of impervious land is increased by 87 acres. $[(0.95) \times (1,667 + 87 \text{ impervious acres}) + (0.30) \times (7,858 - 87 \text{ vegetated acres})] \text{ divided by } 9,525 \text{ total acres}$ is equivalent to 0.42, which indicates a 2.4 percent increase in runoff, or 53 acre-feet of water in a 24 hour period for a 25-year storm (7.83 inches per day with an intensity of 0.2792 inches per hour, assuming a 20-minute time of concentration).

site-wide weighted average runoff coefficient from 0.41 to 0.43⁴. An additional 105 acre-feet of site-wide stormwater detention capacity would be a consideration for mitigating any perceived off-site impacts, which would be minimal.

The construction and demolition activities would be conducted consistent with the requirements of the TPDES stormwater program, as described in Section 4.3.4.1.1. Therefore, no significant adverse water quality impacts are anticipated.

4.3.4.1.3 No Action Alternative

Under the no action alternative, water resources would remain comparable to baseline conditions as described in Section 3.3.4.1.

4.3.4.1.4 Cumulative Impacts

The cumulative actions outside of the proposed and alternative actions would have minor adverse impacts on surface water quality due to the temporary disturbance of approximately 83 acres and the demolition of approximately 12 acres of impervious surfaces associated with outdated buildings and facilities on Lackland AFB. Similar impacts might be expected from other construction activities as loose soil is exposed to runoff during rain events. The net cumulative effect on stormwater at Lackland AFB due to the proposed or alternative activities would be minimal when compared to the whole installation. Sediment erosion would be controlled using best management practices during construction and demolition, negating large-scale adverse effects on surface waters. Therefore, minor cumulative impacts would be expected on water resources.

4.3.4.1.5 Measures to Reduce Impacts

Should the proposed action be implemented, mitigation measures to protect human health and welfare would not be required. Impacts on water resources from the proposed action would be minimal when compared to the whole installation. However, best management practices should be used to reduce or eliminate runoff or contamination into surface water bodies or the groundwater. Site-specific sediment and erosion control plans with detailed best management practices to prevent soil disturbance, capture and contain loose soil, and slow the movement of stormwater during heavy rains should be included in the project development.

⁴ Runoff coefficients used are the same as those to describe the current condition and proposed action, only the amount of impervious land is increased by 228 acres. $[(0.95)*(1,667+228 \text{ impervious acres})+(0.30)*(7,858-228 \text{ vegetated acres})]$ divided by 9,525 total acres is equivalent to 0.43, which indicates a 5 percent increase in runoff, or 105 acre-feet of water in a 24 hour period for a 25-year storm (7.83 inches per day with an intensity of 0.2792 inches per hour, assuming a 20-minute time of concentration).

4.3.4.2 Groundwater

4.3.4.2.1 Proposed Action

There would be negligible effect on groundwater from implementation of the proposed action. None of the proposed actions would install materials or equipment that would degrade groundwater quality. Standard best management practices to reduce runoff, such as revegetation of disturbed areas or sediment fencing would minimize adverse impacts to shallow groundwater quality. Though construction would create more impervious surfaces, the increase is not likely to affect the quality of the shallow aquifer. No effects would be expected on the Edwards Aquifer because recharge does not occur in the Lackland AFB area.

The proposed action would result in increased use of the Edwards Aquifer because of increased personnel and aircraft operations, but these increases would result in slight increases of water use (less than 1 percent). The proposed action would not reduce water availability to existing users or degrade or worsen groundwater quality of the Edwards Aquifer. Therefore, the proposed action would not result in adverse effects on groundwater resources at Lackland AFB.

4.3.4.2.2 Alternative Action

The alternative action would result in increased use of the Edwards Aquifer because of increased personnel and aircraft operations, but these increases would be less than or equivalent to the evaluated population increases recently projected for Lackland AFB in the 2005 BA associated with DoD consumption of Edwards Aquifer water. The alternative action would not reduce water availability to existing users or degrade or worsen groundwater quality of the Edwards Aquifer. Therefore, the alternative action would not result in adverse effects on groundwater resources at Lackland AFB.

4.3.4.2.3 No Action Alternative

Under the no action alternative, groundwater resources would remain comparable to baseline conditions as described in Section 3.3.4.2.

4.3.4.2.4 Cumulative Impacts

Projected increases in population and water demand within the area managed by the EAA will create growing pressure to sustain the needs of all that are dependent on the Edwards Aquifer. The proposed or alternative action, when combined with the other actions proposed in the San Antonio area would result in increased use of water with the cumulative potential to adversely impact the Edwards Aquifer. Demand for water will continue to increase in the future as population and industry increase in San Antonio. Adverse cumulative impacts would be expected as a result of increased use of the Edwards Aquifer. The usage of the aquifer is monitored and evaluated by several entities (i.e., Texas Water Development Board, SAWS, the EAA, county and city water boards) to

make sure that future water demands can be met. Assuming continued research and investment in alternative sources of water for the San Antonio area, the projects presented would not cumulatively overburden the Edwards Aquifer beyond its capacity.

4.3.4.2.5 Measures to Reduce Impacts

Should the proposed action be implemented, mitigation measures to protect human health and welfare would not be required. However, best management practices should be used to reduce or eliminate runoff or contamination into surface water bodies or the groundwater. Site-specific sediment and erosion control plans with detailed best management practices to prevent soil disturbance, capture and contain loose soil, and slow the movement of stormwater during heavy rains should be included in the project development.

In conditions of drought, water conservation practices would be implemented as follows (Whatley 2006):

Stage I – 657.5 feet. This stage sets restrictions on irrigation and washing impervious cover and vehicles. Swimming pools must be covered at least 25 percent of the time when not in use, and restaurants may serve water only upon request.

Stage II – 647.0 feet. This stage incorporates all restrictions from Stage I, sets further restrictions on irrigation, and sets restrictions on the use of water for ornamental fountains or similar features (unless the water is recycled).

Stage III – 642.0 feet. This stage incorporates all restrictions from Stages I and II; restricts new landscaping; prohibits all nonessential water uses; and sets further restrictions on irrigation and uses associated with swimming pools.

Stage IV – 640.5 feet. This stage incorporates all restrictions from Stages I, II, and III; and sets further restrictions on irrigation, swimming pool use, washing vehicles, and landscape planting.

Stage IV – 637.0 feet. This stage incorporates all restrictions from Stages I, II, and III; prohibits the installation of new turf; and sets further restrictions on irrigation, ornamental fountains, and washing military and personal vehicles.

4.3.5 Hazardous Materials and Wastes

The evaluation of impacts on hazardous materials and wastes included the assessment of the degree to which proposed construction and demolition activities could affect the existing environment.

4.3.5.1 Proposed Action

Hazardous materials used for the proposed action would be limited to those typical to a construction environment (e.g., fluids and fuels for construction equipment, asphalt ingredients, paints, etc.). The typical use of these materials in accordance with instructions

and applicable regulations is not likely to create environmental release. The agency or contractor performing the construction would manage hazardous materials used during the project as required by Air Force guidance and regulations AFI 32-7086.

Hazardous wastes are not expected as a result of the construction or operation projects. The hazardous materials described above are typically consumed in process and would therefore not create waste as an end product. If generated, hazardous wastes from the construction activities would be managed in accordance with applicable regulations by the agency or contractor generating the waste.

It is not anticipated that ERP sites would be impacted by the proposed demolition and construction projects. Potential impacts would be the result of excavation of soils associated with the installation of storm sewers, storm sewer inlets, road excavations, gateposts, or any other activity that disturbs the soil below the ground water table. If applicable, an ERP construction site waiver is required by HQ AETC/A7C. The required waiver would be obtained prior to implementation of the proposed action.

Lead-based paint detection sampling and asbestos sampling would be accomplished prior to demolition of a facility. If identified, these materials would be managed in accordance with existing plans and procedures established by Lackland AFB. Demolition of substandard facilities containing lead-based paint and asbestos would decrease the potential of exposure to lead-based paint and asbestos.

4.3.5.2 Alternative Action

Impacts for hazardous materials and wastes and lead-based paint and asbestos would be the same as described for the proposed action. ERP sites would not be impacted by the proposed activities. As described in the Capability Analysis (Appendix B), developable parcels were excluded from consideration if they included active ERP sites. Therefore, there are no impacts to ERP sites associated with implementation of the alternative action.

4.3.5.3 No Action Alternative

Under the no action alternative, there would be no change in the management of hazardous materials, hazardous wastes, ERP sites, asbestos, and lead-based paints.

4.3.5.4 Cumulative Impacts

Hazardous wastes are not expected to be generated as a result of the proposed or alternative action. Therefore, the proposed action or alternative, when combined with the other actions proposed in the San Antonio area, would not be expected to contribute cumulatively to hazardous waste generated at Lackland AFB.

No cumulative impacts to ERP sites or asbestos or lead-based paint waste management activities at Lackland AFB would be expected from the proposed action in combination with other activities in the San Antonio area

4.3.5.5 Measures to Reduce Impacts

In the event of a release, spills of liquid products such as cleaning solvents would be managed according to the existing installation spill response plans. These documents implement applicable state and federal laws for management of these substances.

The hazardous materials pharmacy promotes pollution prevention through the management and monitoring of all hazardous materials (USAF 2005b). Because all hazardous materials are tracked, actions can be taken to reduce usage or use a non-hazardous substitute, as appropriate.

4.3.6 Biological Resources

Potential impacts to biological resources are determined by analyzing the proposed action and alternatives within the context of existing conditions for regional biota and ecosystems. An impact to biological resources would occur if the proposed action would affect threatened or endangered species, substantially diminish habitat for a plant or animal species, substantially diminish a regionally or locally important plant or animal species, interfere substantially with wildlife movement or reproductive behavior, or result in a substantial infusion of exotic plant or animal species.

4.3.6.1 Proposed Action

4.3.6.1.1 Vegetation and Wildlife

The majority of proposed demolition and construction activities would occur within previously disturbed portions of Lackland AFB. No impact to original grassland vegetation would occur, because the original grassland vegetation has been replaced by brushy shrub lands, honey mesquite, hackberry, and Eve's necklace. There would be no impacts to vegetation outside the proposed project areas and best management practices during demolition and construction would minimize impacts to vegetation at and near the construction sites. New trees, shrubs, and other landscaping would provide additional urban habitat for birds and other wildlife. The construction activities associated with the proposed action would not impact wildlife reproduction, movement, or habitat.

4.3.6.1.2 Threatened and Endangered Species

No threatened or endangered species are known on Lackland AFB; therefore, there would be no impact from the proposed action. The proposed action would increase the base population by 117, for a total base population of 41,853. As modeled in the 2005 Biological Assessment, Lackland AFB can support a population of 46,840 without impacting the continued existence of the eight federally listed species that occur in the Edwards Aquifer. Therefore, the proposed action would not impact the continued existence of the eight federally listed species that occur in the Edwards Aquifer.

4.3.6.1.3 Wetlands

The proposed demolition and construction activities associated with the proposed and alternative action would not occur in wetland areas.

4.3.6.1.4 Floodplains

Several projects associated with the proposed action (projects 18, 20, 21, 26, 27, 29, 37, and 38) would be located within areas designated as part of the 100-year floodplain (Figures 3-6 and 3-7). The following projects require a FONPA:

- Project 18 - Construct/Replace Two New Elevated Bridges over Leon Creek (Kelly Field Annex); the Kelly Drive Bridge would be built above the 100-year floodplain contour of Leon Creek. The Hall Street Bridge would be built above the 25-year floodplain contour. Both projects would require raising the roads above the associated floodplain contours. Current conditions prevent access between Security Hill, the flightline, and Lackland Main Base during flood events.
- Project 20 - Upgrade Range Road (Kelly Field Annex); the road would be raised above the 25-year floodplain. The project is necessary to provide on-base access to Security Hill during flood events (Security Hill is otherwise inaccessible during flood events).

These actions projects (project 18 and 20) are modifications of existing roadways and bridges that already occur within the floodplain. The modifications are designed to elevate the crossing so that traffic can continue during periods of flooding. Alternative siting for these bridge improvements are not practicable or available, because there are no other locations that connect Lackland Main Base with Kelly Field Annex that does not involve crossing waterways (i.e., Leon Creek). BMPs would be implemented to structurally moderate the volume and slow the discharge of stormwater associated with the new impervious cover. Landscaping would be installed in strategic locations to increase infiltration capability. A TPDES General Construction Permit and associated SWPPP with BMPs would be required for the project, and would include structural and programmatic controls to eliminate pollution from construction- and operational-related runoff. During the clearing, grading, and construction of facilities, erosion control BMPs would be employed to minimize erosion into nearby waterways on the site. These measures would include installation of silt fences or berms between waterways and the ongoing construction processes. Minimal adverse effects would be expected by construction of the recreational area, parking, displays, and roadways improvements in the floodplain due to the implementation of structural stormwater BMPs during the design and installation of the facilities.

- Project 21 - Kelly Field Golf Course Outdoor Recreational Area (Kelly Field Annex); no new facilities would be constructed during the conversion of the existing traditional 18-hole golf course into a Frisbee golf course, paintball course,

bicycle motocross course, and general outdoor recreational area with amenities. The existing golf course is located within the 100-year floodplain; conversion of the existing facilities requires that the new facilities remain within the boundary of the 100-year floodplain.

- Project 27 - Construct Parking Lot to support 1.5-mile Running Track (Lackland Training Annex); no new facilities would be constructed during the addition of the parking area. Pavement would be added to the area to provide a parking facility for the track. Currently, parking occurs haphazardly along the side of the road. Current parking is occurring within the 100-year floodplain and is affecting vegetation and creating a safety concern for users of the track. Because the existing running track is located within the 100-year floodplain, construction of adjacent parking cannot be sited beyond the 100-year floodplain.
- Project 29 - Construct 0.5-mile Addition to Existing 1-mile Clay Running Track (Lackland Training Annex); the existing 1.0-mile clay running track would be extended by approximately 0.5 mile. No new structures would be constructed during the addition to the running track. Because the existing running track is located within the 100-year floodplain, construction of adjacent parking cannot be sited beyond the 100-year floodplain.

For projects 21, 27, and 29, there would be no displacement of floodwaters and flow of surface water would not be affected, as the parking lots and roadways would be constructed at the ground level and vertical structures would not be constructed to impede flow. BMPs would be implemented to structurally moderate the volume and slow the discharge of stormwater associated with the new impervious cover. Landscaping would be installed in strategic locations to increase infiltration capability. A TPDES General Construction Permit and associated SWPPP with BMPs would be required for the project, and would include structural and programmatic controls to eliminate pollution from construction- and operational-related runoff. During the clearing, grading, and construction of facilities, erosion control BMPs would be employed to minimize erosion into nearby waterways on the site. These measures would include installation of silt fences or berms between waterways and the ongoing construction processes. Minimal adverse effects would be expected by construction of the recreational area, parking, displays, and roadways improvements in the floodplain due to the implementation of structural stormwater BMPs during the design and installation of the facilities.

- Project 37 - Relocation of Combat Arms and Crew Service (Lackland Training Annex); the construction of a new facility at the proposed location ensures like training missions are located in a central area. Students need to move to and from the ranges and there is an added safety hazard associated with the movement of the students from the ranges; weapons must also be transported. This movement is currently over off-base roadways, creating safety hazards. By constructing this

facility near the ranges, the movement of students and their weapons is minimized. No other land is available that meets the requirement of consolidating like training missions in a central area other than the land located within the 100-year floodplain. In order to minimize the potential impact of the floodplain on the new structure, the facility would be sited on the highest ground available and the foundation of the building would be constructed so (1) the finished floor elevations would be set at least 1.5 feet above the established 100-year water surface elevation and (2) the base of the foundation would be protected from erosion with appropriate safety margins. BMPs would be implemented to structurally moderate the volume and slow the discharge of stormwater associated with the new impervious cover and structure. Landscaping would be installed in strategic locations to increase infiltration capability. A TPDES General Construction Permit and associated SWPPP with BMPs would be required for the project, and would include structural and programmatic controls to eliminate pollution from construction- and operational-related runoff. During the clearing, grading, and construction of facilities, erosion control BMPs would be employed to minimize erosion into nearby waterways on the site. These measures would include installation of silt fences or berms between waterways and the ongoing construction processes. Minimal adverse effects would be expected by construction of the recreational area, parking, displays, and roadways improvements in the floodplain due to the implementation of structural stormwater BMPs during the design and installation of the facilities.

- Project 38 - Building 468 (Lackland Training Annex); the construction of an addition to the current facility ensures adequate space would be available for the increase in students associated with the Military Working Dog Handler Course. Another option was considered, but this location is within a munitions blast zone. Other locations would increase the distance students would travel from the classroom to the kennel facilities decreasing overall classroom productivity. The expansion of the current facility would not encroach on any wetland area, but only expand inward toward already established Military Working Dog facilities. No other location is available that meets mission requirements other than the land located within the 100-year floodplain. BMPs would be implemented to structurally moderate the volume and slow the discharge of stormwater associated with the new impervious cover. Landscaping would be installed in strategic locations to increase infiltration capability. A TPDES General Construction Permit and associated SWPPP with BMPs would be required for the project, and would include structural and programmatic controls to eliminate pollution from construction- and operational-related runoff. During the clearing, grading, and construction of facilities, erosion control BMPs would be employed to minimize erosion into nearby waterways on the site. These measures would include installation of silt fences or berms between waterways and the ongoing construction processes. Minimal adverse effects would be expected by construction of the recreational area, parking, displays, and roadways improvements in the floodplain

FINAL

Environmental Consequences

Installation Development Lackland Air Force Base, Texas

due to the implementation of structural stormwater BMPs during the design and installation of the facilities.

As highlighted in Table 4-5, the proposed action would include seven projects involving construction activities within or associated with the 100-year floodplain. The proposed projects would disturb up to 2.72 acres within the 100-year floodplain, resulting in 2.13 acres of new impervious surfaces.

Table 4-5 Summary of Impervious Cover Impacts within 100-year Floodplain, Proposed Action

Project	Approximate Area Disturbed (acres)	Net New Impervious Surfaces	
		(acres)	square feet
Construct/Replace Two New Elevated Bridges at Leon Creek. These bridges are located at Kelly Drive. A third bridge will be constructed near Hall Street. (Main Base and Kelly Field Annex)	0.25	0.07	9,200-6,200 = 3,000
Upgrade Range Road (Kelly Field Annex)	0.83	0.69 (of paved road)	30,000 (of paved road)
Kelly Field Golf Course Outdoor Recreational Area (Kelly Field Annex)	<0.05	<0.04	2,033
Construct Parking Lot to support 1.5-mile Running Track (Lackland Training Annex)	0.29	0.24	10,500
Construct 0.5-mile Addition to Existing 1-mile Clay Running Track (Lackland Training Annex)	0.44	0.37 (of clay track)	15,900 (of clay track)
Relocation of Combat Arms and Crew Service (Lackland Training Annex)	0.74	0.62	27,000
Addition to Building 468 (Lackland Training Annex)	0.12	0.10	4,350
Area Total	2.72 acres	2.13 acres	
Note: Area calculated from project descriptions listed in Table 2-1. Disturbed area approximated by adding 20 percent to the total area associated with construction/demolition projects. Net new impervious area calculated by subtracting demolition of existing pavements/buildings from paved surfaces associated with new construction projects. 1 acre = 43,560 sq ft sq ft square feet			

4.3.6.2 Alternative Action

Impacts to vegetation, wildlife, threatened and endangered species, wetlands, and the floodplain would be the similar to those described for the proposed action. The alternative action would increase the base population to a total of 53,441, which is greater than the population value of 46,840 modeled in the 2005 BA for Lackland AFB in the year 2010. The additional 7,601 in total population potentially supported over the BA 2010 projection incorporates water savings initiatives and other factors as described in Appendix B that were not considered in the BA. As stated in Appendix B, Lackland AFB can support a population of 53,441 based on current DoD water allocations and reported 2005 water consumption without impacting the continued existence of the eight federally listed species that occur in the Edwards Aquifer. Therefore, the alternative action would not impact the continued existence of vegetation, wildlife, the eight federally listed threatened and endangered species, wetlands, or the floodplain at Lackland AFB.

4.3.6.3 No Action Alternative

The construction and demolition activities associated with the proposed and alternative actions would not take place. Therefore, no impacts to biological resources on Lackland AFB would occur under the no action alternative.

4.3.6.4 Cumulative Impacts

No significant impacts to biological resources would not be expected to occur under the proposed and alternative actions associated with the construction of facilities. Therefore, cumulative impacts to biological resources at Lackland AFB are not expected.

4.3.6.5 Measures to Reduce Impacts

A majority of the construction and demolition of facilities would be within previously disturbed areas. Overall, impacts to biological resources inclusive of endangered or threatened species would not occur. Therefore, no mitigation measures beyond best management construction practices are required.

4.3.7 Utilities and Infrastructure

In evaluating impacts on infrastructure and utilities, several items were examined, including: (1) the degree to which a utility service would have to alter operating practices and personnel requirements, (2) the degree to which the change in demands from implementation of the proposed action and alternatives would impact system's capacity, (3) the degree to which a transportation system would have to alter operating practices and personnel requirements to support the action, (4) the capacity required from new or revised transportation systems, (5) the degree to which the increased demands from the proposed program would reduce the reliability of transportation systems, or aggravate already existing adverse conditions on base, and (6) the degree to which the proposed action and alternatives change surface water runoff characteristics and erosion characteristics. For the evaluation of potential impacts, the ROI for the infrastructure and utilities resource area encompasses Lackland AFB.

4.3.7.1 Electricity and Natural Gas

4.3.7.1.1 Proposed Action

The proposed action would increase the interior building space by 2,907,690 square feet due to the combined CIP and BRAC actions and would add 805 students, remove 760 support personnel, and add 72 support staff for a net population increase of 117 people due to BRAC-related actions. The increase in building space represents an increase of approximately 18 percent over the current value of approximately 16,158,605 square feet. The 24-hour equivalent effective service population increase associated with the proposed action is approximately 576⁵ (assuming all students live on base and all support personnel live off base), which is approximately 3 percent greater than the baseline effective population of 23,460 described in Appendix B. As further described in Appendix B, a 18 percent increase in habitable building space is directly related to a similar increase in the demand for electrical and natural gas utilities serving those buildings and the 3 percent increase in effective population is directly related to the potable water and sewer system demand.

The utility systems supporting electrical and natural gas services are capable of supporting a 3 to 18 percent increase in demand (Appendix B). Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in level of service (LOS).

4.3.7.1.2 Alternative Action

The alternative action would increase the interior building space by approximately 7.4 million square feet and would add approximately 11,715 people (4,020 students, 1,211 on-base dependents, and 6,484 civilian and military personnel). The increase in effective population is 7,715 24-hour equivalents (assuming all students, dependents, and 484 military personnel [2.5 dependents per military personnel] live on base and all other personnel live off base). The increase in building space represents an increase of approximately 45 percent over the current value of 16,158,605 square feet. The 24-hour equivalent effective population increase of 7,715 is approximately 33 percent of the baseline effective population of 23,460 described in Appendix B.

Impacts to infrastructure would be expected to be very similar as under the proposed action. Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a decrease in LOS. As further described in Appendix B, the existing utility supplies can manage anticipated demands associated with consumption increases of 33 to 45 percent. However, upgrades to individual electrical subsystems would be anticipated to coincide with implementation of the alternative action projects.

⁵ The calculation for effective population assumes off-base personnel only impact on-base resources for one third of a 24-hour day; so $805 + [(72 - 760) \text{ divided by } 3]$ is 576 effective 24-hour people. Effective population is more fully explained in Appendix B.

4.3.7.1.3 No Action Alternative

Under the no action alternative, there would be no demolition or construction activities. Therefore, there would be no effect on electricity and natural gas as described in Section 3.3.7.1.

4.3.7.1.4 Cumulative Impacts

The efforts described in Section 2.7 are negligible in comparison to either the proposed or the alternative action and therefore the cumulative impacts to the existing electricity supply and natural gas distribution systems would be similar to those already described for the proposed and alternative actions. As further described in Appendix B, the existing utility supplies can manage anticipated demands associated with the proposed consumption increases. However, upgrades to individual electrical subsystems would be anticipated to coincide with implementation of the alternative action projects.

4.3.7.1.5 Measures to Reduce Impacts

Mitigation measures for increased energy requirements would not be required for the proposed action and electrical subsystem replacements would be incorporated into the alternative action, as required.

4.3.7.2 Potable Water

4.3.7.2.1 Proposed Action

The proposed action would add 805 students, remove 760 support personnel, and add 72 support staff for a net population increase of 117 people due to BRAC-related actions. The 24-hour equivalent effective service population increase associated with the proposed action is approximately 576 (assuming all students live on base and all support personnel live off base), which is approximately 3 percent greater than the baseline effective population of 23,460 described in Appendix B. As further described in Appendix B, the 3 percent increase in effective population is directly related to the potable water and sewer system demand.

The utility systems supporting potable water services are capable of supporting a 3 percent increase in demand (Appendix B). Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS.

4.3.7.2.2 Alternative Action

The alternative action would add approximately 11,715 people (4,020 students, 1,211 on-base dependents, and 6,484 civilian and military personnel). The increase in effective population is 7,715 24-hour equivalents (assuming all students, dependents, and 484 military personnel [2.5 dependents per military personnel] live on base and all other personnel live off base). The 24-hour equivalent effective population increase of 7,715 is

approximately 33 percent of the baseline effective population of 23,460 described in Appendix B.

Impacts to infrastructure would be expected to be very similar as under the proposed action. Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS. As further described in Appendix B, the existing potable water system facilities and suppliers can manage anticipated demands associated with consumption increases of at least 33 percent based on current usage.

4.3.7.2.3 No Action Alternative

Under the no action alternative, there would be no demolition or construction activities. Therefore, there would be no effect on the potable water system as described in Section 3.3.7.2.

4.3.7.2.4 Cumulative Impacts

The efforts described in Section 2.7 are negligible in comparison to either the proposed or the alternative action and therefore the cumulative impacts to the existing potable water distribution systems would be similar to those already described for the proposed and alternative actions. As further described in Appendix B, the existing potable water distribution facilities and suppliers can manage anticipated demands associated with the described consumption increases based on current usage.

4.3.7.2.5 Measures to Reduce Impacts

Mitigation measures to protect health and welfare would not be required for the proposed action or alternative. The DoD will enter into a new agreement with the USFWS resulting from the pending BO related to protection of endangered species associated with the use of the Edwards Aquifer as a potable water resource and the recently submitted BA (USAF 2005d). Lackland AFB would continue to seek out alternatives in conjunction with SAWS and other water purveyors, acting as a responsible steward of the potable water resource while at the same time maintaining the flexibility required for sustainable mission growth.

4.3.7.3 Solid Waste Management

In considering the basis for evaluating solid waste impacts, several items were considered, including evaluating the degree to which proposed construction, changes in operations, and the potential for generating additional waste could affect the existing solid waste management program and capacity of the area landfills. The solid waste generated during the construction and demolition phases of the project would consist of building materials such as solid pieces of concrete, metals (conduit, piping, wiring), and lumber

The analysis presented in this section incorporates the following assumptions:

- Approximately 1 pound of construction debris is generated for each square foot of new asphalt/concrete pavement.
- The approximate rate of solid waste generation from construction and addition debris is 4.25 pounds per square foot (Murphy and Chatterjee 1976).
- The approximate rate of solid waste generation from demolition and alteration debris is 7 pounds per square foot (Murphy and Chatterjee, 1976).
- The approximate weight of asphaltic concrete is 120 pounds per cubic foot (Merritt 1976).
- The approximate rate of solid waste generation per person is 3.0 pounds per day (Murphy and Chatterjee 1976).

4.3.7.3.1 Proposed Action

There would be a temporary increase in solid waste generation as a result of the proposed construction and demolition activities. Solid waste would be generated from the demolition activities associated with the existing roadways, park areas, and facilities (Table 4-6). This one-time generation of solid waste would equate to approximately 24,305 tons, or 1.5 percent of the annual quantity of solid waste received at the Covell Gardens Landfill (1,565,000 tons).

Table 4-6 Solid Waste Generation for Construction and Demolition Activities, Proposed Action

	Roadways/Parking Areas		Total Waste
	Total Area (square feet)	Factor	(tons)
Proposed (Construction) Roadways and Parking Areas	1,241,970	1.0 pound per square foot	621
Proposed (Construction) Facilities	3,762,722	4.25 pounds per square foot	7,996
Existing (Demolition) Roadways and Parking Areas ¹	365,120	120 pounds per cubic foot	10,954
Existing (Demolition) Facilities	855,032	7 pounds per square foot	2,993
Existing (Renovation) Facilities	497,450	7 pounds per square foot	1,741
Total Waste Generated	--	---	24,305
¹ It is assumed the total area would be removed to a depth of six inches.			

The proposed action would add 805 students, remove 760 personnel, and add 72 support staff for a net population increase of 117 people due to BRAC-related actions. The 24-hour equivalent effective service population increase associated with the proposed action is approximately 576 (assuming all students live on base and all personnel live

off-base⁶). Therefore, the increase in recurring solid waste would be 315 tons/year for the increase in base personnel due to BRAC. This recurring generation of solid waste would equate to approximately less than one percent of the annual quantity of solid waste received at the Covell Gardens Landfill (1,565,000 tons). The Covell Gardens Landfill has the capacity to accommodate the one-time and recurring generation of solid waste from the proposed construction and demolition activities.

4.3.7.3.2 Alternative Action

The alternative action would add approximately 11,715 people (4,020 students, 1,211 on-base dependents, and 6,484 civilian and military personnel). The increase in effective population is 7,715 24-hour equivalents (assuming all students, dependents, and 484 military personnel [2.5 dependents per military personnel] live on base and all other personnel live off base). Therefore, the increase in recurring solid waste would be 4,224 tons/year for the increase in base personnel.

To the 24,305 tons of waste estimated for the proposed plan, the alternative action would increase the interior building space by approximately 3,666,829 square feet and increase the total pavements by 2,489,920 square feet. The solid waste associated with the construction of additional facilities and associated pavements would be 7,792 and 1,241 tons respectively, added to the 24,305 tons to complete the proposed plan yields a one-time generation of 33,338 tons of solid waste. This one-time generation of 33,338 tons of solid waste would equate to approximately 2.1 percent of the annual quantity of solid waste received at the Covell Gardens Landfill (1,565,000 tons). The Covell Gardens Landfill has the capacity to accommodate the one-time and recurring generation of solid waste under the alternative action.

4.3.7.3.3 No Action Alternative

Under the no action alternative, there would be no demolition or construction activities. Therefore, there would be no effect on solid waste management as described in Section 3.3.7.3.

4.3.7.3.4 Cumulative Impacts

Solid wastes generated within the ROI would cumulatively decrease the life of the Covell Gardens Landfill; however, with a capacity of over 1,565,000 tons per year, it is expected there would be adequate capacity to manage solid waste generated by the proposed, alternative, and other actions in the region. Approximately 4,616 tons of additional one-time generation solid waste would be contributed to the landfill from other projects. Approximately 469 tons/year of recurring solid waste would also be generated

⁶ The calculation for effective population assumes off-base personnel only impact on-base resources for one third of a 24-hour day; so $806 + [(72-760) \text{ divided by } 3]$ is 576 effective 24-hour people. Effective population is more fully explained in Appendix B.

with the increase in population due to the additional projects. It is expected there would be adequate capacity to manage solid waste generated by the proposed and other actions, as well as the alternative action when considered in addition to other actions. A summary of solid waste generation is presented in Table 4-7.

4.3.7.3.5 Measures to Reduce Impacts

Since demolition and construction waste generated under the proposed actions would be managed and disposed of by the contractor and existing waste management and disposal facilities are adequate to handle the addition of waste materials, no mitigation measures are required. Some of the waste debris could be pulverized by mechanical grinding prior to disposal to further decrease the volume of waste disposed at the landfill.

4.3.7.4 Wastewater

4.3.7.4.1 Proposed Action

The proposed action would add 805 students, remove 760 support personnel, and add 72 support staff for a net population increase of 117 people due to BRAC-related actions. The 24-hour equivalent effective service population increase a

ssociated with the proposed action is approximately 576 (assuming all students live on base and all support personnel live off-base), which is approximately 3 percent greater than the baseline effective population of 23,460 described in Appendix B. As further described in Appendix B, the 3 percent increase in effective population is directly related to the potable water and sewer system demand.

The utility systems supporting sanitary services are capable of supporting a 3 percent increase in demand (Appendix B). Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS.

4.3.7.4.2 Alternative Action

The alternative action would add approximately 11,715 people (4,020 students, 1,211 on-base dependents, and 6,484 civilian and military personnel). The increase in effective population is 7,715 24-hour equivalents (assuming all students, dependents, and 484 military personnel [2.5 dependents per military personnel] live on base and all other personnel live off base). The 24-hour equivalent effective population increase of 7,715 is approximately 33 percent of the baseline effective population of 23,460 described in Appendix B.

Impacts to infrastructure would be expected to be very similar as under the proposed action. Localized temporary service disruptions may occur during construction of new facilities, but would not constitute a permanent decrease in LOS. As further described in Appendix B, the existing sewer system facilities and suppliers can manage anticipated demands associated with consumption increases of at least 33 percent based on current usage.

Table 4-7 Solid Waste Generation, Cumulative Impacts

Project	Total Waste	
	Facilities (tons)	Increase in Population (tons/year)
Expansion of the Security Forces Officer Course and Security Forces Apprentice Course and Construction of a Mission Rehearsal Area	319	107 (195 personnel)
Upgrade of Existing and Construction of New Sanitary Sewer Lift Station	Minor	0
Construction of Munitions Transport Rest Area Relocation of C-5 Formal Training Unit	9	0
Relocation of C-5 Formal Training Unit	235	175 (320 personnel)
Construction of Kelly Parkway East of Lackland AFB	1,500	
Construction of Security Forces Operations Facility	70	0
Construction of Student Dormitories	468	
Implementation of the Medina Regional Security Operations Center Community Plan	236	187 (341 personnel)
Outdoor Recreational Complex	Minor	NA
Basic Military Training Demolition Projects Phase I	303	0
Basic Military Training Demolition Projects Phase II	590	0
Basic Military Training Demolition Projects Phase III	113	0
Basic Military Training Demolition Projects Phase IV	773	0
Total Waste Generated	4,616	469
NA not applicable		

4.3.7.4.3 No Action Alternative

Under the no action alternative, there would be no demolition or construction activities. Therefore, there would be no effect on the sanitary sewer system as described in Section 3.3.7.4.

4.3.7.4.4 Cumulative Impacts

The efforts described in Section 2.7 are negligible in comparison to either the proposed or the alternative action and therefore the cumulative impacts to the existing sewer collection systems would be similar to those already described for the proposed and alternative actions. As further described in Appendix B, the existing sewer system facilities and suppliers can manage anticipated demands associated with the described consumption increases based on current usage.

4.3.7.4.5 Measures to Reduce Impacts

Measures to reduce impacts human health and welfare would not be required for the proposed action or alternative. Impacts on wastewater treatment and capacities may likely occur. Measures to reduce the impact of the proposed action or alternative include minimization of the duration of needed upgrade construction as well as timing and extent of each construction project.

4.3.7.5 Transportation

4.3.7.5.1 Proposed Action

Under the proposed action, 117 personnel would be added to Lackland AFB. The additional traffic created by these additional personnel would be minor and would not change conditions at Lackland AFB. In addition, minor traffic congestion from the construction and demolition activities could occur as a result of heavy equipment and contractor vehicles. This congestion would be short-term, and would cease upon completion of the projects. In addition, several projects under the proposed action include roadway improvements as elements of the project. Therefore, there would be a slight benefit to transportation with the implementation of the proposed action.

4.3.7.5.2 Alternative Action

Limited transportation data is available for Lackland AFB. Although some actual traffic volume data is available from the base, the City of San Antonio, and TXDOT, the data was not complete and does not allow for a detailed assessment. A comprehensive transportation study has not been conducted by Lackland AFB since 1989. As a result, key assumptions were made to project the potential impacts to traffic that would be associated with the alternative action. For the purposes of this analysis, traffic is assumed to increase proportionally with the increase in populations that would be associated with the proposed action. Based on this assumption, the proposed action would result in an increase in traffic over baseline conditions. As a result of this population increase, more people would be required to access Lackland AFB on a routine basis. This would create a draw of people to a relatively small area, accessing the base via one of eight gates.

A LOS analysis is utilized to allow for a description of traffic conditions along highways and roadways (Table 4-8). Typically, the LOS for congested roadways in the vicinity of Lackland AFB would be in the range of C to F. For those less congested roadways, the LOS would be between A and C. Using the Highway Capacity Manual procedures, for those roadways categorized with a LOS of C or lower, roadway improvements are recommended. Implementation of the proposed action would result in a projected LOS of C or lower for the following roads:

- Wilford Hall Loop from Bergquist Gate to Kenly Drive.
- Luke Boulevard from Bong Avenue to Kenly Avenue.
- Kenly Avenue from Luke Boulevard to Tyndall Street.
- Luke Boulevard from Southwest Military Drive to Bong Avenue.
- Wilford Hall Loop from US Highway 90 Gate to Bergquist Gate Road.

Table 4-8 Levels of Service Classifications and Conditions

LOS	Traffic Flow Conditions
A	Free flow operations. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The general level of physical and psychological comfort provided to the driver is high.
B	Reasonably free flow operations. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to the driver is still high.
C	Flow with speeds at or near free flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more vigilance on the part of the driver. The driver notices an increase in tension because of the additional vigilance required for safe operation.
D	Speeds decline with increasing traffic. Freedom to maneuver within the traffic stream is more noticeably limited. The driver experiences reduced physical and psychological comfort levels.
E	At lower boundary, the facility is at full capacity. Operations are volatile because there are virtually no gaps in the traffic stream. There is little room to maneuver. The driver experiences poor levels of physical and psychological comfort.
F	Breakdowns in traffic flow. The number of vehicles entering the highway section exceeds the capacity or ability of the highway to accommodate that number of vehicles. There is little or no room to maneuver. The driver experiences poor levels of physical and psychological comfort.
LOS level of service.	

All of these roads are located on Lackland AFB and would not significantly degrade traffic patterns in the surrounding (off-base) areas. In addition, impacts would be minimized by other ongoing actions in the vicinity of the installation (see Section 4.3.7.5.4).

4.3.7.5.3 No Action Alternative

Impacts to transportation under the alternative action would be the same as described for the proposed action (Section 3.3.7.5).

4.3.7.5.4 Cumulative Impacts

Transportation within the ROI may experience slight, localized short-term negative impacts during the construction and demolition of the proposed facilities as a result of the operation of construction equipment; however, impacts would be minimized by the short operating period associated with each project.

Cumulative impacts to transportation as a result of the proposed or alternative action in combination with other projects in the San Antonio area would be expected to be positive over the long-term because they would enhance the flow of traffic on, to, and off the installation. Several projects within the vicinity of the installation include roadway improvements.

4.3.7.5.5 Measures to Reduce Impacts

Interim measures to minimize any short-term impacts have been defined as part of the proposed action. Therefore, no other Measures to reduce impacts would be required.

4.3.7.6 Stormwater Drainage

4.3.7.6.1 Proposed Action

Under the proposed action, several facilities would be constructed at Lackland AFB. As detailed in Table 2-1, a total of 87 acres of impervious cover would be added to the installation. This is expected to have a minimal impact on the total amount of impervious cover (5 percent increase) and on the total volume of stormwater runoff (2 percent or 53 acre-feet additional runoff in 24 hours) and would not impact existing capacity of the stormwater drainage systems. Additionally, new site-specific stormwater drainage would be designed, engineered, and implemented at each project location to move stormwater efficiently into the overall drainage system.

Since construction and demolition activities would require the disturbance of more than one acre, a TPDES Construction Stormwater Permit and SWP3 would be required. An SWP3 would be prepared to address all the elements of the proposed action before initiating activities. The plan would include erosion and sediment control techniques that would be used during demolition and construction to minimize erosion. Additionally, the SWP3 should include diversion ditches that would be constructed to retard and divert runoff to protect drainage courses.

4.3.7.6.2 Alternative Action

Under the alternative action, a total of 228 acres of new impervious cover would be added to the installation. This is expected to have a minimal impact on the total amount of impervious cover (13.7 percent increase) and on the total volume of stormwater runoff (5 percent or 105 acre-feet of additional runoff in 24 hours) and would not impact existing capacity of the stormwater drainage systems. The kind and duration of construction activities associated with the alternative action would be similar to those identified under the proposed action. The construction and demolition activities would be conducted consistent with the requirements of the TPDES stormwater program, as described in Section 4.3.7.6.1. Therefore, no significant adverse water quality impacts are anticipated.

4.3.7.6.3 No Action Alternative

Under the no action alternative, there would be no demolition or construction projects; therefore, there would be no effect on stormwater drainage as described in Section 3.3.7.6.

4.3.7.6.4 Cumulative Impacts

The cumulative actions outside of the proposed and alternative actions would have minor adverse impacts on stormwater drainage due to the temporary disturbance of

approximately 84 acres and the demolition of approximately 12 acres of impervious surfaces associated with outdated buildings and facilities on Lackland AFB. Similar impacts might be expected from other construction activities as loose soil is exposed to runoff during rain events. The net cumulative effect on stormwater at Lackland AFB, due to the proposed activities, would be minimal when compared to the whole installation. Sediment erosion would be controlled using best management practices during construction and demolition, negating large-scale adverse effects on surface waters. Therefore, minor cumulative impacts would be expected on stormwater resources.

4.3.7.6.5 Measures to Reduce Impacts

Impacts on stormwater resources from the proposed action are minimal when compared to the whole installation. However, best management practices should be used to reduce or eliminate runoff or contamination into stormwater conveyances. Site-specific sediment and erosion control plans with detailed best management practices to prevent soil disturbance, capture and contain loose soil, and slow the movement of stormwater during heavy rains should be included in the project development. The cumulative addition of approximately 105 ac-ft of stormwater detention facilities across Lackland AFB may be considered as a stormwater management best management practice for good stewardship of the common watersheds shared with neighboring facilities and residences.

4.3.8 Socioeconomics

The socioeconomic analysis for this effort addressed the potential impacts to population, housing, and the economy within the ROI that could result from the implementation of the proposed action and alternatives.

4.3.8.1 Proposed Action

The implementation of the proposed action, including implementation of the BRAC program, would consist of a change in population based on gaining and losing missions at Lackland AFB. Lackland AFB permanent personnel would increase by approximately 117 due to the relocation of missions. As discussed in Section 3.3.8.1, Bexar County has experienced 17.7 percent growth (an increase of 210,158 persons) from 1990 to 2000. Therefore, there would be no measurable impact on the housing market or regional economy as a result of the proposed increase in permanent personnel. Slight benefits would occur to the local economy through the proposed construction and projects.

Lackland AFB is a dynamic installation, with military construction projects occurring every year. The proposed construction activities would be in line with previous years' construction budgets, and would be expected to generate economic benefits for the local community.

4.3.8.2 Alternative Action

Under the alternative action, the issues and conditions relating to population, housing, and the local economy would be consistent with those discussed in Section 4.3.8.1.

4.3.8.3 No Action Alternative

Under the no action alternative, there would be no change from baseline conditions as described in Section 3.3.8.

4.3.8.4 Cumulative Impacts

The proposed action and all other announced actions for Lackland AFB would take place in the vicinity of the ROI. The effects of these combined actions would not be expected to have a measurable effect on the population of the base, local housing market, or local economy. Therefore, no cumulative effects are anticipated.

4.3.8.5 Measures to Reduce Impacts

Mitigation measures would not be required for the proposed or alternative actions.

4.3.9 Air Quality

4.3.9.1 Methodology

Air emissions resulting from the proposed action were evaluated in accordance with federal, state, and local air pollution standards and regulations. The air quality impacts from a proposed activity or action would be significant if:

- There was an increase of 10 percent or more in project criteria pollutant emissions over the baseline AQCR 217 emissions.
- They increase ambient air pollution concentrations above any NAAQS.
- They contribute to an existing violation of any NAAQS.
- They interfere with or delay timely attainment of NAAQS.
- They impair visibility within any federally mandated PSD Class I area.

Texas has developed a SIP as required by Section 110 of the CAA to provide for the implementation, maintenance, and enforcement of the NAAQS for each air quality region within the state. The SIP is the primary vehicle used by USEPA for enforcement of federal air pollution legislation.

Section 176(c) of the CAA provides the basis for the relationship between the SIP and federal projects. It states that no federal agency shall support or approve any activity or action that does not conform to an implementation plan after the plan has been approved or promulgated under Section 110. This means that federally supported or funded activities would not (1) cause or contribute to any new violation of any air quality standard,

(2) increase the frequency or severity of any existing violation of any standard, or (3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. In accordance with Section 176(c), USEPA promulgated the General Conformity Rule that is codified as 40 CFR 51, Subpart W. The provisions of this rule apply to state review of all federal general conformity determinations submitted to the state pursuant to 40 CFR 51, Subpart W. The Conformity Rule only affects federal actions occurring in nonattainment and maintenance areas. As explained in Section 3, Bexar County is currently an attainment area for all criteria air pollutants except O₃, for which it is designated “nonattainment-deferred.” Under the applicable regulations, General Conformity does not apply to nonattainment-deferred areas under an EAC unless the EAC area fails the attainment demonstration. As such, the General Conformity Rule does not apply to this action.

Even though a conformity determination is not required, the federal action must still comply with the conformity requirements of Section 176(c); that is, the federal action may not exceed the threshold and criteria outlined above. For impacts screening in this analysis, a more restrictive criteria than found in the General Conformity Rule was used. Rather than comparing project emissions to 10 percent of a region’s inventory (as required by the General Conformity Rule), emissions were compared to 10 percent of Bexar County’s year 2002 inventory (National Emissions Inventory) for each pollutant, a more restrictive comparison. Therefore, the 10 percent criterion for each pollutant has been selected to determine if the proposed project causes adverse impacts to air quality.

As described in Section 3.3.9.2, Section 169A of the CAA established the PSD regulations to protect the air quality in regions that already meet the NAAQS. Certain national parks, monuments, and wilderness areas have been designated as PSD Class I areas, where appreciable deterioration in air quality is considered significant. The nearest PSD Class I area is more than 350 miles from Lackland AFB.

Supporting calculations of air pollutant emissions are provided in Appendix C.

4.3.9.2 Proposed Action

The proposed action would involve construction of new buildings and roadways, with associated building demolition and vacating of existing building space, under the BRAC and CIP programs.

4.3.9.2.1 Construction Emissions

Emissions during the construction period were quantified to determine the potential impacts on regional air quality. Potential emissions were calculated for VOCs, nitrogen oxides (NO_x) sulfur oxides (SO_x), CO, and PM₁₀. Emissions from construction, grading, trenching, and paving activities were performed using USEPA emission factors compiled in the *Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations* (O’Brien and Wade 2003), *California Environmental Quality Air Act Quality Handbook* (South Coast Air Quality Management District 1993), and *Calculations Methods*

for Criteria Air Pollution Emission Inventories (Jagelski and O'Brien 1994). The emission factors for building construction include contributions from engine exhaust emissions (i.e., construction equipment, material handling, and workers' travel) and fugitive dust emissions (e.g., from grading activities). Demolition emissions evaluated include fugitive dust and transport of demolition debris offsite. Site preparation emissions include fugitive dust from ground disturbance, plus combustive emissions from heavy equipment during the construction period. Paving emissions include combustive emissions from bulldozers, rollers, and paving equipment, plus emissions from dump trucks hauling pavement materials to the site. Estimated annual emissions (averaged over the 5-year construction period) from construction and site preparation activities under the proposed action are presented in Table 4-9.

Table 4-9 Total Emissions, Proposed Action

Activity	Emissions (tons/year)				
	CO	VOC	NO _x	SO _x	PM
Construction	41.76	12.76	184.95	0.32	15.87
Indirect	11.86	1.01	0.89	0.05	0.66
Aircraft Operations	0.00	0.00	0.00	0.00	0.00
Total	53.62	13.77	185.84	0.37	16.53
Bexar County Emissions	431,424.49	66,247.05	63,604.04	30,957.94	64,073.29
Percentage of Bexar County Emissions	0.01	0.02	0.29	0.00	0.03
CO carbon monoxide	NO _x nitrogen oxides				
PM particulate matter	VOC volatile organic compound				
SO _x sulfur oxides					

Emissions generated by construction projects are temporary in nature and would end when construction is complete. The emissions of fugitive dust (PM₁₀) would be less than those presented in Table 4-9 with the implementation of control measures in accordance with standard construction practices. For instance, frequent spraying of water on exposed soil during construction, proper soil stockpiling methods, and prompt replacement of ground cover or pavement are standard landscaping procedures that could be used to minimize the amount of dust generated during construction. Using efficient equipment operating practices and avoiding long periods where engines are running at idle may reduce combustion emissions from construction equipment. Vehicular combustion emissions from construction worker commuting may be reduced by carpooling.

Combustive and fugitive dust emissions would produce localized, short-term elevated air pollutant concentrations (Table 4-9), which would not result in any long-term impacts on the air quality in Bexar County or AQCR 217. The temporary construction-related emissions of PM₁₀ and SO_x (emissions that can affect visibility) are not expected to adversely impact the air quality or visibility in Bexar County or any PSD Class I area.

4.3.9.2.2 Operational Emissions

During the operation phase of the proposed action (after the proposed action construction activities have been completed), air emissions would be generated by sources associated with operating the facilities to include stationary sources (boilers, heaters, etc.) and mobile sources (cars, trucks, etc.). Building additions and construction of new buildings to replace older facilities would include heating and cooling equipment and associated utilities that would be more efficient and have lower air pollutant emissions than their older counterparts. Construction and modification of stationary sources would be required to follow State air quality laws and regulations, including potential permit requirements. No changes to based aircraft operations are included in the proposed action. Operational emissions due to the proposed action would not result in any long-term impacts on the air quality in Bexar County or AQCR 217.

4.3.9.2.3 Indirect Emissions

Implementation of the proposed action would result in a relatively minor change in the number of workers or commuters. Indirect emissions (e.g., emission resulting from the growth inducing impacts) are therefore expected to remain relatively similar to the baseline.

4.3.9.2.4 Total Emissions

The projected annual emissions of ozone precursors for the proposed action are less than 10 percent of the Bexar County emissions shown in Table 3-10 (Baseline Emissions Inventory, Bexar County). For the proposed action, the projected annual percentage of the Bexar County emissions for CO, VOCs, NO_x, SO_x, and PM are approximately 0.01 percent, 0.02 percent, 0.29 percent, 0.00 percent, and 0.03 percent, respectively (see Table 4-9, Total Emissions, Proposed Action).

4.3.9.3 Alternative Action

Under the alternative action, the base would be developed and populated to its maximum capability. The alternative action would involve an increase in personnel and aircraft, as well as construction of new buildings and pavements.

4.3.9.3.1 Construction Emissions

Emissions during the construction period were quantified to determine the potential impacts on regional air quality using the same calculation methods and assumptions as described in Section 4.3.9.2. Estimated annual emissions that would occur from construction and site preparation activities under the alternative action are presented in Table 4-10.

Table 4-10 Total Emissions, Alternative Action

Activity	Emissions (tons/year)				
	CO	VOC	NO _x	SO _x	PM
Construction	90.26	26.39	372.14	1.28	40.03
Indirect	816.36	69.44	61.15	3.56	45.55
Aircraft Operations	161.20	42.90	274.60	11.40	22.10
Total	1,067.82	138.73	707.89	16.24	107.68
Bexar County Emissions	431,424.49	66,247.05	63,604.04	30,957.94	64,073.29
Percentage of Bexar County Emissions	0.25	0.21	1.11	0.05	0.17
CO carbon monoxide	NO _x nitrogen oxides				
PM particulate matter	VOC volatile organic compound				
SO _x sulfur oxides					

Emissions generated by construction projects are temporary in nature and would end when construction is complete. The emissions from fugitive dust (PM₁₀) would be less than those presented in Table 4-10 with the implementation of control measures in accordance with standard construction practices. For instance, frequent spraying of water on exposed soil during construction, proper soil stockpiling methods, and prompt replacement of ground cover or pavement are standard landscaping procedures that could be used to minimize the amount of dust generated during construction. Using efficient equipment operating practices and avoiding long periods where engines are running at idle may reduce combustion emissions from construction equipment. Vehicular combustion emissions from construction worker commuting may be reduced by carpooling.

Combustive and fugitive dust emissions would produce localized, short-term elevated air pollutant concentrations (Table 4-10), which would not result in any long-term impacts on the air quality in Bexar County. The temporary construction-related emissions of PM₁₀ and SO_x are not expected to adversely impact the air quality or visibility in Bexar County or any PSD Class I area.

4.3.9.3.2 Operational Emissions

During the operation phase of the alternative action (after the alternative action construction activities have been completed), air emissions would be generated by sources associated with operating the facilities to include stationary sources (boilers, heaters, etc.) and mobile sources (cars, trucks, etc.). Building additions and construction of new buildings to replace older facilities would include heating and cooling equipment and associated utilities that would be more efficient and have lower air pollutant emissions than their older counterparts. Construction and modification of stationary sources would be required to follow state air quality laws and regulations, including potential permit requirements.

An increase in flying operations to the maximum sustainable flying mission levels would entail an increase in operations conducted by based aircraft by 15 percent. The increase in emissions from aircraft operations were estimated based on the increase in daily operations due to the alternative action. The aircraft flying operation emissions in the table below were calculated using emission factors and default Air Force combat aircraft time-in-mode data for C-5 and F-16 aircraft assuming that each operation consists of a standard take-off and landing (O'Brien and Wade 2003). Table 4-10 shows the increase in annual emissions from based aircraft operations at Lackland AFB that would be expected due to implementation of the alternative action.

The projected annual emissions of ozone precursors for the alternative action are less than 10 percent of the Bexar County emissions shown in Table 3-10 (Baseline Emissions Inventory, Bexar County). Emissions due to the alternative action operational increases are not expected to adversely impact the air quality or visibility in Bexar County or any PSD Class I area.

4.3.9.3.3 Indirect Emissions

Implementation of the alternative action could result in an increase of 11,715 personnel living at or commuting to the base. The increase in commuting emissions was calculated based on the assumption that the new personnel would drive an average of 40 miles per day, 5 days per week and 50 weeks per year, with an average vehicle occupancy of 1.70 personnel per vehicle. The vehicles were assumed to be a standard mix of vehicle types with an average model year of 2000 (O'Brien and Wade 2003). Table 4-10 shows the estimated increase in annual commuting emissions to and from Lackland AFB due to implementation of the alternative action. Indirect emissions due to the alternative action are not expected to impact the air quality in Bexar County or AQCR 217.

4.3.9.3.4 Total Emissions

The projected annual emissions of ozone precursors for the alternative action are less than 10 percent of the Bexar County emissions shown in Table 3-10 (Baseline Emissions Inventory, Bexar County). For the proposed action, the projected annual percentage of the Bexar County emissions for CO, VOCs, NO_x, SO_x, and PM are approximately 0.25 percent, 0.21 percent, 1.11 percent, 0.05 percent, and 0.17 percent, respectively (see Table 4-10, Total Emissions, Alternative Action).

4.3.9.4 No Action Alternative

Under the no action alternative, no construction emissions would occur and the base's operational and indirect emissions would be identical to current baseline presented in Chapter 3.

4.3.9.5 Cumulative Impacts

Other actions currently identified for Lackland AFB would result in emissions associated with construction activities. Air quality impacts from these actions would be temporary and short-term in nature. Therefore, cumulative impacts to regional air quality would not occur from the interaction of the proposed action and alternatives with other actions currently identified for Lackland AFB.

4.3.9.6 Measures to Reduce Impacts

Potential, short-term impacts from site clearing activities and corresponding emissions of PM₁₀ would be minimized and kept under control in accordance with federal, state, and local guidelines (where applicable) for reduction of fugitive dust emissions. These control measures may include, but are not limited to periodic watering of construction sites and disturbed areas, reduction of vehicle speeds, covering of dirt and aggregate trucks and/or piles, prevention of dirt carryover to paved roads, and construction of erosion barriers and windbreaks. Combustion-related emissions from construction equipment would be minimized by efficient use of equipment.

In the event the alternative action (i.e., aircraft operations) should be scheduled to occur within the five-year timeframe analyzed in this EA, additional analysis may be required based on the attainment status of the local AQCR at the time of alternative action implementation.

FINAL

Environmental Consequences

*Installation Development
Lackland Air Force Base, Texas*

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Chapter 5

List of Preparers

FINAL

List of Preparers

*Installation Development
Lackland Air Force Base, Texas*

CHAPTER 5

LIST OF PREPARERS

Name/Organization	Degree	Professional Discipline	Years of Experience
Kent R. Wells, P.G. Science Applications International Corporation (SAIC)	B.S., Geology M.S., Industrial Hygiene	Environmental Scientist	20
Alysia Baumann SAIC	B.S. Chemical Engineering	Chemical Engineer/ NEPA Specialist	2
Benjamin P. Elliott, P.E. SAIC	B.A., Physical Sciences, B.S., Civil Engineering, M.S.E., Petroleum and Geosystems Engineering,	Civil Engineer Geographical Information Specialist	10
James A. Garrison, P.E., SAIC	M.E., Environmental Engineering, B.S. Agricultural Engineering	Environmental Engineer	30
David Linger, Ph.D. SAIC	Ph.D., Chemistry B.S., Chemistry and Mathematics	Air Quality Specialist	21
Brandi J. Mulkey, E.I.T SAIC	B.S., Environmental Engineering	Environmental Engineer Geographical Information Specialist	7
Lesley Pedde, P.E. SAIC	B.S., Professional Chemistry B.S.C.E., Civil Engineering with an Environmental Option	Environmental Engineer	30
Victoria J. Wark SAIC	B.S., Biology	Biologist	18
M. Scott Weaver SAIC	B.S., Chemical Engineering	Air Quality Specialist	14
William A. Wuest SAIC	M.P.A., Political Science B.S., Political Science	Noise Specialist	33
Carol Johnson SAIC	B.S., Education	Senior Technical Editor Geographical Information Specialist	9
Lisa P. Barron SAIC	A.A., Secretarial Science	Administrative Assistant (Electronic Publishing Specialist)	10

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List of Preparers

*Installation Development
Lackland Air Force Base, Texas*

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Chapter 6

Persons and Agencies Consulted

CHAPTER 6

PERSONS AND AGENCIES CONSULTED

The following individuals and agencies were consulted during the preparation of this EA:

6.1 FEDERAL AGENCIES

Lackland Air Force Base

Wildie, John A. (37 CES/CEVN)
Ravichandran, Mahalingam (37 CES/CEVR [formerly 37 CES/CEVC])
Cooper, Maurice (37 CES/CEVN)
Brown, Ronald B. (37 CES/CEVN)
Whatley, Stephen R. (37 CES/CEVC)
Gonzales, Gabriel (HQ AETC/A7CVI [formerly 37 CES/CECB])
Eng, Arthur Y. (37 CES/CEOE)
Hinojosa, Andres (37 CES/CE)
Ladd, Dean A. (37 CES/CEOE)
Abdulahad, Elias (37 CES/CECC1)

Headquarters Air Education and Training Command

Erwin, Marion S. (HQ AETC/A7CVI)
Richmond, Allen P. (HQ AETC/A7CVI)

6.2 STATE AGENCIES

Texas Commission on Environmental Quality

FINAL

Persons and Agencies Contacted

*Installation Development
Lackland Air Force Base, Texas*

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Chapter 7

References

CHAPTER 7

REFERENCES

- Alamo Area Council of Governments. 2003. Solid Waste Advisory Committee Meeting Minutes. San Antonio, Texas. 6 August.
- American National Standards Institute. 1983. *American National Standard Specification for Sound Level Meters*. April.
- American Industrial Hygiene Association (AIHA). 1986. *Noise and Hearing Conservation Manual*, Fourth Edition.
- Bies and Hansen. 1988. *Engineering Noise Control: Theory and Practice*, London: Unwin Hyman, pp. 36-37.
- Construction Engineering Research Laboratory. 1978. United States Department of the Army, Construction Engineering Research Laboratory, *MicorBNOISE, a User's Manual, Technical Report N-86/12*. June.
- Cooper. 2006. E-mail correspondence with Mr. Maurice Cooper regarding Hazardous Waste generation statistics, 37 CES/CEV. 23 June.
- Department of Defense (DoD). 1998. *Biological Assessment, The Effect of Water Draw on the Edwards Aquifer by Department of Defense Installations in the San Antonio Area*. San Antonio, Texas. February.
- Edgewood Independent School District. 2006. "Inside Edgewood Independent School District". www.eisd.net/inside.htm. Accessed 2 August.
- Executive Order (EO). 1977. *Executive Order 11988, Floodplain Management*. 24 May.
- Federal Reserve System. 2006. April 2006 Texas State & Metro Economic Indicators. Federal Reserve Bank of Dallas, Dallas, TX. <http://www.dallasfed.org/data/hotstats/econ/econ0604.html>. 27 June.
- Harris. 1991. Harris, Cyril M *Handbook of Acoustic Measurements and Noise Control*, 3rd Edition, New York: McGraw-Hill.
- Jagielski, K. and O'Brien, J. 1994. *Calculations Methods for Criteria Air Pollution Emission Inventories*. USAF, Armstrong Laboratory, AL/OE-TR-1994-0049. Brooks AFB.
- Lackland Independent School District. 2006. "Quick Links About Us". www.lackland.k12.tx.us/QuickLinks/AboutUs.htm. Accessed 2 August.
-

References

- Military Water Working Group. 2005. *The Effect of Water Draw on the Edwards Aquifer by the Department of Defense Installations in the San Antonio Area, DoD, San Antonio, Texas*. April.
- Moulton, et al. 1990. *Air Force Procedure for Predicting Aircraft Noise around Airbases: Noise Exposure Model (NOISEMAP) User's Manual*. Harry G. Armstrong Aerospace Medical Research Laboratory, Human Systems Division, Air Force Systems Command, Wright-Patterson AFB, OH. AAMRL-TR-90-011. February.
- Murphy, K.S., and S. Chatterjee. 1976. *Development of Predictive Criteria for Demolition and Construction Solid Waste Management*. Construction Engineering Research Laboratory, Champaign. October.
- Northside Independent School District. 2006. "Enrollment Figures". www.nisd.net/schools/enrollment. Accessed 2 August.
- O'Brien and Wade. 2003. "Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations." United States Air Force Institute for Environment, Safety and Occupational Health Risk Analysis, Risk Analysis Directorate, Environmental Analysis Division, IERA-RS-BR-SR-2001-0010, Brooks AFB, Texas, January 2002, revised December 2003.
- Occupational Safety and Health Administration (OSHA) 1983. *Occupational Noise Exposure Standard*. Code of Federal Regulations (CFR) Title 29, Part 1910, Section 1910.95 (29 CFR § 1910.95).
- Ravichandran. 2006. E-mail correspondence with Mr. Mahalingam Ravichandran regarding ERP sites, 37 CES/CEV. 23 June.
- San Antonio Water System (SAWS). 2002. Personal Interview with Santa Rivas, San Antonio Water Systems, San Antonio, Texas. October.
- South Coast Air Quality Management District. 1993. *CEQA Air Quality Handbook*.
- South San Antonio Independent School District. 2006. "South San Antonio Independent School District Home Page". www.southsaisd.net/education/district/district. Accessed 2 August.
- Southwest Independent School District. 2006. "About Us". www.swisd.net/aboutus/about.htm. Accessed 2 August.
- United States Air Force (USAF). 1993. Air Force Policy and Guidance on Lead-Based Paint in Facilities. June.
- USAF. 1997a. *Programmatic Environmental Impact Statement, Disposal and Realignment of Kelly AFB, Texas, Final*. Kelly AFB, Texas. May.
- USAF. 1997b. *Biological Assessment for the Proposed Disposal of Kelly Air Force Base*. United States Air Force, Air Materiel Command, San Antonio Air Logistics Center, Environmental Management. San Antonio, Texas. May.

FINAL

References

*Installation Development
Lackland Air Force Base, Texas*

- USAF. 1997c. *The Socioeconomic Impact Analysis Study*. Kelly AFB, Texas. May.
- USAF. 2001. *Final Environmental Assessment Upgrade to Recreational Areas*. 37th Civil Engineer Squadron, Lackland AFB, Texas. June.
- USAF. 2002a. *The General Plan*. Lackland Air Force Base. 37 CES/CE. July.
- USAF. 2002b. *Capacity Analysis for the Installation Development Program on Lackland AFB, Texas*. 37th Civil Engineer Squadron, Lackland AFB, Texas and Air Education and Training Command, Randolph AFB, Texas. December.
- USAF. 2002c. *Final Environmental Assessment – Additional Private Sector Financed Housing Units*. 37th CES, Lackland AFB, Texas. June.
- USAF. 2002d. *Cultural Resources Management Plan for Lackland AFB, Texas*. 37th Civil Engineer Squadron, Lackland AFB, Texas. October.
- USAF. 2003. *Environmental Assessment Security Forces Training Expansion, Final*. 37th CES/CEV, Lackland AFB, Texas. March.
- USAF. 2004a. *Environmental Assessment Capital Improvements Program 2004*. Lackland AFB, Texas. 37 CES/CEV. November.
- USAF. 2004b. *Facts and Stats Reports*. Office of Financial Management. Lackland AFB, Texas.
- USAF. 2004c. *Baseline Validation Report for Military Installations in San Antonio*. Department of Defense, Military Water Working Group, San Antonio, Texas. May.
- USAF. 2004d. *Solid Waste Reduction Metric Submittal Sheet Fiscal Years 2002-2003*. Lackland AFB, Texas. August.
- USAF. 2005a. *Environmental Impact Statement for the Relocation of the C-5 Formal Training Unit from Altus Air Force Base, Oklahoma*. Headquarters Air Force Reserve Command. January.
- USAF. 2005b. *The 2030 Plan*. Lackland Air Force Base. 37 CES/CE. October.
- USAF. 2005c. *Final Environmental Assessment – Military Family Housing Privatization Phase II*. 37th CES, Lackland AFB, Texas. December.
- USAF. 2005d. *Biological Assessment for the Effect of Water Draw on the Edwards Aquifer by the Department of Defense Installations in the San Antonio Area*. Military Water Working Group. Headquarters Air Education and Training Command. April.
- USAF. 2006. Interviews with 37 CES/CEOE Art Eng, Andy Hinojosa, Dean Lad. Lackland AFB, Texas. November 2005-January 2006.
- United States Department of Agriculture. 1962. United States Department of Agriculture, Soil Survey, Bexar County, Texas, Soil Survey Series No. 12.
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FINAL

*Installation Development
Lackland Air Force Base, Texas*

References

- United States Environmental Protection Agency (USEPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety*, EPA Report 550/9-74-004.
- USEPA. 2004. Letter to Governor of Texas on Nonattainment Area in Texas. United States Environmental Protection Agency, Washington, D.C. <http://www.epa.gov/ozone/snap/regs/62fr30275.pdf>. 15 April.
- USEPA. 2005. "8-Hr Ozone and Designated PM-2.5 Nonattainment Areas." United States Environmental Protection Agency, Green Book, <http://www.epa.gov/oar/oaqps/greenbk/qnc13.html> updated 10/14/2005.
- United States Fish and Wildlife Service (USFWS). 1997. Biological Opinion to Director, San Antonio Logistics Center Environmental Management/Kelly AFB, Texas. Issued by USFWS. 26 June.
- Wasmer, F. and F. Mausell. 2002. NMPlot Computer Program. Wasmer Consulting.
- Whatley. 2006. Comments on Final Draft Environmental Assessment received from Mr. Steve Whatley regarding Lackland AFB water program. 29 August.

Appendix A

Public Notification and Interagency and Intergovernmental Coordination for Environmental Planning

FINAL

Appendix A

*Installation Development
Lackland Air Force Base, Texas*

APPENDIX A

**PUBLIC NOTIFICATION AND INTERAGENCY AND INTERGOVERNMENTAL
COORDINATION FOR ENVIRONMENTAL PLANNING**

December 1, 2006

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Appendix A

*Installation Development
Lackland Air Force Base, Texas*

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December 1, 2006



DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Mr. Kenny Johnson
Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Ms. Laura Jane Stephens
Alamo Area Council of Governments
Community Relations Coordinator
8700 Tesoro Drive, Suite 700
San Antonio, Texas 78744-3291

Dear Ms. Stephens

The US Air Force is preparing an Environmental Assessment (EA) for a proposal to implement the Base Realignment and Closure (BRAC) program as it relates to Lackland Air Force Base (AFB), as well as other installation development based on the current Capital Improvements Program (CIP). The environmental analysis for the proposed action is being conducted by Lackland AFB in accordance with the Council on Environmental Quality Guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached proposed action and alternatives and solicit your comments concerning the proposal and any potential environmental consequences of the action.

Proposed Action

The proposed action includes implementation of the BRAC program, as well as other installation development at Lackland AFB. Additionally under the proposed action, Lackland AFB proposes to implement their CIP in support of installation development. The components of the CIP would include new building construction and alteration, replacement of old buildings, and demolition of some existing facilities. Under this alternative (see Attachment 1), there would be approximately 3,094,844 square feet of construction, including new facilities and pavements.

Maximum Capability Alternative

An alternative to the proposed action is to evaluate the environmental effect associated with the maximization and development potential at Lackland AFB. Under this alternative, a maximum capability of Lackland AFB would be identified. The maximum capability of the Base would evaluate: the maximum supportable population; the base's ability to provide infrastructure support to this population; the maximum acreage available for development; and

the maximum number of aircraft that could be supported at the Base within the environmental constraints. Under this alternative, Lackland AFB could support an increase of on-base population by up to 12,178 personnel, increase habitable space on-base by 3,672,577 square feet, development of 124 parcels comprising 1,430 acres, and increase airfield operations by 15 percent, without causing significant impact to the environment.

No Action Alternative

Under the no action alternative, there would be no construction or demolition accomplished in support of the CIP at Lackland AFB. Also, this alternative would not allow Lackland AFB to accomplish congressionally mandated mission changes as a result of the 2005 BRAC recommendations.

The Draft EA will be forwarded in its entirety for your review within the next couple of months; however, we are soliciting any initial comments or concerns regarding the proposal you may have at this time so that we might incorporate them into our analysis in a proactive manner. A listing of federal and state agencies that have been contacted is attached (Attachment 2). If there are any additional agencies that you feel should review and comment on the proposal or the Draft EA, please let us know.

To facilitate cumulative impact analysis (reasonably foreseeable future projects in the region of influence), we would also appreciate identification of major projects in the vicinity that may contribute to cumulative impacts associated with this proposal. Please return your comments to our consultant within 30 days of receipt.

Any questions concerning the proposal should be directed to our consultant, Science Applications International Corporation (SAIC). The point of contact at SAIC is Mr. Kent R. Wells who can be reached at (210) 731-2217. Please forward your written comments to Mr. Wells, in care of SAIC, at 4242 Piedras Drive East, Suite 200, San Antonio, Texas, 78216, or via fax at (210) 731-2299. Thank you for your assistance.

Sincerely

A handwritten signature in black ink, appearing to read "Kenny Johnson", with a stylized, flowing script.

KENNY JOHNSON, P.E.

Attachments:

1. Table 1 Project List, Proposed Action
2. Federal and State Agencies



DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Mr. Kenny Johnson
Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Mr. F. Lawrence Oaks
State Historic Preservation Office
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78111-2276

Dear Mr. Oaks

The US Air Force is preparing an Environmental Assessment (EA) for a proposal to implement the Base Realignment and Closure (BRAC) program as it relates to Lackland Air Force Base (AFB), as well as other installation development based on the current Capital Improvements Program (CIP). The environmental analysis for the proposed action is being conducted by Lackland AFB in accordance with the Council on Environmental Quality Guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached proposed action and alternatives and solicit your comments concerning the proposal and any potential environmental consequences of the action.

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Mr. Kenny Johnson
Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Ms. Denise S. Francis
TRACs-Single Point of Contact
P.O. Box 12428
Room 441-A
Austin Texas 78711-2428

Dear Ms. Francis

The US Air Force is preparing an Environmental Assessment (EA) for a proposal to implement the Base Realignment and Closure (BRAC) program as it relates to Lackland Air Force Base (AFB), as well as other installation development based on the current Capital Improvements Program (CIP). The environmental analysis for the proposed action is being conducted by Lackland AFB in accordance with the Council on Environmental Quality Guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached proposed action and alternatives and solicit your comments concerning the proposal and any potential environmental consequences of the action.

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Mr. Kenny Johnson
Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Ms. Kyle Mills
Federal Emergency Management Agency
800 North Loop 288
Denton, Texas 76209

Dear Ms. Mills

The US Air Force is preparing an Environmental Assessment (EA) for a proposal to implement the Base Realignment and Closure (BRAC) program as it relates to Lackland Air Force Base (AFB), as well as other installation development based on the current Capital Improvements Program (CIP). The environmental analysis for the proposed action is being conducted by Lackland AFB in accordance with the Council on Environmental Quality Guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached proposed action and alternatives and solicit your comments concerning the proposal and any potential environmental consequences of the action.

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Mr. Kenny Johnson
Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Mr. David C. Frederick
Field Supervisor
U.S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin Texas 78758

Dear Mr. Frederick

The US Air Force is preparing an Environmental Assessment (EA) for a proposal to implement the Base Realignment and Closure (BRAC) program as it relates to Lackland Air Force Base (AFB), as well as other installation development based on the current Capital Improvements Program (CIP). The environmental analysis for the proposed action is being conducted by Lackland AFB in accordance with the Council on Environmental Quality Guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached proposed action and alternatives and solicit your comments concerning the proposal and any potential environmental consequences of the action.

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2. Federal and State Agencies



DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Mr. Kenny Johnson
Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Mr. Wayne Lea
U.S. Army Corps of Engineers
Regulatory Branch, Permit Section
ATTN: CESWF-PER-R
P.O. Box 17300
Fort Worth TX 786012-0300

Dear Mr. Lea

The US Air Force is preparing an Environmental Assessment (EA) for a proposal to implement the Base Realignment and Closure (BRAC) program as it relates to Lackland Air Force Base (AFB), as well as other installation development based on the current Capital Improvements Program (CIP). The environmental analysis for the proposed action is being conducted by Lackland AFB in accordance with the Council on Environmental Quality Guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached proposed action and alternatives and solicit your comments concerning the proposal and any potential environmental consequences of the action.

Proposed Action

The proposed action includes implementation of the BRAC program, as well as other installation development at Lackland AFB. Additionally under the proposed action, Lackland AFB proposes to implement their CIP in support of installation development. The components of the CIP would include new building construction and alteration, replacement of old buildings, and demolition of some existing facilities. Under this alternative (see Attachment 1), there would be approximately 3,094,844 square feet of construction, including new facilities and pavements.

Maximum Capability Alternative

An alternative to the proposed action is to evaluate the environmental effect associated with the maximization and development potential at Lackland AFB. Under this alternative, a maximum capability of Lackland AFB would be identified. The maximum capability of the Base would evaluate: the maximum supportable population; the base's ability to provide

the maximum number of aircraft that could be supported at the Base within the environmental constraints. Under this alternative, Lackland AFB could support an increase of on-base population by up to 12,178 personnel, increase habitable space on-base by 3,672,577 square feet, development of 124 parcels comprising 1,430 acres, and increase airfield operations by 15 percent, without causing significant impact to the environment.

No Action Alternative

Under the no action alternative, there would be no construction or demolition accomplished in support of the CIP at Lackland AFB. Also, this alternative would not allow Lackland AFB to accomplish congressionally mandated mission changes as a result of the 2005 BRAC recommendations.

The Draft EA will be forwarded in its entirety for your review within the next couple of months; however, we are soliciting any initial comments or concerns regarding the proposal you may have at this time so that we might incorporate them into our analysis in a proactive manner. A listing of federal and state agencies that have been contacted is attached (Attachment 2). If there are any additional agencies that you feel should review and comment on the proposal or the Draft EA, please let us know.

To facilitate cumulative impact analysis (reasonably foreseeable future projects in the region of influence), we would also appreciate identification of major projects in the vicinity that may contribute to cumulative impacts associated with this proposal. Please return your comments to our consultant within 30 days of receipt.

Any questions concerning the proposal should be directed to our consultant, Science Applications International Corporation (SAIC). The point of contact at SAIC is Mr. Kent R. Wells who can be reached at (210) 731-2217. Please forward your written comments to Mr. Wells, in care of SAIC, at 4242 Piedras Drive East, Suite 200, San Antonio, Texas, 78216, or via fax at (210) 731-2299. Thank you for your assistance.

Sincerely

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KENNY JOHNSON, P.E.

Attachments:

1. Table 1 Project List, Proposed Action
2. Federal and State Agencies



DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Mr. Kenny Johnson
Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Mr. Robert Spain
Texas Parks and Wildlife Department
Chief, Habitat Assessment Branch
4200 Smith School Road
Austin, Texas 78744-3291

Dear Mr. Spain

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the maximum number of aircraft that could be supported at the Base within the environmental constraints. Under this alternative, Lackland AFB could support an increase of on-base population by up to 12,178 personnel, increase habitable space on-base by 3,672,577 square feet, development of 124 parcels comprising 1,430 acres, and increase airfield operations by 15 percent, without causing significant impact to the environment.

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Table 1 Project List, Proposed Action

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
RECRUIT HOUSING AND TRAINING (RH&T) REPLACEMENT PLAN						
1	Reconstruct Airman Gate/Valley Hi Gate (Main Base)	CIP	107,500 road 1,000 bldg	65,000 road 1,000 bldg		Gate is being upgraded to new anti-terrorist force protection standards. A guard shack/visitors' center of approximately 1,000 square feet will be constructed, and approximately 107,500 square of pavement will be replaced (2007).
2	300-room Student Dormitory/Technical Training (Main Base)	CIP	108,000 road 202,400 bldg	38,200		Construct 202,400-square foot facility with 108,000 square feet of associated roadways. The facility consists of one four-story student dormitory, Technical Training facility, and associated parking area. Prior to construction of the new facility, an estimated 38,200 square feet of demolition (Buildings 10656 and 10650) would occur (2009).
3	Relocation of the Apprentice and Craftsman Traffic Management Courses under Transportation Management Flight (losing mission) (Main Base)	BRAC			60,550	Approximately 60,550 square feet of building space located in portions of Buildings 10800, 10900, and 10902 currently housing technical training classrooms, high bay technical training facilities, and technical training support will be vacated. There would be no demolition associated with the off-site relocation of this mission (2007-2011).
4	RH&T Reception Center (Main Base)	CIP	32,550		29,600	Vacate Building 2246 and construct a 32,550-square foot facility to support the Basic Military Training mission (2010).
5	RH&T Warehouse (Drum and Bugle) (Main Base)	CIP	24,000			Construct a 24,000-square foot warehouse to support the Drum and Bugle Corps (2010).
6	RH&T Complex (Main Base)	CIP	1,222,950	115,000		The RH&T Complex is being constructed to consolidate basic training and basic trainee housing in a campus setting to eliminate the need for transportation of basic trainees to educational facilities. The project includes the demolition of Buildings 9024, 9028, 9030, and 9038; a total of 115,000 square feet (2009). New construction will consist of three 313,350-square foot four-story dormitories as well as three 94,300-square foot facilities that consist of a dining hall and classroom space (2011).
7	RH&T Troop Overpass - Truemper and Barnes (Main Base)	CIP	11,000			Construct an 11,000-square foot troop overpass to provide access to the Basic Military Training support areas. This is the final pedestrian overpass to be constructed, and will allow pedestrian access throughout the RH&T Complex campus area (2005).

Table 1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
8	Basic Military Training Administrative Support & Military Training Instructor Training Center (Main Base)	CIP	30,000			Construct 30,000-square foot administrative facility. This center would help replace administrative office space displaced by the new RH&T Complexes (2011).
9	Expand Base Library (Main Base)	CIP	6,000			Construction of 6,000-square foot addition. The addition would alleviate crowding due to expanding service and customer usage (2006).
MILITARY WORKING DOGS CAMPUS						
10	Construct Military Working Dogs Campus Roadway and Training Surface (Main Base)	CIP	360,150			Construct 360,150 square feet of roadway and training surfaces. This construction would support the safe movement of dogs through the training campus (2011).
11	Construct Military Working Dogs 747 Aircraft Training Site (Main Base)	CIP	12,600			Construct 12,600 square feet of training facilities. This effort supports the Transportation Administration training of dogs (2006).
ADMINISTRATIVE AREA						
12	Common Delivery of Installation Services Administrative Center (gaining mission) (Main Base)	BRAC	52,400	15,000		Construct 52,400-square foot multi-story facility and demolish Buildings 5450 and 5460 totaling 15,000 square feet. This center would be constructed to consolidate common installation support facilities (2008).
13	Headquarters Administrative Center Air Force Center for Environmental Excellence (gaining mission) Air Force Real Property Agency (gaining mission) Air Force Outreach Program Office (gaining mission) (Main Base)	BRAC	148,400			Construct 148,400-square foot multi-story facility that would include administrative support space, a special compartmented information facility, general storage, and associated parking areas. This center would be constructed to house relocating missions (2009).

Table 1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
14	Dental Clinic-BRAC (Main Base)	BRAC	15,000	15,700		Construct 15,000-square foot dental clinic and associated parking over the existing footprint of B3550. Approximately 15,700 square feet of demolition would be associated with B3550. This facility would support a consolidated oral surgery residency training program (2009).
15	Dental Clinic-MILCON (Main Base)	CIP	60,000	33,700		Construct a 60,000-square foot facility to provide dental services. Buildings 3662, 3664, 3744, 3746, and 3748 would be demolished. Approximately 33,700 square feet of demolition is associated with the project (2009).
16	Ambulatory Care Center (gaining mission) (Main Base)	BRAC	184,000			Renovate 184,000 square feet of the basement, first, second, and fourth floors of the Wilford Hall Medical Center. The ambulatory center would support the delivery of health care services (2007-2011).
17	Medical Administrative Center Air Force Medical Support Agency (gaining mission) Air Force Medical Operations Agency (gaining mission) Other Medical Administrative Support Agencies (gaining mission) (Main Base)	BRAC	46,600			Construct 46,600-square foot single-story facility that would include administrative support space, general storage, and associated parking areas.
KELLY ANNEX						
18	Construct Two New Elevated Bridges at Leon Creek and Elevate Portions of Kelly Drive, Chappie James Way and Hall Street (Kelly Annex)	CIP	9,200	6,200		Demolition of 6,220 square feet of the existing Kelly Drive Bridge and construction of 9,200 square feet of bridge built to an elevation above the 100-year floodplain of Leon Creek. This project is sited in the floodplain, and is necessary to provide on-base access to both Security Hill and the flightline mission during flood events (2010).

Table 1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
19	Base Level F-110 Intermediate Maintenance (Air National Guard) (losing mission) (Kelly Annex)	BRAC			14,400	Vacate 14,400 square feet. Approximately 1/3 of the mission will be relocated (2007).
20	Upgrade Range Road (Kelly Annex)	CIP	90,000 (upgrade only)			Approximately 60,000 square feet of pavement will be replaced, and approximately 30,000 square feet of gravel roadway would be paved during the upgrade of the Range Road to bring it above the 25-year floodplain. This project is sited in the floodplain, within the footprint of the existing roadway, and is necessary to provide on-base access to both Security Hill and the flightline mission during flood events (2008).
21	Kelly Field Golf Course Outdoor Recreational Area (Kelly Annex)	CIP				Convert the existing traditional 18-hole golf course into a Frisbee golf and general outdoor recreational area. No new facilities will be constructed. This project is sited in the floodplain (2008).
SECURITY HILL						
22	Air Force Information Warfare Center (Security Hill)	CIP	205,000		117,500	Construct a new 205,000-square foot complex to accommodate the entire Air Force Information Warfare Center. The location will be west of Security Hill. Approximately 117,500 square feet of building space would be vacated (Buildings 171, 178, and 179) (2011).
23	33rd Information Operations Squadron (Security Hill)	CIP	65,600			Construct 65,600-square foot facility. The complex would be constructed to consolidate and accommodate various missions located at other facilities on base (2008).
24	Cryptologic Systems Group Administration Support (Security Hill)	CIP	53,000			Construct 53,000-square foot facility. The complex would be constructed to consolidate and accommodate various missions located at other facilities on base (2011).
25	Intelligence Operations Center (68th Information Operations Squadron and 710th Information Operations Flight) (gaining mission) (Security Hill)	BRAC	40,400			Construct a 40,400-square foot single-story facility that would include administrative support space, a special-compartmented information facility area, general storage, and associated parking areas. This project would require the cleanup of the former skeet range (potential problems with soil pH and elevated lead concentrations). An alternate site will be chosen if no BRAC funding is received (2009).

Table 1, Continued

Project Number	Description/Location	Type of Project (BRAC or CIP)	Construction (square feet)	Demolition (square feet)	Vacating (square feet)	Summary (Programmed Fiscal Year)
LACKLAND TRAINING ANNEX						
26	Demolish Missile Launch Mockup Training Facility at Building 400 (Lackland Training Annex)	CIP		10,500		Building 400 (a 10,500-square foot facility) will be demolished, but the concrete foundation will remain in place. Building 400 is located in the floodplain (2006).
27	Parking Lot for Running Track (Lackland Training Annex)	CIP	10,500			Construct 10,500-square foot parking area. This project is sited in the floodplain (2007).
28	Community Center Mini-mall (Lackland Training Annex)	CIP	150,000			Construct 150,000-square foot mini-mall, to include such services as barbershop, cleaners, Army-Air Force Exchange Service convenience store, bank, etc. (2007).
29	Addition to Existing Clay Running Track (Lackland Training Annex)	CIP				The existing 1.0-mile clay running track would be extended by approximately 0.5 mile (15,900 square feet of clay track). The existing running track is sited in the floodplain (2007).
30	Career Enlisted Aviator Center of Excellence (gaining mission) (Lackland Training Annex)	CIP	9,200	105,300		Renovation of 9,200-square foot facility. Building 147 and 150 would be demolished (approximately 105,300 square feet). Students would be consolidated from five other buildings on the base (2006).
31	Basic Expeditionary Airmen Skills Training Management (Lackland Training Annex)	CIP	167,350			Construct 167,350 square feet of facilities. Facilities consist of 12 tent pads, tornado shelter, instructors' observation tower, restroom facilities, airstrip (constructed of base material). Utilities (water, sewer, and upgraded electrical service) will be provided to the area (2008).
32	Confidence Course (Lackland Training Annex)	CIP	150,000 road 5,144 building			Construct 21 obstacles within 150,000 square feet of paved area. 5,144 square feet of support facilities will be constructed (2007).
33	Recreational Vehicle and Boat Storage (Lackland Training Annex)	BRAC	100,000			Construct a 100,000-square feet of parking storage area paved with base material to provide additional space to accommodate increased use of the facility (2007).
34	Vacate Munitions Facility (losing mission) (Lackland Training Annex)	BRAC			210,400	Vacate 67 munitions storage facilities totaling 210,400 square feet (2007).
35	Lackland Air Force Base Correctional Facility (losing mission) (Lackland Training Annex)	BRAC			16,000	Vacate Buildings 180, 181, 183, and 187 totaling 16,000 square feet due to the relocation of the correctional facility off base (2008).

Attachment A

Federal and State Agencies Contacted

Mr. David C. Frederick
Field Supervisor
U.S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin, Texas 78758

Mr. Wayne Lea
U.S. Army Corps of Engineers
Regulatory Branch, Permit Section
ATTN: CESWF-PER-R
P.O. Box 17300
Fort Worth, Texas 76012-0300

Mr. Robert Spain
Texas Parks and Wildlife Department
Chief, Habitat Assessment Branch
4200 Smith School Road
Austin, Texas 78744-3291

Ms. Laura Jane Stephens
Alamo Area Council of Governments
Community Relations Coordinator
8700 Tesoro Drive, Suite 700
San Antonio, Texas 78744-3291

Mr. F. Lawrence Oaks
State Historic Preservation Office
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78111-2276

Ms. Denise Francis
Office of the Governor
P.O. Box 12428
Austin, Texas 78111

Ms. Kyle Mills
Federal Emergency Management Agency
800 North Loop 288
Denton, Texas 76209



DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

26 October 2006

Mr. Keith Beeler
Acting Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Ms. Denise Francis
Office of the Governor
P.O. Box 12428
Austin Texas 78111

Dear Ms. Francis

The U.S. Air Force, Lackland Air Force Base (AFB), has prepared a draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for a proposal to implement the Base Realignment and Closure (BRAC) program as it relates to Lackland AFB, as well as other installation development based on the current Capital Improvements Program (CIP). The environmental analysis for the proposed action and alternatives has been conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached EA and FONSI describing the proposed action and alternatives and solicit your comments concerning any potential environmental consequences of the proposed action or alternatives. Two action alternatives and the no action alternative were analyzed in the EA.

Any questions concerning the proposal should be directed to Mr. John Wildie, 37 CES/CEVN, 1555 Gott Street, Lackland AFB, Texas, 78236, Voice: (210) 671-5337 or Fax: (210) 671-0335. Thank you for your assistance.

Sincerely

A handwritten signature in red ink, appearing to read "Keith Beeler", is positioned above the printed name.

KEITH BEELER
Acting Chief, Environmental Flight

Attachment:
Environmental Assessment



DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

26 October 2006

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Acting Chief, Environmental Flight
37 CES/CEV
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Executive Director
Texas Historical Commission
P.O. Box 12276
Austin Texas 78111-2276

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26 October 2006

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Acting Chief, Environmental Flight
37 CES/CEV
1555 Gott Street
Lackland AFB TX 78236-5645

Ms. Tiffany Pickens
Alamo Area Council of Governments
Community Relations Coordinator
8700 Tesoro Drive, Suite 700
San Antonio Texas 78217

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1555 Gott Street
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Dr. David Sager
Texas Parks and Wildlife Department
Chief, Ecosystem/Habitat Assessment Branch
4200 Smith School Road
Austin Texas 78744-3291

Dear Dr. Sager

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Mr. Wayne Lea
U.S. Army Corps of Engineers
Regulatory Branch, Permit Section
ATTN: CESWF-PER-R
P.O. Box 17300
Fort Worth Texas 76012-0300

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Acting Chief, Environmental Flight
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1555 Gott Street
Lackland AFB TX 78236-5645

Mr. Robert Pine
Field Supervisor
U.S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin Texas 78758

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26 October 2006

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37 CES/CEV
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Lackland AFB TX 78236-5645

Mr. Tom Adams, Director
Intergovernmental Coordination
Governor's Office
P.O. Box 12428
Austin Texas 78711

Dear Mr. Adams

The U.S. Air Force, Lackland Air Force Base (AFB), has prepared a draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for a proposal to implement the Base Realignment and Closure (BRAC) program as it relates to Lackland AFB, as well as other installation development based on the current Capital Improvements Program (CIP). The environmental analysis for the proposed action and alternatives has been conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing the attached EA and FONSI describing the proposed action and alternatives and solicit your comments concerning any potential environmental consequences of the proposed action or alternatives. Two action alternatives and the no action alternative were analyzed in the EA.

Any questions concerning the proposal should be directed to Mr. John Wildie, 37 CES/CEVN, 1555 Gott Street, Lackland AFB, Texas, 78236, Voice: (210) 671-5337 or Fax: (210) 671-0335. Thank you for your assistance.

Sincerely

A handwritten signature in red ink, appearing to read "Keith Beeler", is positioned above the typed name.

KEITH BEELER
Acting Chief, Environmental Flight

Attachment:
Environmental Assessment

Appendix B

Capability Analysis

FINAL

Appendix B

*Installation Development
Lackland Air Force Base, Texas*

APPENDIX B

CAPABILITY ANALYSIS

December 1, 2006

FINAL

Appendix B

*Installation Development
Lackland Air Force Base, Texas*

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December 1, 2006



CAPABILITY ANALYSIS

**FOR THE
INSTALLATION DEVELOPMENT ON
LACKLAND AIR FORCE BASE, TEXAS**

FINAL

**United States Air Force
Air Education and Training Command
Lackland Air Force Base, Texas**

August 2006

ACRONYMS AND ABBREVIATIONS

AC	Advisory Circular	mgd	million gallons per day
ac-ft	Acre-feet	MW	megawatt
ac-ft/yr	Acre-feet per year	MWh	megawatt-hours
ADSL	Average Daily Student Load	NA	not applicable
AFB	Air Force Base	N/A	not available
AFH	Air Force Handbook	psi	pounds per square inch
BA	Biological Assessment	SAWS	San Antonio Water System
BO	Biological Opinion	sf	square feet
CPS	City Public Service	USAF	United States Air Force
CY	calendar year	USEPA	US Environmental Protection Agency
dB	decibel		
dBA	A-weighted decibels	USFWS	US Fish and Wildlife Services
DoD	Department of Defense	VMC	Visual Meteorological Conditions
EA	Environmental Assessment	WWTP	wastewater treatment plant
EIS	Environmental Impact Statement		
ERP	Environmental Restoration Program		
FAA	Federal Aviation Administration		
FW	Fighter Wing		
FY	fiscal year		
GIS	Geographic Information System		
H _z	hertz		
ID	identification		
IMC	Instrumentation Meteorological Conditions		
KFA	Kelly Field Annex		
kV	kilovolt		
L _{dn}	Day-night average sound level		
LTA	Lackland Training Annex		
MCF	million cubic feet		
MCF/d	million cubic feet per day		

**CAPABILITY ANALYSIS
FOR THE
INSTALLATION DEVELOPMENT PROGRAM
ON
LACKLAND AIR FORCE BASE, TEXAS**

FINAL

Department of the Air Force
Headquarters, Air Education and Training Command

and

37 CES/CEV
Lackland AFB, Texas

Contract No. F41689-02-D-0001
Task Order No. 0057

August 2006

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Table of Contents

TABLE OF CONTENTS

Acronyms and Abbreviations	Inside Front Cover
Executive Summary	ES-1
1. Introduction.....	1-1
1.1 Purpose.....	1-1
1.2 General Methodology and Approach.....	1-1
2. Non-Flying Mission Capability	2-1
2.1 Introduction - Non-Flying Mission	2-1
2.2 Assumptions - Non-Flying Mission	2-3
2.3 Baseline and Projected Population Summary	2-4
2.3.1 Biological Assessment Projected Population	2-4
2.3.2 Effective Population	2-5
2.4 Land Use	2-5
2.4.1 Current and Future Land Use Categories	2-5
2.4.2 Potentially Developable Parcels	2-15
3. Constraints Analysis	3-1
3.1 Introduction.....	3-1
3.1.1 Water.....	3-1
3.1.1.1 Regulatory Constraints.....	3-1
3.1.1.2 Water System Capability	3-2
3.1.1.3 Summary of Water Capability	3-3
3.1.2 Wastewater Collection Systems.....	3-4
3.1.3 Electrical Supply	3-5
3.1.4 Natural Gas	3-8
3.2 Summary of Constraints	3-8
4. Flying Mission Capability.....	4-1
4.1 Methodology	4-1
4.2 Aviation Resources	4-3
4.2.1 Current Aircraft Operations	4-3
4.3 Aviation Resources Capacity	4-6
4.3.1 Aircraft Operations	4-6
4.3.2 Airfield.....	4-8
4.3.3 Runway	4-10
4.3.4 Military Training Airspace	4-11
5. List of Preparers.....	5-1
6. References.....	6-1

TABLE OF CONTENTS (cont.)

Appendices

- A Land Use Factors and Calculations for Projected Buildings and Pavements
- B Utility Summary Data

Figures

2-1	Non-Flying Mission Capability Analysis Process Flow Diagram	2-2
2-2	Existing Land Use on Lackland AFB, Texas.....	2-9
2-3	Future Land Use on Lackland AFB, Texas	2-10
2-4	Potentially Developable Parcels on Lackland AFB, Texas	2-13
4-1	Baseline Noise Contours with Sensitive Receptors Lackland AFB	4-4
4-2	Capability Scenario Noise Contours with Sensitive Receptors Lackland AFB	4-7
A-1	Lackland Training Annex	A-21
A-2	Lackland Main Base West	A-22
A-3	Lackland Main Base East and Kelly Field Annex	A-23

Tables

2-1	Biological Assessment Population and Projection for Lackland AFB from 2000 through 2011	2-6
2-2	Current and Projected Effective Population for Lackland AFB	2-7
2-3	Existing Land Use Categories.....	2-11
2-4	Existing and Future Land Use Acreage by Land Use Category	2-12
2-5	Developable Parcels by Land Use Type	2-15
3-1	Summary of Water Consumption and Capacity (Headroom).....	3-3
3-2	Wastewater Flow and Capacity (Headroom).....	3-6
3-3	Electrical Consumption and Capacity (Headroom)	3-7
3-4	Natural Gas Consumption and Capacity (Headroom)	3-9
3-5	Summary of Resource Constraints on Potential Development.....	3-10
4-1	Current Daily Aircraft Operations at Lackland AFB.....	4-3
4-2	Land Areas Exposed to Elevated Noise Levels– Baseline Conditions.....	4-5
4-3	Noise Exposure at Sensitive Receptors–Baseline Conditions	4-5
4-4	Projected Daily Aircraft Operations at Lackland AFB.....	4-6
4-5	Land Areas Exposed to Elevated Noise Levels	4-6
4-6	Noise Levels at Sensitive Receptors – Capability Scenario	4-8
4-7	Comparison of Airfield Operations for Baseline Conditions and Capability Scenario.....	4-10
4-8	Comparison of Airfield Operations for Current Conditions and Capability Scenario under Varying Weather Conditions	4-10
4-9	Estimated Runway Capacity after Increased Operations.....	4-11

Executive Summary

EXECUTIVE SUMMARY

The purpose of this Capability Analysis is to define the maximum development potential for Lackland Air Force Base considering limiting factors. The primary objective is to determine sustainable non-flying and flying mission growth potential through the 5-year planning period ending in the year 2011. The growth potential identified in this Capability Analysis will be used to define a potential development alternative to be assessed in the Installation Development Environmental Assessment.

Because of the complexity, diversity, and unique attributes of the missions on Lackland Air Force Base, this analysis was conducted in two parts: flying and non-flying missions. The division was necessary to capture differences in projecting growth for the differing types of missions; however, the analyses were conducted in parallel. Baseline conditions were compared against an established capacity or capability to determine available headroom for growth. Slight differences in the analyses of the flying and non-flying missions are discussed in the following sections, as needed.

Non-Flying Mission:

Open space areas or available areas identified in *The General Plan* and *The 2030 Plan* were evaluated for their future development potential relative to operational and physical land use constraints. These constraints included quantity safety distances, range impact areas, environmental management areas, security zones, and land use compatibility factors. Environmental management areas include all historical and cultural resource areas (i.e., archeological sites, etc.), Environmental Restoration Program sites and areas of concern, floodplains, wetlands, and biologically sensitive areas. Manpower projections for Lackland Air Force Base for 2004 through 2010 were extracted from the 2005 *Biological Assessment for the Effect of Water Draw on the Edwards Aquifer by the Department of Defense Installations in the San Antonio Area* and utilized for analysis of current and future population based water consumption projections.

Table ES-1 summarizes the present consumption data against capability for the resources evaluated during the analysis of non-flying mission capability. Based on the analysis of available resources, the annual limitation for potable water from the Edwards aquifer is a primary limiting factor; however, available current and future building space as identified in Appendix A, presently appear to be the limiting factor for population growth at Lackland Air Force Base. The electrical subsystems at Lackland Training Annex and Kelly Field Annex need attention as they may be limiting growth in those areas. Based on available information, the natural gas distribution and sewer collection systems do not appear to limit growth capability as evaluated and presented in this report.

Table ES-1
Summary of Resource Constraints on Potential Development

Resource Usage Category	Allocation or Capability	Percent Utilized Base wide	Remaining Capability	Additional Population Supported																									
Base Lands (acres)	9,525	95%	523	NA																									
Current and Future Building Space (sf)	20,067,843	82%	3,666,829	11,715																									
Potable Water from Edwards Aquifer (ac-ft/yr)	4,099	60%	1,629	25,610																									
Electrical System (MW)	72.9	67%	24.31	NA																									
Gas System (MCF/d)	7.33	53%	3.48	NA																									
Sewer System (mgd)	12.11	25%	9.05	NA																									
<p>Note: Calculation details and resources used from Appendices A and B presented in Table 3-5 for all values presented in this table.</p> <table> <tr> <td>ac-ft/yr</td><td>acre-feet per year</td><td>BA</td><td colspan="2"><i>Biological Assessment</i></td></tr> <tr> <td>FY</td><td>fiscal year</td><td>MCF/d</td><td colspan="2">million cubic feet per day</td></tr> <tr> <td>mgd</td><td>million gallons per day</td><td>MW</td><td colspan="2">megawatt</td></tr> <tr> <td>NA</td><td>not applicable</td><td>sf</td><td colspan="2">square feet</td></tr> <tr> <td>USAF</td><td>United States Air Force</td><td>%</td><td colspan="2">percent</td></tr> </table>					ac-ft/yr	acre-feet per year	BA	<i>Biological Assessment</i>		FY	fiscal year	MCF/d	million cubic feet per day		mgd	million gallons per day	MW	megawatt		NA	not applicable	sf	square feet		USAF	United States Air Force	%	percent	
ac-ft/yr	acre-feet per year	BA	<i>Biological Assessment</i>																										
FY	fiscal year	MCF/d	million cubic feet per day																										
mgd	million gallons per day	MW	megawatt																										
NA	not applicable	sf	square feet																										
USAF	United States Air Force	%	percent																										

Flying Mission:

The growth potential for Lackland Air Force Base, in regard to aircraft operations and flying missions, is limited by the installation's location in a developed urban community. Noise levels from the existing aircraft operations have been established in two previous Environmental Impact Statements, both of which garnered considerable attention from the surrounding community. Given the sensitivity of the local citizens, this Capability Analysis used Federal Aviation Administration's standards for determining levels of significance to evaluate potential changes in noise levels as they would relate to the capability identified for the flying mission: an increase at sensitive receptors of more than 1.5 decibels. Using this Federal Aviation Administration criterion, the determination was made that both C-5 and F-16 aircraft operations could increase by 15 percent before there would be an increase of more than 1.5 decibels at any of the 18 sensitive receptors identified in the area around Lackland Air Force Base. This increased level of aircraft operations would result in a 10 percent increase in the total area of land exposed to a day-night average sound level greater than 65 A-weighted decibels.

From the airfield demand perspective, if all of the Annual Demand was used under the maximum capacity scenario, aircraft operations would increase 15 percent and the remaining capacity of the airfield would decrease 6 percent from a current surplus capacity of 30 percent to a surplus of 24 percent. After the increase in operations, even if all of the average planned operations are conducted under the most demanding conditions (Instrumentation Meteorological Conditions), the airfield would still have unused capacity.

The environmental parameters evaluated in this Capability Analysis were analyzed to that level of detail to determine the capacity for growth at Lackland Air Force Base.

Additional resource areas must be evaluated and further comprehensive analyses conducted in the subsequent Environmental Assessment before it can be determined whether proposed growth would result in any significant environmental impacts.

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Chapter 1

Introduction

1. INTRODUCTION

1.1 PURPOSE

The purpose of this Capability Analysis is to define the maximum development potential for Lackland Air Force Base (AFB) considering limiting factors. The primary objective is to quantify sustainable non-flying and flying mission growth through the 5-year planning period ending in the year 2011. As identified in *The General Plan* and *The 2030 Plan* (United States Air Force [USAF] 2002a and 2005a), there is open and undeveloped space that could support expansion in the various missions on Lackland AFB.

The information provided in this document will be the basis for a subsequent Installation Development Environmental Assessment (EA). The growth potential quantified in this Capability Analysis will be used to develop the Description of Proposed Action and Alternatives that will drive the environmental impact analysis, and more specifically, to define a potential development alternative to be assessed in the Installation Development EA.

1.2 GENERAL METHODOLOGY AND APPROACH

Because of the complexity, diversity, and unique attributes of the missions on Lackland AFB, this analysis was conducted in two parts: for flying and non-flying missions. The division was necessary to capture differences in projecting growth for the differing types of missions; however, the analyses were conducted in parallel. Baseline conditions were compared against an established capacity or capability to determine available headroom for growth. Slight differences in the analyses of the flying and non-flying missions are discussed in the following sections, as needed.

After determining the current baseline, the first step in determining the maximum installation development potential was to calculate the maximum available land: the net acreage available for development in each land use category (excluding parcels smaller than 1 acre) that was free of any physical and/or operational constraints (e.g., quantity distance arcs, range impact areas, clear zones, floodplains, environmental restoration program sites, etc.). The next step was to determine the basis for sustainable population growth through the end of the planning period. The evaluation of available land and sustainable population presented in Section 2.0 includes land uses and population growth that support both flying and non-flying missions. The resulting maximum developable land and sustainable populations were then evaluated with respect to potentially limiting factors such as potable water resources and other utility system resources (i.e., wastewater collection, electrical, and natural gas distribution) to determine the maximum development potential (Section 3.0). Finally, parallel to the above processes, the noise environment surrounding the Lackland AFB airfield and training airspace was evaluated to determine the maximum growth potential for the flying mission. This analysis is presented in Section 4.0. The in-depth evaluation of potential environmental

impacts to other resources such as stormwater runoff, transportation systems, waste disposal, and air quality will be addressed in the subsequent Installation Development EA.

Chapter 2

Non-Flying Mission Capability

2. NON-FLYING MISSION CAPABILITY

2.1 INTRODUCTION - NON-FLYING MISSION

This section specifically addresses the land use analysis figures and population figures to be used during the remainder of this Capability Analysis. Open space areas or available areas identified in *The General Plan* (USAF 2002) and *The 2030 Plan* (USAF 2005a) were evaluated for their future development potential relative to operational and physical land use constraints. These constraints included quantity safety distances, range impact areas, environmental management areas, security zones, and land use compatibility factors. Environmental management areas include all historical and cultural resource areas (i.e., archeological sites, etc.), Environmental Restoration Program (ERP) sites and areas of concern, floodplains, wetlands, and biologically sensitive areas. Manpower projections for Lackland AFB for 2004 through 2010 were extracted from the *Biological Assessment for the Effect of Water Draw on the Edwards Aquifer by the Department of Defense Installations in the San Antonio Area* (USAF 2005b) (the BA) and utilized for analysis of current and future population based water consumption projections.

The result of the land use and sustainable population analysis was an estimate of building space, pavements, and population that could be incorporated into the lands currently available for development at Lackland AFB. The estimated growth from available lands does not account for demolition of existing structures or environmental restoration activities that could free up additional land, nor does it account for use of sensitive resources like the Edwards Aquifer or surface watersheds like Leon or Medio Creeks that could constrain sustainable populations and pavements. The estimated sustainable population is based on the BA and, therefore, protective of the Edwards Aquifer resource. Watershed requirements are addressed in the EA.

Demolition plans, watershed issues, and other resources will be addressed and accounted for in the EA, restoration activities cannot be accounted for until they occur sometime in the future, and Edwards Aquifer resource issues are specifically addressed by utilizing the projected population and water consumption values presented in the BA (USAF 2005b).

The methodology used for the non-flying mission growth capability evaluation is illustrated in Figure 2-1.

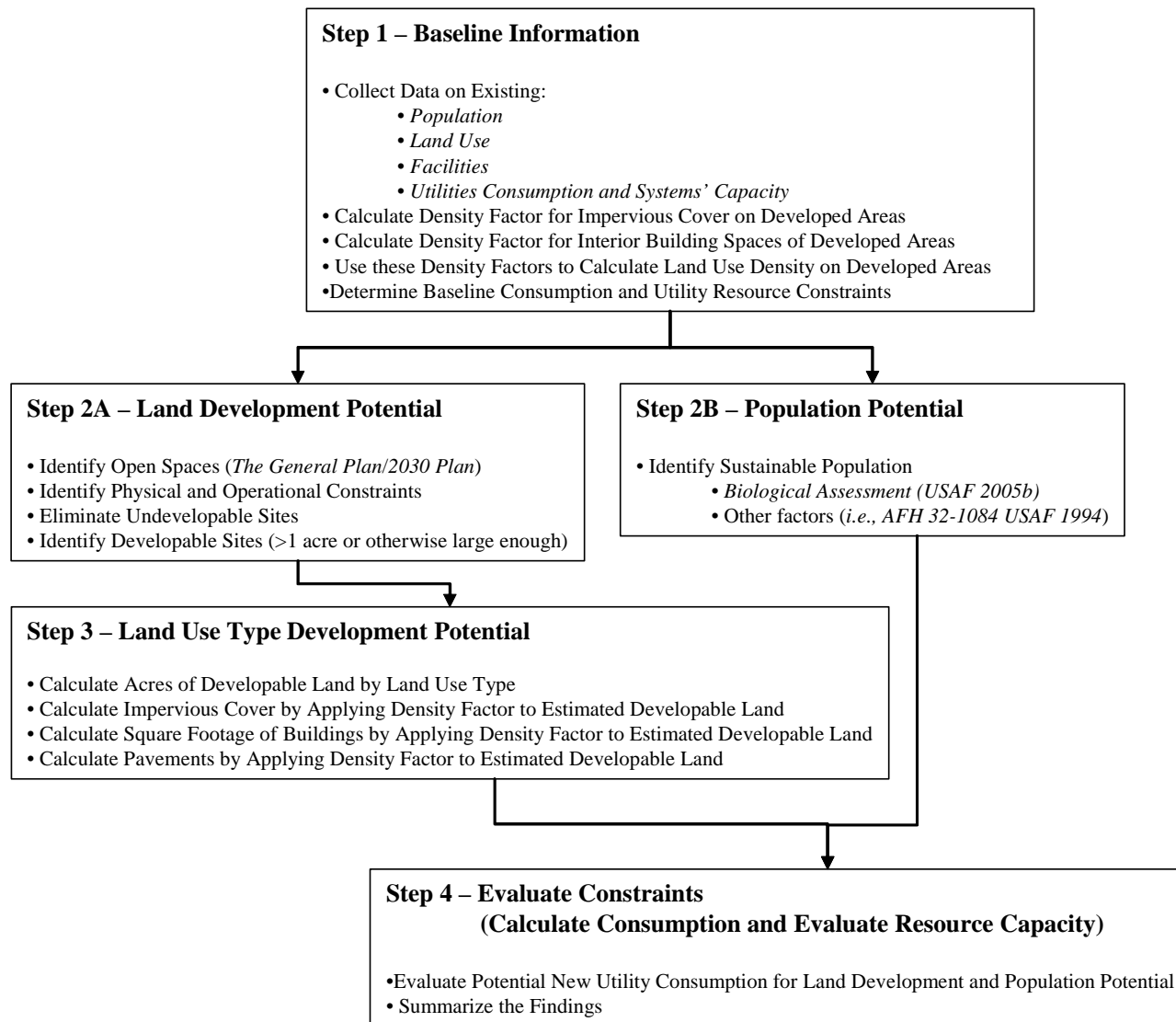


Figure 2-1
Non-Flying Mission Capability Analysis Process Flow Diagram

2.2 ASSUMPTIONS - NON-FLYING MISSION

In order to develop a comprehensive and consistent Capability Analysis, several assumptions were developed and incorporated into the process. These assumptions reflect Air Force policy, land use development concepts, as well as areas in which data were not available at the time of this analysis. The following general assumptions were incorporated into the Capability Analysis process.

- The projected population increases defined for Lackland AFB in the BA (USAF 2005b) for calendar years (CY) 2004 through 2010 were used as the population basis for this effort. Actual population data for fiscal years (FY) 2004 and 2005 obtained from the Office of Financial Management on Lackland AFB vary from the BA projections for CY2004 and CY2005 due to the inclusion of off-base dependents in the official base population estimates. Since off-base dependents do not pose a significant draw on base utilities and resources, the BA population is used during this analysis of on-base resource demands.
- Other Department of Defense (DoD) installations in the San Antonio area have projected sufficient growth to account for any potential mission changes that could impact commonly managed resources such as the Edwards Aquifer.
- No changes would be made to the Lackland AFB internal water allocation established by the DoD Water Working Board.
- The following facility requirements and land use factors defined in Air Force Handbook (AFH) 32-1084 (USAF 1994) were used to develop the formulas required to analyze the variations in land use development. General administrative facilities were assigned 180 gross square feet (sf) per person. Training facilities with classrooms and assembly space were assigned 100 sf per person. Factors for other support and recreational facilities, warehouses, and maintenance and operations facilities were computed using the charts and formulas found in AFH 32-1084.
- Land use concepts and planning goals defined in *The General Plan* (USAF 2002) and *The 2030 Plan* (USAF 2005a) were used to assign compatible alternate land uses for developable parcels.
- Any changes made to the land use categories defined in *The General Plan* (USAF 2002) and *The 2030 Plan* (USAF 2005a) would be compatible with adjacent land uses.
- Construction in the 100-year floodplain is not strictly prohibited. However, it is restricted and is not recommended for Lackland AFB based on the flood-event cycle of the San Antonio area and the abundance of urban development in both the Leon Creek and Medio Creek watersheds. Many of the mature trees found on

base are situated along the creeks and provide cover for the birds and animals that move along the watercourses. Wetlands cannot be filled and developed. The areas on Lackland AFB adjacent to the creeks have steep slopes and the soils along the creeks are generally silty-clays; neither characteristic which is conducive to construction. Although some facility development and construction could occur in the floodplain, if limited to intermittent- and low-occupancy recreational and recreational support facilities, for this analysis it was assumed that no new development would occur in either of the two floodplains on Lackland AFB.

- The acquisition of the parcel of land north of the 149th Fighter Wing (FW) (known as the Van de Walle Property) was previously addressed and evaluated in the Capital Improvements Program Environmental Assessment for Lackland AFB (November 2004). This Capability Analysis will not address the development of the Van de Walle property since it has not yet been acquired.
- Transportation systems on and off base could handle any growth increases through infrastructure upgrades, new construction, and other programmed improvements and therefore would never be a permanent barrier to growth on Lackland AFB. Transportation will be formally evaluated in the EA.

2.3 BASELINE AND PROJECTED POPULATION SUMMARY

2.3.1 Biological Assessment Projected Population

Determining the number of people currently working and living on Lackland AFB is a key component to defining the maximum number of people the base can support without creating a significant environmental impact. Base population data for 2005 obtained from the Lackland AFB Financial Management Office indicated a total population of 45,356, which is the official population for the base in 2005. This value includes a number of off-base dependents, which for purposes of this study do not pose a significant demand on the base utilities and resources. For Lackland AFB and other installations in the Edwards Aquifer Region, potable water obtained from groundwater resources is one of the leading factors in determining sustainable population growth. The recently published BA report presents an in-depth review and analysis of sustainable population growth and resulting water demand for Lackland AFB and two other DoD installations in the region (USAF 2005b). Because of the sensitivity surrounding use of the Edwards Aquifer and the fact that potable water resources are a limiting factor in population growth, this Capability Analysis incorporates primary population data from the BA report, including the actual population for Lackland AFB for 2000 through 2003 and the projected population presented in the BA for 2004 through 2010.

Table 2-1 presents the population data reported in the 2005 BA and illustrates a 22 percent increase in the number of non-resident military and civilian personnel (8-hour Base Population) working on Lackland AFB from 2000 to 2001. This increase was due in large part to the realignment of a portion of former Kelly AFB (primarily the airfield and associated activities) to Lackland AFB. The same 8-hour population grew at a minimal rate (at an average of only 1.1 percent) in the following years (2002 and 2003). Total population growth for Lackland AFB was estimated in the BA by using the 2003 population as a baseline and adding in personnel additions associated with mission changes identified through 2010. This study utilizes the projected population for 2010 from the BA to estimate the 2011 population.

2.3.2 Effective Population

For the purposes of this analysis, two different population types were evaluated: worker population (8 hours of demand per day) and worker/resident population (24 hours of demand per day). In order to determine the current, future, and maximum demand on utilities and infrastructure, the number of people on the base for 8 hours per day needs to be defined. Additionally, those individual working and living on the base (creating a 24-hour demand) must also be determined. The current and projected effective populations for this Capability Analysis are extracted from information associated with the BA (USAF 2005b) and are presented in Table 2-2. Based on information found in the BA, the total population and effective populations are anticipated to increase by 12 percent and 17 percent, respectively, between 2005 and 2011.

2.4 LAND USE

The General Plan (USAF 2002) and subsequent document *The 2030 Plan* (USAF 2005a) provide the foundation of this analysis. Changes from the existing land uses (Figure 2-2) to the planned future land uses (Figure 2-3) are quantified in Section 2.4.1 (Table 2-3). Section 2.4.2 provides an evaluation of developable spaces by land use type that are presented in Table 2-4, Figure 2-4, and in Plates A-1 through A-3 in Appendix A.

2.4.1 Current and Future Land Use Categories

As identified in *The General Plan* and *The 2030 Plan* (USAF 2002 and 2005a), there is sufficient open and undeveloped space on Lackland AFB to provide sufficient growth potential for the installation over the next five years. This shift in land use would support reasonably foreseeable changes and expansion in the various missions on Lackland AFB. The land use categories used by the Air Force are defined in Table 2-3, and the shift in area between existing and future land uses are presented in Table 2-4.

Table 2-1 Biological Assessment Population and Projection for Lackland AFB from 2000 through 2011

	2000	2001	2002	2003 ¹	2004	2005	2006	2007	2008	2009	2010	2011 ⁴
Base Population (8-hour)	20,404	24,793	24,795	26,035	26,885	27,385	27,815	27,990	28,121	28,346	29,168	29,168
ADSL ² (24-hour)	9,667	10,169	10,545	10,257	10,557	10,557	10,617	12,417	12,642	13,042	13,420	13,420
On-base Residents ³ (24-hour)	6,467	3,753	3,449	3,380	3,380	3,784	4,300	4,816	4,252	4,252	4,252	4,252
Total	36,538	38,715	38,789	39,672	40,822	41,726	42,732	45,223	45,015	45,640	46,840	46,840

Source: *Biological Assessment* (USAF 2005b) and Headquarters Air Education and Training Command (USAF 2006b)

¹Base year for BA population projections is 2003. Years 2000 through 2003 are actual population values.

²ADSL (Average Daily Student Load)

³On-base residents include military personnel and their dependents.

⁴2011 projected population is the same as 2010 population given in the BA (which only projects population through 2010) (USAF 2006b).

Table 2-2 Current and Projected Effective Population for Lackland AFB

Current Population¹	2005		
	Total Population	Weight Factor	Effective Population
Base Population (8-hour)	27,385	0.333	9,119
ADSL ² (24-hour)	10,557	1	10,557
On-base Residents ³ (24-hour)	3,784	1	3,784
Total	41,726		23,460
Projected Population⁴	2011		
	Total Population	Weight Factor	Effective Population
Base Population (8-hour)	29,168	0.333	9,713
ADSL ² (24-hour)	13,420	1	13,420
On-base Residents ³ (24-hour)	4,252	1	4,252
Total	46,840		27,385
Percent Increase over 2005	12%		17%

Source: *Biological Assessment* (USAF 2005b) and Headquarters Air Education and Training Command (USAF 2006b)

¹2005 population extracted from BA (USAF 2005b)

²ADSL (Average Daily Student Load)

³On-base residents include military personnel and their dependents.

⁴2011 projected population is the same as 2010 population given in the BA (which only projects population through 2010) (USAF 2006b).

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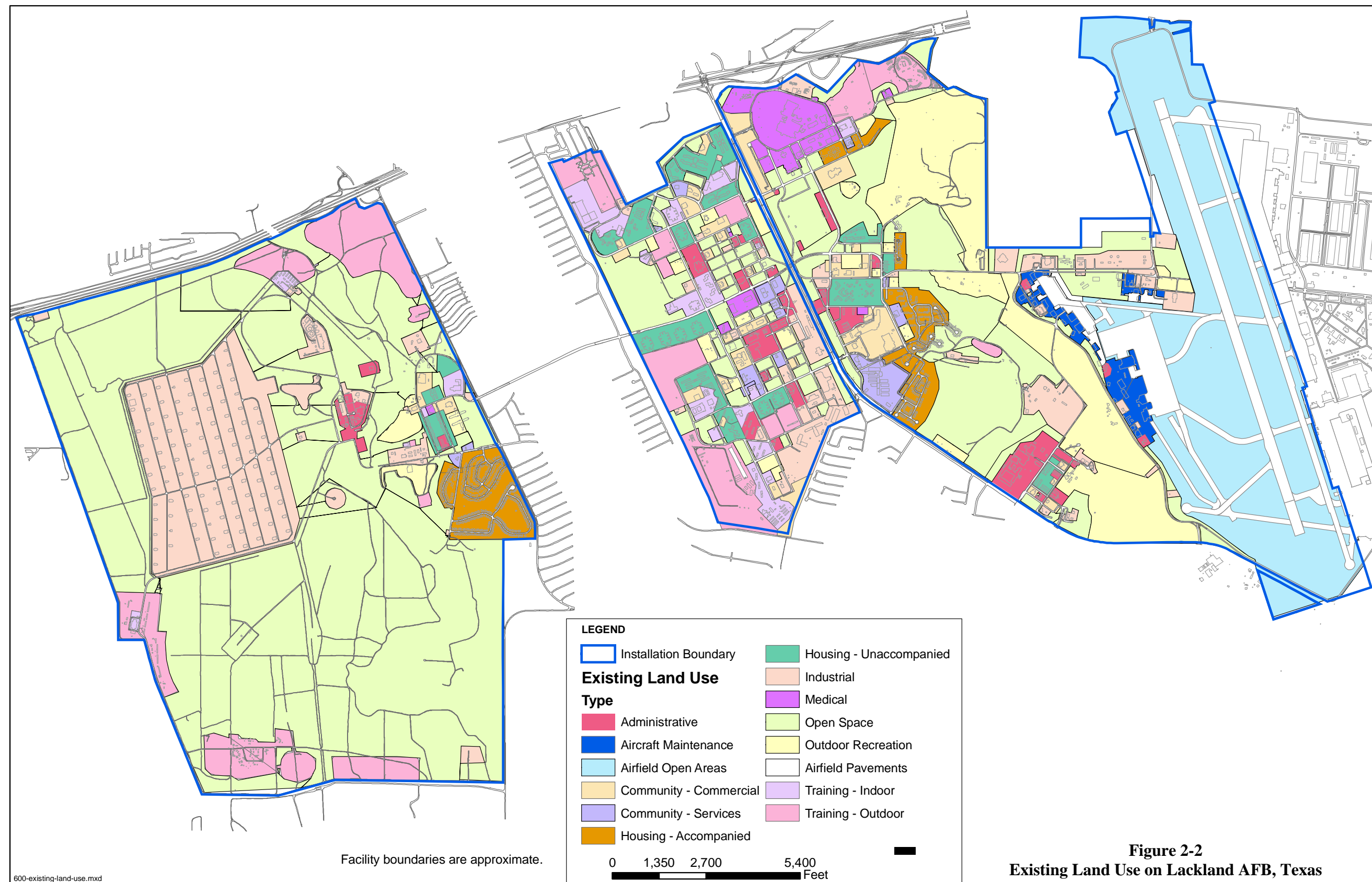


Figure 2-2
Existing Land Use on Lackland AFB, Texas

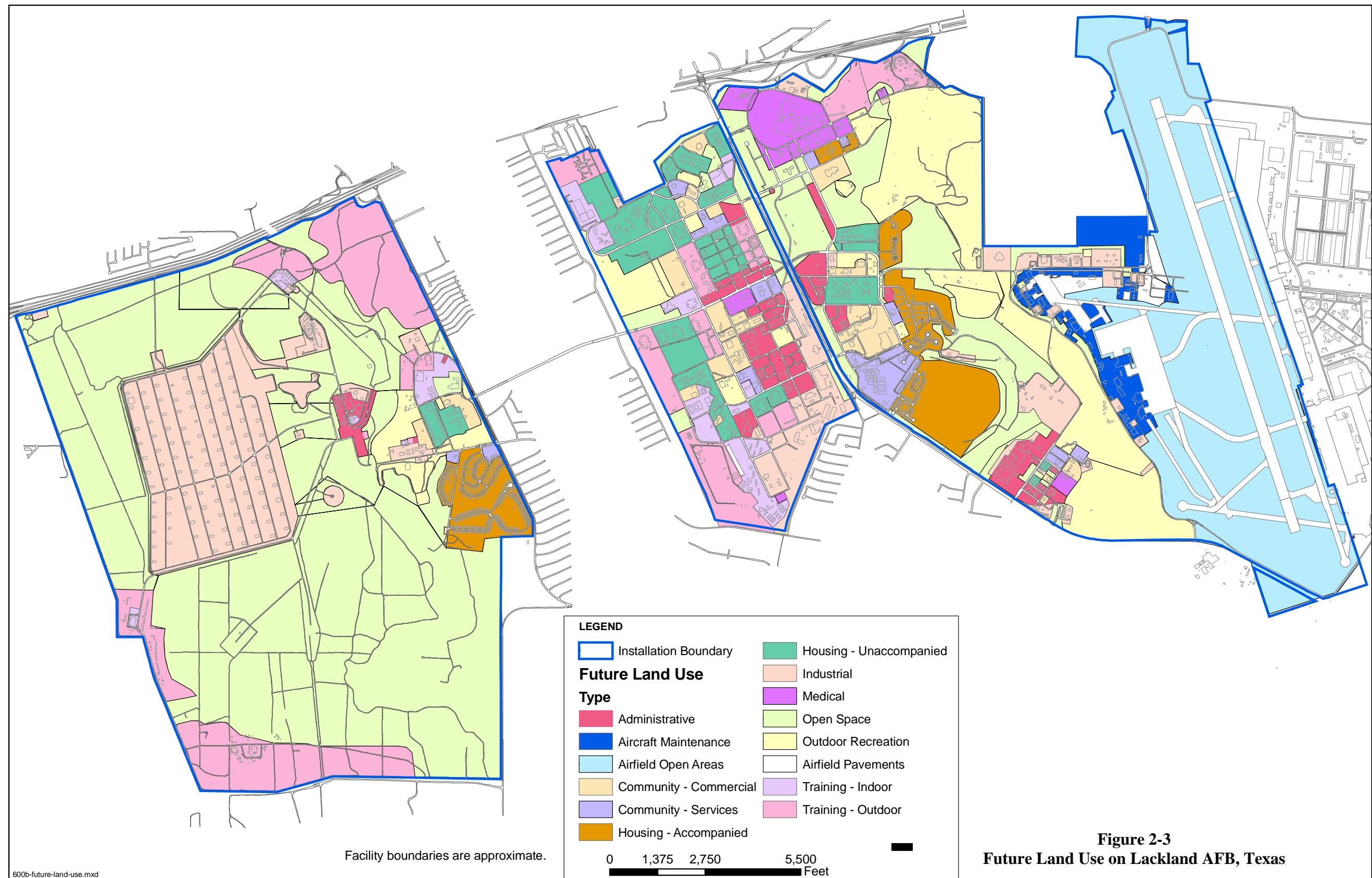


Table 2-3 Existing Land Use Categories

Land Use Category	Typical Facilities and Features
Administrative	Headquarters, civilian personnel, education center, law center, security operations.
Aircraft Maintenance	Aircraft maintenance hangars, shops, docks, base operations, control tower, fire station, flight training.
Airfield Open Areas	Open spaces associated airfield clearances and safety zones.
Airfield Pavements	Runways, taxiways, aprons
Community-Commercial	Commissary, exchange, club, dining hall, recreation center, gym, theater.
Community-Service	Post office, library, chapel, childcare center, education center.
Housing-Accompanied	Family housing, Temporary Lodging Facility, and support.
Housing-Unaccompanied	Housing for singles, visitors' housing.
Industrial	Base engineering, maintenance shops, storage, warehousing, utilities.
Medical	Hospital, clinic, medical storage.
Open Space	Grazing area, conservation area, buffer space.
Outdoor Recreation	Outdoor courts and fields, swimming pools, ranges, riding stables, golf course.
Training-Indoor	Classroom buildings, hangars and other facilities used for instructional purposes.
Training-Outdoor	Outdoor open areas used for instructional purposes.
Source: USAF 2002	

Table 2-4 Existing and Future Land Use Acreage by Land Use Category

Land Use Type	Existing Land Use		Future Land Use		Change in Land Use (acres)
	Acres	Percent Distribution	Acres	Percent Distribution	
Administrative	181	2%	245	3%	64
Aircraft Maintenance	84	1%	157	2%	73
Airfield Open Areas	1,337	14%	1,413	15%	76
Airfield Pavements	352	4%	411	4%	59
Community - Commercial	194	2%	184	2%	-10
Community - Services	80	1%	114	1%	34
Housing - Accompanied	321	3%	362	4%	41
Housing - Unaccompanied	256	3%	352	4%	96
Industrial	910	10%	921	10%	11
Medical	135	1%	133	1%	-2
Open Space ¹	4,169	44%	3,499	37%	-670
Outdoor Recreation	712	7%	823	9%	111
Training - Indoor	164	2%	159	2%	-5
Training - Outdoor	630	7%	752	8%	122
Total	9,525	100%	9,525	100%	0
¹ A variance in acreage of approximately 5% of the total base area was found between information obtained from <i>Facts and Stats</i> (USAF 2005e) and existing and future land use area obtained from base geographical information system data. To correct the variance, acreage was added to open space for existing and future land use to obtain the Total Acres provided by <i>Facts and Stats</i> . Source: <i>The General Plan</i> (USAF 2002), <i>The 2030 Plan</i> (USAF 2005a), <i>Facts and Stats</i> (USAF 2005e)					

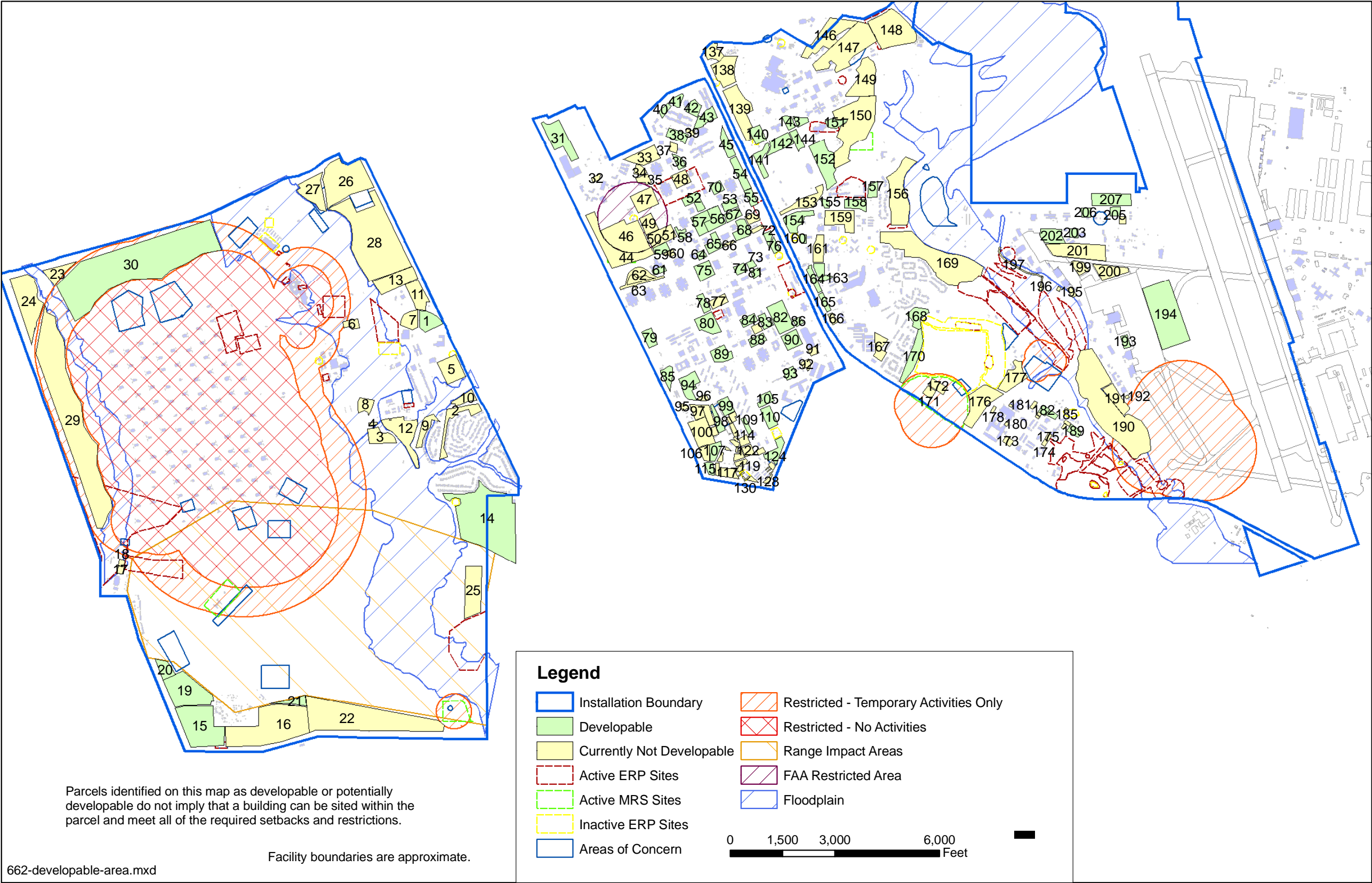


Figure 2-4
Potentially Developable Parcels on Lackland AFB, Texas

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2.4.2 Potentially Developable Parcels

A review of base aerial photographs and land use planning maps resulted in the identification of 207 potentially developable parcels comprising 1,430 acres of apparently vacant lands. Of the 207 identified sites on base, 120 sites were eliminated due to physical and operational constraints or because the sites were already in use¹ (Appendix A). The most common discriminating factors encountered included sites within floodplains, active ERP sites, or established outdoor training and recreation areas, and sites that were too small to develop within established setback requirements.

The remaining 87 parcels are potentially developable under current conditions, comprising 523 acres of land. The summary of available areas by land use type is presented below in Table 2-5. Additional detail may be found in Appendix A.

Table 2-5 Developable Parcels by Land Use Type

Land Use Type	Total (acres)	Undevelopable Parcel (acres) ¹	Developable Parcel (acres)
Administrative	51	4	47
Aircraft Maintenance	0	0	0
Airfield Open Areas	0	0	0
Airfield Pavements	35	0	35
Community - Commercial	43	25	18
Community - Services	15	12	3
Housing - Accompanied	19	0	19
Housing - Unaccompanied	51	24	27
Industrial	41	9	32
Medical	10	10	0
Open Space	643	404	239
Outdoor Recreation	98	85	13
Training - Indoor	31	15	16
Training - Outdoor	393	319	74
Total	1,430	907	523
¹ Appendix A presents the individual constraint associated with each undevelopable parcel.			

¹ Many of the 120 sites that were eliminated were originally included as potentially developable due to proposed demolition activities identified in *The General Plan* (USAF 2002) and *2030 Plan* (USAF 2005a) and still have buildings or other facilities located upon them. Should demolition occur, these sites would then become available for construction.

By comparing this estimated total of 523 acres of developable land to the total base area of 9,525, it can be estimated that 95 percent of the land at Lackland AFB is currently developed. Approximately 3.7 million sf of building spaces and 57 acres of associated pavements could be accommodated by the developable parcels under present site conditions, based on estimates using density factors presented in Appendix A. These identified building spaces could potentially accommodate up to an additional 11,715 people without consideration to other potential resource constraints (Appendix A).

Chapter 3

Constraints Analysis

3. CONSTRAINTS ANALYSIS

3.1 INTRODUCTION

The purpose of this section is to determine the capability of Lackland AFB's primary utility resources relative to current demand requirements and to establish available headroom for facility growth based on the current configuration and regulation of these resources. As established in Section 2 and detailed in Appendices A and B, the developable areas of Lackland AFB can potentially accommodate the construction of over 3.7 million sf of interior building space for a wide range of uses. The current interior building space on Lackland AFB (as of October 2005) is 16,158,605 sf, therefore, a 20 percent increase in building space is possible outside of other resource constraints (USAF 2004b and 2005d). An analysis of the population trends presented in the BA indicate the projected total population through 2011 could increase by as much as 12 percent over the 2005 total population, which would result in a 17 percent increase over the 2005 effective population (USAF 2005b). The analysis presented in this section will evaluate potential constraints on this projected growth based on available headroom from current utility resources.

3.1.1 Water

3.1.1.1 Regulatory Constraints

Potable water sources are a critical issue for Lackland AFB and the San Antonio metropolitan area. The base currently obtains most of its potable water from the Edwards Aquifer. The US Environmental Protection Agency (USEPA) has classified the Edwards Aquifer as a sole source aquifer, and several threatened and endangered species are associated with it. In 1999, the US Fish and Wildlife Service (USFWS) issued a Biological Opinion (BO) related to water withdrawals from the Edwards Aquifer by all active military installations in the San Antonio area excluding Brooks City-Base (i.e., former Kelly AFB, Lackland AFB, Randolph AFB, and Fort Sam Houston). The USFWS identified the maximum DoD withdrawal for these installations from the Edwards Aquifer as 11,830 acre-feet per year (ac-ft/yr) for 2000 and 2001, and 10,515 ac-ft/yr for 2002 through the end of the time period addressed by the 1999 consultation. The 1999 BO has been extended several times.

A new Biological Assessment was submitted to the USFWS in early 2005, and a new BO is presently under consideration to replace the present BO. For purposes of this study, the new DoD maximum annual withdrawal from the Edwards Aquifer will be 8,400 ac-ft/yr, based on the current DoD allocation of 2.1 percent of the out-year aquifer capacity of 400,000 ac-ft/yr. Of the DoD withdrawal, Lackland AFB has been allocated 48.8 percent, or 4,099 ac-ft/yr. This volume includes the amount retained for portions of Kelly AFB that became part of Lackland AFB. The recently submitted 2005 BA report indicates projected usage for 2005 and 2010 to be 2,470 ac-ft/yr and 2,856 ac-ft/yr, which

represents 60% and 70% (respectively) of Lackland AFB's total allocation (USAF 2005b). For purposes of this analysis, these values will be used as a comparison against the regulatory constraints.

3.1.1.2 Water System Capability

The water systems for each of the three distinct regions of Lackland AFB (i.e., the Main Base, Lackland Training Annex, and Kelly Field Annex) are managed separately due to their unique geographic location and features. For the purposes of this water system capability analysis, the system for each region has been evaluated separately as follows.

Lackland Main Base: Potable water is currently supplied to the main base by six Edwards Aquifer wells that have a total designed withdrawal capacity of 13.22 million gallons per day (mgd) (14,808 ac-ft/yr). The water system on the main base includes more than 60 miles of water mains and four elevated tanks that provide a total storage capacity of 1.275 million gallons (3.9 acre-feet [ac-ft]). During historical peak withdrawal conditions, the wells operated at 36 percent of total design capacity (approximately 4.76 mgd or 5,332 ac-ft/yr) (USAF 2002). More recent data indicate peak withdrawals occurred in August 2003 (2.54 mgd [2,845 ac-ft/yr], 19 percent of capacity) and July 2005 (2.08 mgd [2,330 ac-ft/yr], 16 percent of capacity) (USAF 2006a). Peak withdrawals were triggered by seasonal and operational demands; they were not sustained over the course of the year. The overall design capacity of the system would not limit Lackland Main Base's ability to produce and distribute water within the DoD-assigned withdrawal limit for the installation.

Lackland Training Annex: The Lackland Training Annex currently obtains potable water from two Edwards Aquifer wells with a combined design capacity of 4.3 mgd (4,817 ac-ft/yr). The water system on the Lackland Training Annex includes more than 15 miles of water mains and two elevated tanks that provide a total storage capacity of 375,000 gallons (1.1 ac-ft). During historical peak withdrawal conditions, the wells operated at 17 percent of total design capacity (approximately 0.74 mgd or 829 ac-ft/yr) (USAF 2002). More recent data indicate a peak withdrawal occurred in July 2005 (0.73 mgd [818 ac-ft/yr], 17 percent of capacity) (USAF 2006a). Again, these peak conditions varied by seasonal and operational demands and were not sustained throughout the year. The overall design capacity of the system would not limit Lackland Training Annex's ability to produce and distribute water within the DoD-assigned withdrawal limit for the installation.

Kelly Field Annex: The water system on the Kelly Field Annex is managed separately from the rest of Lackland AFB as a result of the closure of Kelly AFB. As a part of the disposal of Kelly AFB, the water system on the former installation was sold to SAWS. In a contractual arrangement with SAWS, the Air Force retained the water rights for the two Edwards Aquifer wells on former Kelly AFB, as well as the contractual option to purchase additional water from SAWS in lieu of utilizing the water rights retained by the

Air Force. At present, all potable water supplied to the Kelly Field Annex and the leaseback areas on the east side of former Kelly AFB is purchased from SAWS and is not counted against the DoD-assigned withdrawal limit for the installation. During FY2005 (October 2004 through September 2005), 342.3 ac-ft of water was purchased from SAWS and distributed to the Kelly Field Annex and leaseback areas. This capability analysis assumes this practice will continue.

3.1.1.3 Summary of Water Capability

Table 3-1 presents the combined capacity, regulatory limits, projected consumption, and available headroom associated with all water uses for Lackland AFB. The recent peak consumption values indicate the potential to approach the average daily value of DoD-assigned withdrawal limit for the installation on a short-term basis; however, these peak conditions were not sustained over the course of the year and the allocations are based on annual consumption. The annual consumption values presented for 2005 from the BA indicate 60 percent of the DoD-assigned withdrawal limit for the installation would have been consumed if all of the water were obtained from on-base Edwards Aquifer wells. The calculated headroom above the 2005 and 2010 projected consumption values from the BA are 1,629 ac-ft/yr and 1,243 ac-ft/yr, respectively.

**Table 3-1 Summary of Water Consumption and Capacity
(Headroom)**

Category	Main Base	LTA	KFA	Total	Percent of Capacity	Percent of Regulated Limit	Headroom																				
Withdrawal capacity (ac-ft/yr)	14,808	4,817	NA	19,625	100%	479%	NA																				
Internal allocation (ac-ft/yr)	NA	NA	NA	4,099	21%	100%	NA																				
Historical peak (ac-ft/yr)	5,332	829	NA	6,161	31%	150%	NA																				
Recent peak (2005) (ac-ft/yr)	2,330	818	NA	3,148	16%	77%	951																				
BA 2005 Annual consumption (ac-ft/yr)	NA	NA	NA	2,470	13%	60%	1,629																				
BA 2010 Annual consumption (ac-ft/yr)	NA	NA	NA	2,856	15%	70%	1,243																				
<p>Note: BA 2005 and 2010 projected consumption values do not account for water savings associated with recycled water and potable water purchases from SAWS. Withdrawals for 2011 are assumed to be the same as 2010. Historical and recent (2005) peak withdrawals were calculated based on daily peak flows triggered by seasonal and operational demands; although presented in units of ac-ft/yr, the peak withdrawal rates were not sustained over the course of the year.</p> <p>1 mgd is approximately 1120 ac-ft/yr</p> <p>Sources: USAF 2005b, USAF 2002, USAF 2006a</p> <table><tr><td>ac-ft/yr</td><td>acre-feet per year</td><td>BA</td><td>Biological Assessment</td></tr><tr><td>KFA</td><td>Kelly Field Annex</td><td>LTA</td><td>Lackland Training Annex</td></tr><tr><td>mgd</td><td>million gallons per day</td><td>NA</td><td>not applicable</td></tr><tr><td>SAWS</td><td>San Antonio Water System</td><td>USAF</td><td>United States Air Force</td></tr><tr><td>%</td><td>percent</td><td></td><td></td></tr></table>								ac-ft/yr	acre-feet per year	BA	Biological Assessment	KFA	Kelly Field Annex	LTA	Lackland Training Annex	mgd	million gallons per day	NA	not applicable	SAWS	San Antonio Water System	USAF	United States Air Force	%	percent		
ac-ft/yr	acre-feet per year	BA	Biological Assessment																								
KFA	Kelly Field Annex	LTA	Lackland Training Annex																								
mgd	million gallons per day	NA	not applicable																								
SAWS	San Antonio Water System	USAF	United States Air Force																								
%	percent																										

Based on an evaluation of the effective population breakdown for 2005 as presented in the BA (USAF 2005b), and consumption factors presented in Appendix B (not considering other resource constraints such as developable land), the headroom estimated from the 2005 water consumption projection compared to the current allocation for Lackland AFB indicates the base could support an additional 25,610 people (Appendix B). The projected 2010 total population from the BA indicated an expected increase of 5,114 people over the BA projected 2005 population, approximately 20 percent of the capability based on available water.

The estimated surplus amounts do not account for implemented water conservation and alternative water resources currently utilized by the base. If continued water conservation efforts and the use of alternative water resources are maintained, it is apparent that the DoD-assigned withdrawal limit for the installation is sufficient to sustain the base population projected through 2011 (based on the 2010 population projected in the BA).

3.1.2 Wastewater Collection Systems

SAWS provides wastewater collection and treatment services to Lackland AFB. Domestic sewage from the Main Base and Kelly Field Annex is collected in a system that consists of approximately 44 miles of sewer mains. Although the system operates predominantly by gravity flow, lift stations and force mains are used to connect individual facilities to the main system. The collection system eventually discharges to the Leon Creek Wastewater Treatment Plant (WWTP) by gravity flow through connection points into the SAWS sewer line located along the north and east base boundaries (USAF 2002).

Although the designed daily average throughput capacity of the Leon Creek WWTP is 46 mgd, the permitted daily average and daily maximum flows are 36.5 mgd and 92 mgd, respectively (SAWS 2002). The rated capacity of the Lackland Main and Kelly Field Annex sewer mains are 9.79 mgd and 2.32 mgd, respectively (USAF 2006a and SAWS 2002). The capacity of these two lines is 33 percent of the permitted daily average and 13 percent of the permitted maximum flow. The combined maximum wastewater flows metered from Main Base, Kelly Field Annex, and the leaseback² areas for FY2005 was 2.65 mgd, less than 22 percent of the design capacity of the lines (USAF 2006a).

Wastewater at the Lackland Training Annex is collected by gravity flow and lift stations and conveyed through a two-mile long force main where it is discharged to the Medio Creek WWTP via the SAWS sewer line near the northeast corner of the annex. The

² Leaseback areas are those areas presently owned by the Greater Kelly Development Authority and leased to DoD to maintain personnel and missions that will eventually move to Main Base or KFA.

Medio Creek WWTP has a current designed daily average throughput capacity of 8.5 mgd. This facility is currently permitted at daily and maximum flow rates of 6.1 mgd and 13 mgd, respectively (USAF 2006a and SAWS 2002). Based on FY2005 data, the combined maximum wastewater flows metered from the Lackland Training Annex areas was 0.4 mgd, less than seven percent of the permitted daily average and less than three percent of the permitted daily maximum at Medio Creek WWTP (USAF 2006a).

Table 3-2 summarizes the current wastewater capability for Lackland AFB. The calculated headroom for Main Base and Kelly Field Annex amounts to 6.4 mgd. It is based on an estimated 75 percent of line capacity (compared to maximum recorded flow of 2.66 mgd during FY2005) and the following assumptions: that Leon Creek permit restrictions are not limiting effluent from the base and that infiltration is not of concern. Headroom at Lackland Training Annex could not be evaluated based on available information, and infiltration is thought to be an issue with the collection system (SAWS 2002). However, based on available metering data, there appears to be headroom whether additional flows are pumped to Medio Creek WWTP or to Leon Creek WWTP. Wastewater collection capacity does not appear to be limiting the growth capability of Lackland AFB.

3.1.3 Electrical Supply

CPS Energy (CPS) is San Antonio's municipally-owned natural gas and electric company. CPS provides electrical service to the Main Base, Kelly Field Annex, and Lackland Training Annex. Lackland AFB operates a substation located on the west side of the Main Base just off Valley-Hi Road (USAF 2002).

Three incoming feeders from the on-base substation power the Main Base switching station. These three primary feeds have the following load ratings: 20.4 megawatts (MW), 17.8 MW, and 18.2 MW (CPS 2002). Seven 13.2-kilovolt (kV) distribution circuits serve different areas of the base. Two of these circuits are dedicated to the Wilford Hall Medical Center and operate as a back up to the Total Energy Plant (USAF 2001). The annual supply capability is 439,402 megawatt-hours (MWh) and the peak supply is 50.2 MW (based on an 88 percent power supply factor). The demand reported for the FY2005 reporting period was 147,012 MWh. Load factors ranged between 66 percent and 79 percent and averaged 72 percent for the year. The maximum peak load for the system was 29.1 MW (reported in September 2005); this peak load is 58 percent of the rated capacity (USAF 2006a and USAF 2005e).

Two underground lines from the KellyUSA substation east of the airfield supply the Kelly Field Annex. The ratings of these two feeds are 7.7 MW and 8.6 MW, respectively (CPS 2002). The annual supply capability is 125,653 MWh and the peak supply is 14.3 MW (based on an 88 percent power supply factor). The demand reported for the FY2005 reporting period was 56,730 MWh. Load factors ranged between 59 percent and 77 percent and averaged 65 percent for the year. The maximum peak load for the system

was 12.3 MW (reported in August 2005); this peak load is 86 percent of the rated capacity (USAF 2006a and 2005e).

Table 3-2 Wastewater Flow and Capacity (Headroom)

Category	Flow Rate (mgd)	Percent of WWTP Permitted Daily Flow	Percent of WWTP Permitted Maximum Flow	Percent of Line Capacity
Main Base and Kelly Field Annex				
Leon Creek WWTP (Permitted Daily Average)	36.5	100%	40%	NA
Leon Creek WWTP (Permitted Daily Maximum)	92	252%	100%	NA
Leon Creek WWTP (Design Daily Average)	46	126%	50%	NA
Line Capacity (18-inch Main)	12.11	33%	13%	100%
Metered Flow (FY2005)	2.66	7%	3%	22%
Lackland Training Annex				
Medio Creek WWTP (Permitted Daily Average)	6.1	100%	47%	NA
Medio Creek WWTP (Permitted Daily Maximum)	13	213%	100%	NA
Medio Creek WWTP (Design Daily Average)	8.5	139%	65%	NA
Line Capacity (24-inch Main)	N/A	N/A	N/A	N/A
Metered Flow (FY2005)	0.4	7%	3%	N/A
% percent FY fiscal year mgd million gallons per day NA not applicable N/A not available SAWS San Antonio Water System USAF United States Air Force WWTP wastewater treatment plant Source: USAF 2005e, USAF 2006a, SAWS 2002				

A switching station serving the Lackland Training Annex is located on Eagle Drive near Ray Ellison Drive, on the east side of Lackland Training Annex. The single primary feed to this station has a rating of 10 MW (CPS 2002). Electrical service is distributed through four 13.2 kV circuits to various parts of the annex (USAF 2002). This station also services commercial facilities in the area. The nominal supply load for the Lackland Training Annex facilities is 8.4 MW. The annual supply capability is 69,905 MWh and the peak supply is 7.98 MW (based on a 95 percent power supply factor for the 8.4 MW supplied to Lackland Training Annex). The demand reported for

the FY2005 reporting period was 34,403 MWh. Load factors ranged between 64 percent and 80 percent and averaged 72 percent for the year. The maximum peak load reported for the system was 7.17 MW (reported in September 2005); this peak load is 90 percent of the rated supply to Lackland Training Annex and 75 percent of the overall switch capacity (USAF 2005e). *The 2030 Plan* indicates that the Eagle Drive Substation needs upgrading (USAF 2005a).

Table 3-3 summarizes the electrical system consumption, capacity, and headroom for the various parts of Lackland AFB. The supply to Main Base indicates ample room for at least a 40 percent increase over current consumption, based on peak loading information. The available supplies to Kelly Field Annex and Lackland Field Annex indicate room for less than a 14 to 16 percent increase over current consumption, again based on peak loading information.

Table 3-3 Electrical Consumption and Capacity (Headroom)

Category	Value	Percent of Supply
Main Base		
Valley-Hi Substation - Annual Supply (MWh)	439,402	100%
Valley Hi Switch - Peak Supply (MW)	50.2	100%
Annual Consumption (MWh)	147,012	33%
Peak Load (MW)	29.1	58%
Kelly Field Annex		
KellyUSA Substation - Annual Supply (MWh)	125,653	100%
KellyUSA Switch - Peak Supply (MW)	14.3	100%
Annual Consumption (MWh)	56,730	45%
Peak Load (MW)	12.3	86%
Lackland Training Annex		
Ray Ellison Substation - Annual Supply (MWh)	83,711	100%
Ray Ellison Switch - Peak Supply (MW)	10.0	100%
Ray Ellison Substation - Annual Supply to LTA (MWh)	69,905	84%
Ray Ellison Switch - Peak Supply to LTA (MW)	8.4	84%
Annual Consumption (MWh)	34,403	49%
Peak Load (MW)	7.2	85%
% percent LTA Lackland Training Annex MW megawatt MWh megawatt-hour SAWS San Antonio Water System USAF United States Air Force Source: USAF 2005e, USAF 2006a, SAWS 2002		

3.1.4 Natural Gas

Natural gas is supplied by CPS to the Main Base through an eight-inch pipeline that enters at the south end of the Main Base. The combination loop and radial distribution system contains approximately 41 miles of pipeline. The Main Base has a high pressure, 48 pounds per square inch (psi) distribution loop that circles the western half of the base and a low pressure, 18 psi distribution loop on the east side (USAF 2002). In addition to the CPS supply lines, an eight-inch, 250-psi line runs along the northern base boundary to supply the Wilford Hall Medical Center Total Energy Plant. Lackland AFB has contracted with United Gas to supply up to 4.93 million cubic feet per day (MCF/day) for the 250-psi line that supplies the Total Energy Plant. If the Wilford Hall Medical Center and Total Energy Plant are demolished, the entire supply from this 250-psi line will become available to the base and could be used as either a primary or a backup supply. A regulator station provides a second (emergency) feed to the base loop system. The combined natural gas line capacity for the Main Base is 9.254 MCF/d (USAF 2006a).

Current data from FY2005 indicate total annual and peak natural gas usage for Lackland AFB (including the Main Base and the Lackland Training Annex) were 977.273 million cubic feet (MCF) and 3.28 MCF/d, respectively. The peak figure reflects 36 percent of the peak capacity.

CPS owns and maintains the gas service for Kelly Field Annex, which enters the area in a supply line coming under the airfield from KellyUSA. The supply capability of the CPS line is 2.4 MCF/d based on an estimated line capacity (USAF 2006a). Current data from FY2005 indicate total annual and peak usage for Kelly Field Annex and the Leaseback Areas were 115.120 MCF and 0.57 MCF/d, respectively. The peak usage figure reflects 24 percent of the estimated peak capacity.

The natural gas supply for the Lackland Training Annex enters on the eastern side near Valley-Hi Drive. The distribution system at the annex consists of 10 miles of pipeline. A majority of the housing and cantonment areas is served by a 12-psi looped distribution system, and a single non-looped plastic line serves the shooting range area. This system is tied to the Main Base distribution system and is supplied by CPS (USAF 2002 and 2006a).

Table 3-4 summarizes the natural gas distribution system consumption, capacity, and headroom for the various parts of Lackland AFB. The supply to Main Base indicates ample room for at least a 33 percent increase over current consumption based on peak usage data. The available supplies to Kelly Field Annex indicate ample room for at least a 76 percent increase over current consumption based on peak usage data.

3.2 SUMMARY OF CONSTRAINTS

Table 3-5 summarizes the present consumption data against capacity for the resources evaluated during this analysis. Based on the analysis of available resources, it appears that potable water is most limiting resource, followed by the electrical subsystems at Lackland and Kelly Field Annexes, and then available land. Currently the natural gas distribution and wastewater collection systems do not appear to be limiting factors; however, the analyses of these resources would likely be refined upon incorporation of additional data related to natural gas and wastewater collection.

Table 3-4 Natural Gas Consumption and Capacity (Headroom)

Category	Total	Percent of Line Capacity	Percent of Supply
Main Base and Lackland Training Annex			
United Gas Supply to 250 psi line at Wilford Hall (MCF/d)	4.93	53%	100%
Supply Line Capacity (MCF/d)	9.254	100%	188%
Annual Consumption Main and LTA (MCF)	977.273	29%	54%
Peak Consumption Main and LTA (MCF/d)	3.28	35%	67%
Kelly Field Annex			
CPS Gas Supply to KFA	2.4	100%	100%
Supply Line Capacity (MCF/d)	2.4	100%	100%
Annual Consumption KFA (MCF)	115.121	13%	13%
Peak Consumption KFA (MCF/d)	0.57	24%	24%
% percent CPS City Public Service KFA Kelly Field Annex LTA Lackland Training Annex MCF million cubic feet MCF/d million cubic feet per day psi pounds per square inch			

**Table 3-5 Summary of Resource Constraints on
Potential Development**

Resource Usage Category	Allocation or Capability	Percent Utilized Base wide	Remaining Capability	Additional Population Supported
Base Lands (acres) ¹	9,525	95%	523	NA
Current and Future Building Space (sf) ²	20,067,843	82%	3,666,829	11,715
Potable Water from Edwards Aquifer (ac-ft/yr) ³	4,099	60%	1,629	25,610
Electrical System (MW) ⁴	72.9	67%	24.31	NA
Gas System (MCF/d) ⁵	7.33	53%	3.48	NA
Sewer System (mgd) ⁶	12.11	25%	9.05	NA
Notes: ¹ Base total area is based on FY2005 Facts and Stats. Developable Parcel information is detailed in Table A-1, Appendix A. ² Current Building Space is 16,158,605 sf provided from FY2005 Facts and Stats and is assumed to be at 100 percent occupancy. Future Building Space is 3,666,829 sf based on analysis presented in Table A-4, Appendix A. Supported total population from additional buildings is also presented in Table A-4. ³ Water consumption based on BA (USAF 2005b) projections for 2005 against base allocation for years 2008 through 2010. Additional total population supported is based on an evaluation of the BA 2005 population, effective population breakdown, and consumption factors presented in Appendix B. Projected 2010 total population from BA indicated an expected increase of 5,114 people over the BA projected 2005 population. ⁴ Base wide electrical usage is based on total peak demand from FY2005 against total peak supplies in MW, subsystem usage data is available in Appendix B. Calculated values for total peak supply and peak demand are the following: peak supply = $50.2+14.3+8.4 = 72.9$ MW and peak demand = $29.1+12.3+7.2 = 48.6$ MW. ⁵ Base wide natural gas usage is based on total supplies and total peak demand from FY2005 in MCF/d, subsystem usage data is available in Appendix B. Calculated values for total peak supply and demand are the following: peak supply = $4.93+2.40 = 7.33$ MCF/d and peak demand = $3.28+0.57 = 3.85$ MCF/d. ⁶ Base wide sewer usage assumes 100 percent of current flow is piped to Leon Creek Wastewater Treatment Plant, remaining capacity is based on pipeline capacity for trunkline to Leon Creek and assumes treatment plant capability readily meets this demand. Subsystem usage data is available in Appendix B. Calculated values for total peak line capacity and peak demand are the following: peak line capacity = $9.79+2.32 = 12.11$ mgd and peak demand = $2.25+0.41+0.40 = 3.06$ mgd.				
ac-ft/yr	acre-feet per year	BA	<i>Biological Assessment</i>	
FY	fiscal year	MCF/d	million cubic feet per day	
mgd	million gallons per day	MW	megawatt	
NA	not applicable	sf	square feet	
USAF	United States Air Force	%	percent	

Chapter 4

Flying Mission Capability

4. FLYING MISSION CAPABILITY

This section assesses Lackland AFB's flying mission capacity. The assessment will consider two factors: noise levels in the immediate vicinity of the airfield, and the airfield's physical capacity to support increased operations (which considers Air Traffic Control procedures and requirements).

The assessment addresses two conditions. First, existing operations from the base are described. Then, these conditions are compared with a potential increase in Lackland-based C-5 and F-16 operations to determine whether existing assets can support the increases. Given that C-5 and F-16 aircraft dominate aircraft operations at Lackland AFB and are the primary contributors to noise levels associated with the airfield, this analysis addresses the increase in those aircraft operations to determine the growth potential for the installation's flying mission.

4.1 METHODOLOGY

Environmental Noise

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. The word "metric" is used to describe a standard of measurement. As used in environmental noise analysis, there are many different types of noise metrics. Each has a different physical meaning or interpretation. The values depicted in these metrics incorporate a common factor. The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000 to 4,000 Hz range. The human ear is most sensitive to frequencies in this range, and sounds measured with these instruments are termed A-weighted, and are shown in terms of A-weighted decibels (dBA). The metric associated with this assessment is described below.

Day-Night Average Sound Level

This metric, identified as Day-Night Average Sound Level (L_{dn}), is the most commonly used. Normally, it is used to assess aircraft operations around an airport. It sums the individual noise events and averages the resulting level over a specified length of time. Thus, it is a composite metric representing the maximum noise levels, the duration of the events, the number of events that occur, and the time of day during which they occur. This metric adds 10 decibels (dB) to those events that occur between 10:00 P.M. and 7:00 A.M. to account for the increased intrusiveness of noise events that occur at night

when ambient noise levels are normally lower than during the day time. This cumulative metric does not represent the variations in the sound level heard. Nevertheless, it does provide an excellent measure for comparing environmental noise exposures when there are multiple noise events to be considered.

Public annoyance is the most common concern associated with exposure to elevated noise levels. When subjected to L_{dn} levels of 65 dBA, approximately 12 percent of the persons so exposed will be “highly annoyed” by the noise. At levels below 55 dBA, the percentage of annoyance is significantly lower (less than three percent), and at levels above 70 dBA, it is significantly higher (greater than 25 percent) (Finegold et al 1994).

L_{dn} metrics are the preferred noise metrics of the DoD, the Department of Housing and Urban Development, the Department of Transportation, the Federal Aviation Administration (FAA), the USEPA, and the Veteran’s Administration. While L_{dn} does provide a single measure of overall noise impact, it is fully recognized that it does not provide specific information on the number of noise events or the specific individual sound levels. For example, an L_{dn} of 65 dB could result from a few very noisy events, or a large number of quieter events. Although it does not represent the sound level heard at any one particular time, it does represent the total sound exposure. Scientific studies and social surveys have found the L_{dn} to be the best measure to assess levels of community annoyance associated with all types of environmental noise. Therefore, its use is endorsed by the scientific community and governmental agencies (ANSI 1980, 1988; USEPA 1974; FICUN 1980; FICON 1992).

Finally, it should be noted that ambient background noise is not considered in the aircraft noise calculations that are presented below. There are two reasons for this. First, ambient background noise, even in wilderness areas, varies widely, depending on location and other conditions. For example, studies conducted in an open pine forest in the Sierra National Forest in California have measured up to a 10 dBA variance in sound levels simply due to an increase in wind velocity (Harrison 1973). Therefore, assigning a value to background noise would be arbitrary. Secondly, and probably most important, it is reasonable to assume that ambient background noise in the project’s Region of Influence would have little or no effect on the calculated L_{dn} . In calculating noise levels, louder sounds dominate the calculations, and overall, aircraft noise would be expected to be the dominant noise source characterizing the acoustic conditions in the region.

Using measured sound levels as a basis, the Air Force developed several computer programs to calculate noise levels resulting from aircraft operations. Sound levels calculated by these programs have been extensively validated against measured data and have been proven to be highly accurate.

Airfield Noise

The following terms are defined to provide a better understanding of how data are developed for input to the noise models used to calculate noise. Around an airfield, aircraft operations are categorized as takeoffs, landings, or closed patterns (which could

include activities referred to as touch-and-gos or low approaches). Each takeoff or landing constitutes one operation. A closed pattern occurs when the pilot of the aircraft approaches the runway as though planning to land, but then applies power to the aircraft and continues to fly as though taking off again. The pilot then flies a circular or rectangular track around the airfield, and again approaches for landing. In some cases, the pilot may actually land on the runway before applying power, or in other cases the pilot simply approaches very close to the ground. In either event, since a closed pattern operation essentially consists of a landing and a takeoff, it is considered two operations.

4.2 AVIATION RESOURCES

4.2.1 Current Aircraft Operations

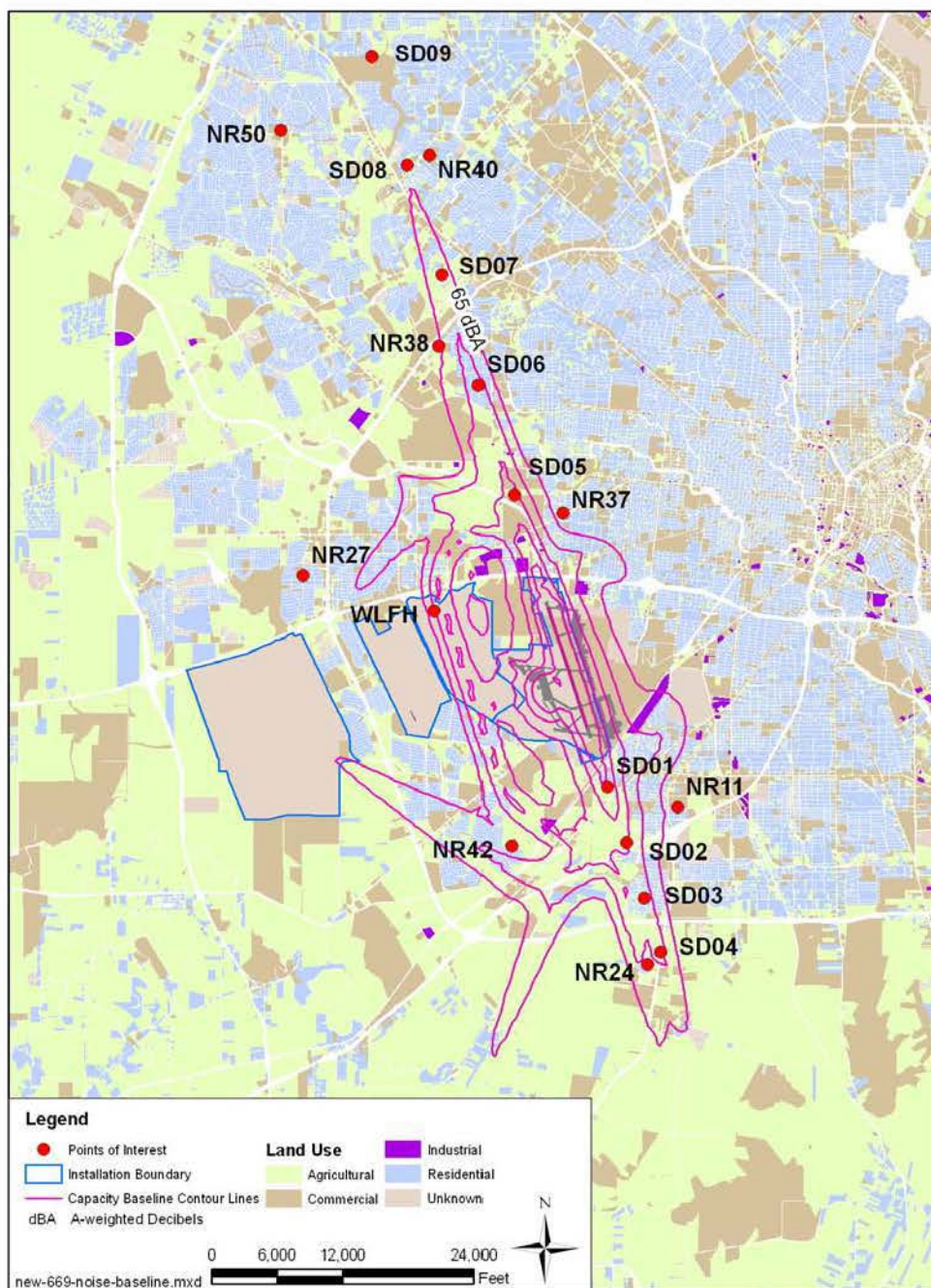
Under baseline (current) conditions, Lackland AFB supported approximately 146,816 annual aviation operations. This equates to approximately 427 daily operations (Table 4-1) (USAF 2005c). Considering all types of flight activities, a scenario representing an “average day’s” operations was developed. The operations considered include arrivals (landings), departures (takeoffs), and closed patterns. Noise calculations consider the frequency of flight operations, runway utilization, and the flight tracks and flight profiles flown by each aircraft.

Table 4-1 Current Daily Aircraft Operations at Lackland AFB

Aircraft	Baseline
C-5	78
F-16	188
Other Aircraft	161
Total	427
Source: USAF 2005c	

These levels and types of activity are then combined with information on climatology, maintenance activities, and aircraft flight parameters, and processed through the Air Force's BASEOPS/NOISEMAP (Moulton 1990) computer models to calculate day-night average sound level (L_{dn}). Once noise levels are calculated, they are plotted on a background map in 5-decibel increments from 65 dBA to 85 dBA, as applicable. Noise contours associated with baseline activities at Lackland AFB are shown in Figure 4-1. The land areas (in acres) encompassed by each contour are shown in Table 4-2.

Figure 4-1
Baseline Noise Contours with Sensitive Receptors
Lackland AFB



Source: NMPlot (Wasmer et al 2002)

**Table 4-2 Land Areas Exposed to Elevated Noise Levels–
Baseline Conditions**

Noise Level (in L_{dn})	Land Area (in Acres) ¹
65 – 69	9,544.0
70 – 74	6,144.7
75 – 79	2,196.8
80 – 84	888.12
> 85	921.38
¹ Area shown is for applicable noise levels. Total land area exposed to L_{dn} 65 or greater is 19,695 acres. Source: NMPlot (Wasmer et al 2002) L_{dn} day-night average sound level	

In order to further assess noise exposure from aviation activity, 18 locations around the base were selected for specific analysis. These points represent land uses that could be potentially sensitive to elevated noise levels. Figure 4-1 reflected these points, and Table 4-3 defines the points and shows noise exposure under baseline conditions.

Table 4-3 Noise Exposure at Sensitive Receptors–Baseline Conditions

Point ID	Location	Noise Level In L_{dn}
SD01	Residential Area (Quintana Road and Southwest Military Drive)	85.3
SD02	Residential Area (Golden Community Park)	75.9
SD03	Residential Area (Palo Alto)	73.7
SD04	Residential Area (North Spicewood Park)	72.8
SD05	Residential Area (Van De Walle Park)	76.6
SD06	Residential Area (Ingram and Callaghan Roads)	72.0
SD07	Residential Area (South Leon Valley)	67.5
SD08	Residential Area (Huebner and Bandera Roads)	64.5
SD09	Residential Area (South O.P. Schnabel Park)	62.3
NR11	Kindred School / South San Antonio High School	63.3
NR24	Residential Area (South Spicewood Park)	69.0
NR27	John Glenn School	52.1
NR37	Lincoln School	62.8
NR38	Oliver W. Holmes High School	64.5
NR40	John Marshall High School	58.0
NR42	Residential Area / School Southeast Pearsall Road	67.3
NR50	Stevenson Middle School	47.9
WLFH	Wilford Hall Hospital	69.2
Source: NOISEMAP (Moulton 1990) L_{dn} day-night average sound level ID identification		

4.3 AVIATION RESOURCES CAPACITY

4.3.1 Aircraft Operations

In order to assess the potential for the expansion of C-5 and F-16 operations at Lackland AFB, C-5 and F-16 flights were incrementally increased, and the changed noise levels were evaluated at the 19 specific points described in Table 4-3 above. Two criteria were applied, which reflect land use guidance provided in 14 *Code of Federal Regulations* Part 150, Subpart B, § 150.21:

- Capacity would be reached when a previously compatible land use became incompatible.
- Capacity would be reached when noise levels at any one point, where the current land use is incompatible to the existing noise level, increases by more than 1.5 dB.

These criteria were met when levels of operations conducted by based aircraft were increased by 15 percent. This equates to performing approximately 160,023 annual or 467 daily operations at the installation (Table 4-4). The noise contours associated with these increased activity levels are shown in Figure 4-2, and the land areas exposed to elevated noise levels are compared with current conditions in Table 4-5.

Table 4-4 Projected Daily Aircraft Operations at Lackland AFB

	Current Baseline	Capability Scenario
Aircraft	2005	2011
C-5	78	90
F-16	188	216
Other Aircraft	161	161
Total	427	467

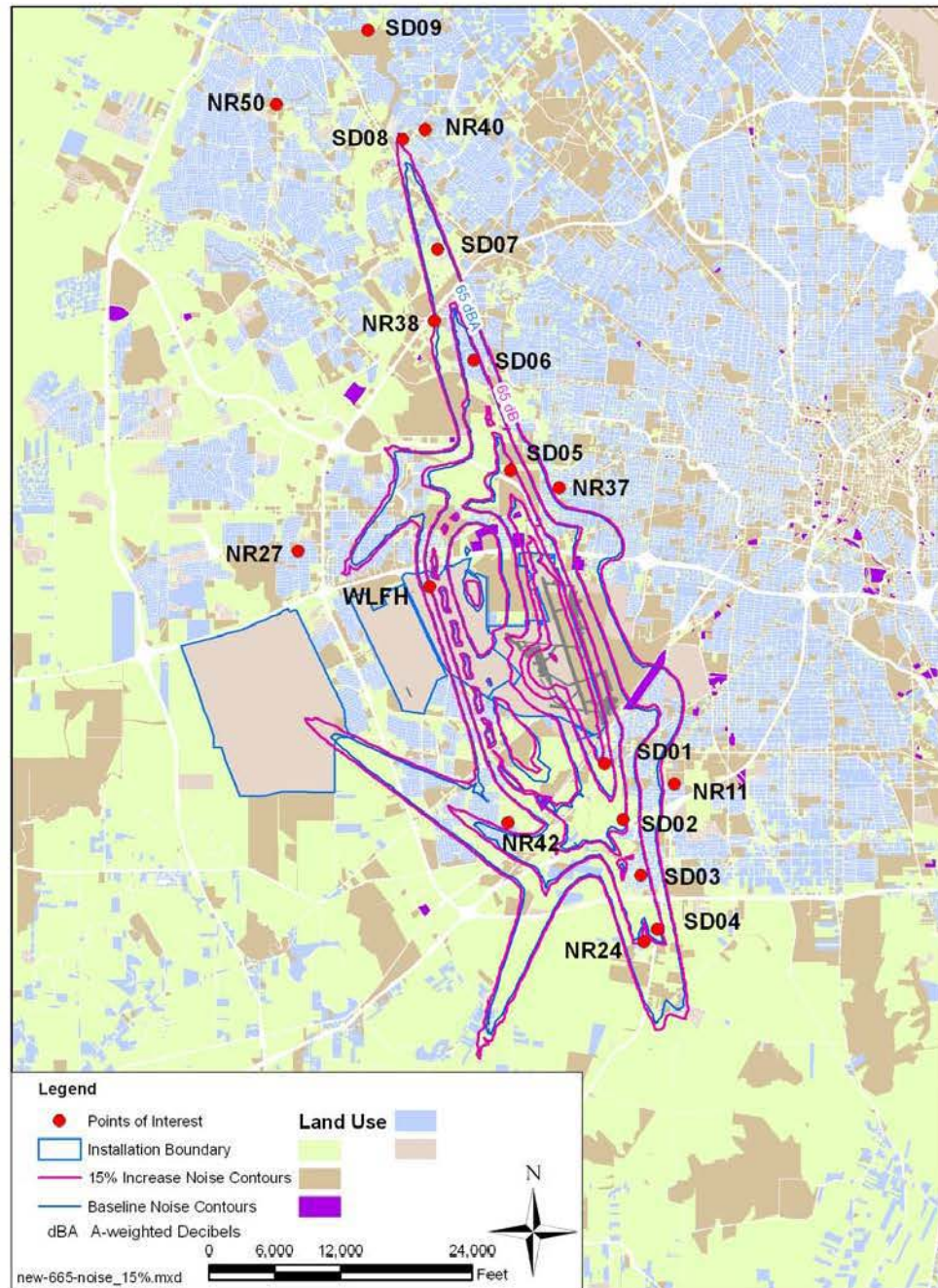
Source: USAF 2005c

Table 4-5 Land Areas Exposed to Elevated Noise Levels

Noise Level (L_{dn})	Land Area, in Acres, Exposed To Elevated Noise ¹			
	Current Operations	Expanded Operations	Change (Acres)	Percent Change
65 – 69	9,544.0	10,367.0	+ 823.0	+ 9
70 – 74	6,144.7	6,614.4	+ 469.7	+ 8
75 – 79	2,196.8	2,618.5	+ 421.7	+ 19
80 – 84	888.1	961.3	+ 73.2	+ 8
> 85	921.4	1,026.8	+ 105.4	+ 11

¹Area shown is for applicable noise levels.
Total land area exposed to L_{dn} 65 or greater increases from 19,695 acres to 21,588 acres, an approximate 10 percent increase.
Source: Wasmer et al 2002
 L_{dn} day-night average sound level

Figure 4-2
Capability Scenario Noise Contours with Sensitive Receptors
Lackland AFB



Source: NMPlot (Wasmer et al 2002)

The changes to noise exposure at the sensitive receptors are identified in Table 4-6. As shown, noise exposure at points SD08 (Residential Area) and NR38 (Oliver W. Holmes High School) change from previously compatible to non-compatible land uses.

Table 4-6 Noise Levels at Sensitive Receptors – Capability Scenario

Point ID	Location	Noise Level (L_{dn})		
		Current	Capability Scenario	Change
SD01	Residential Area (Quintana Road and Southwest Military Drive)	85.3	85.9	0.6
SD02	Residential Area (Golden Community Park)	75.9	76.4	0.6
SD03	Residential Area (Palo Alto)	73.7	74.2	0.5
SD04	Residential Area (North Spicewood Park)	72.8	73.4	0.6
SD05	Residential Area (Van de Walle Park)	76.6	77.1	0.5
SD06	Residential Area (Ingram and Callaghan Roads)	72.0	72.6	0.6
SD07	Residential Area (South Leon Valley)	67.5	68.1	0.6
SD08	Residential Area (Huebner and Bandera Roads)	64.5	65.0	0.5
SD09	Residential Area (South O.P. Schnabel Park)	62.3	62.8	0.5
NR11	Kindred School / South San Antonio High School	63.3	63.8	0.5
NR24	Residential Area (South Spicewood Park)	69.0	69.6	0.6
NR27	John Glenn School	52.1	52.7	0.6
NR37	Lincoln School	62.8	63.2	0.4
NR38	Oliver W. Holmes High School	64.5	65.0	0.5
NR40	John Marshall High School	58.0	58.5	0.5
NR42	Residential Area / School Southeast Pearsall Road	67.3	67.9	0.6
NR50	Stevenson Middle School	44.2	44.5	0.3
WLFH	Wilford Hall Hospital	47.9	48.4	0.5
Source: NOISEMAP (Moulton 1990)				
L_{dn} day-night average sound level				

4.3.2 Airfield

The capacity of an airfield is described by its throughput rate. Throughput rate is the maximum number of operations that can take place within a given time period. Operations considered include arrivals, departures, and closed patterns.

Many factors determine an airfield's capacity (e.g., the number and types of runways, availability of taxiways, the availability and capability of land-side support facilities to cycle aircraft, and the numbers and types of aircraft operating at the facility). In order to assess these factors, the FAA has developed several models. These are used in the civilian sector for airport planning. However, they are also often used by the military in preparing planning data.

For this document, runway capacity is assessed using guidance in FAA Advisory Circular (AC) 150 / 5060-5, Airport Capacity and Delay. Two different methods were employed: the first is applicable to long-term planning and is somewhat generalized; the second is more detailed and specific and focused on the capacity of Lackland AFB's runway.

Long Term Planning

The assessment for long-term planning considers the mix of aircraft classes, and the ratio of aircraft in each class operating from the airfield. Aircraft are classified by their maximum takeoff weight and the number of engines. This calculated "mix-index" is then applied to standard nominal values developed for the applicable runway configuration, which for Lackland AFB is a single runway. Output from this assessment provides annual service volume (capacity) per year, and the number of operations per hour that can be conducted under Visual Meteorological Conditions³ (VMC) and Instrumentation Meteorological Conditions⁴ (IMC). These factors can then be compared with expected demand to assess the "capacity consumed" by a given level of operations. Table 4-7 summarizes the assessment for annual conditions, and Table 4-8 shows similar data for operations per hour that could be conducted under VMC or IMC conditions. It should be noted that data in Table 4-8 reflect a range of values. VMC and IMC would be mixed; neither would exist all of the time. Therefore, capacity would fall between the two values.

As illustrated above, application of the FAA's long-range planning methodology indicates sufficient capacity for potential expansion of operations at the airfield. However, as previously stated, these assessments use nominal values for the many factors that influence an airfield's capacity. Many of these factors involve land-side supporting facilities dealing with the handling and processing of aircraft and deplaning/emplaning of passengers at a civil facility. These considerations are not applicable for Lackland AFB; however, the runway component is applicable.

³ Instrumentation Meteorological Conditions are meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

⁴ Visual Meteorological Conditions (VMC) are meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.

Table 4-7 Comparison of Airfield Operations for Baseline Conditions and Capability Scenario

Lackland AFB Operations	Annual Service Volume ¹ (Capacity)	Annual Demand	Capacity (percent)	
			Used	Remaining
Current	210,000	146,800 ²	70	30
Capability Scenario	210,000	160,000 ³	76	24
¹ Source: FAA 1983 ² Source: USAF 2005c ³ Reflects 15 percent increase in based F-16 and C-5 operations, which is the maximum potential expansion based on noise considerations. AFB Air Force Base FAA Federal Aviation Administration USAF United States Air Force				

Table 4-8 Comparison of Airfield Operations for Current Conditions and Capability Scenario under Varying Weather Conditions

Lackland AFB Operations	Operations Hourly Capacity ¹	Operations Hourly Expected	Capacity (percent)	
			Used	Remaining
VMC Conditions				
Baseline	55	27 ²	48	52
Capability Scenario	55	29 ³	53	47
IMC Conditions				
Baseline	53	27 ²	51	49
Capability Scenario	53	29 ³	55	45
¹ SOURCE: FAA 1983				
² Source: USAF 2005c				
³ Reflects 15 percent increase in based F-16 and C-5 operations				

4.3.3 Runway

The FAA guidance in AC 150/5060-5 provides methodology to specifically model the throughput capacity for the runway. However, more specific data pertaining to specific types of operations and availability of taxiways is used than for the long-range planning addressed above.

Table 4-9 shows the modeled hourly capacity of Lackland AFB's runway under IMC and VMC. This capacity is then assessed in relation to the estimated demand that would exist after the increase in based F-16 and C-5 operations.

Table 4-9
Estimated Runway Capacity after Increased Operations

Weather Condition	Operations Hourly Capacity ¹	Operations Hourly Demand ²	Capacity (percent)	
			Used	Remaining
VMC	67	29	44	56
IMC	45	29	65	35
¹ Source: FAA 1983				
² USAF 2005c (current operations plus 15 percent increase in based F-16 and C-5 Operations)				

As shown, after the increase in operations, even if all of the average planned operations are conducted under the most demanding conditions (IMC), the airfield still has unused capacity. However, it should be noted that the calculated capacity consumed is conservative. Under severe IMC conditions, some operations would be cancelled or curtailed. Thus, the runway's capacity would not necessarily be stressed at the indicated levels.

4.3.4 Military Training Airspace

Lackland AFB-based aircraft make use of the regional military training airspace (Military Operations Areas, Military Training Routes, and Restricted Areas). These airspace elements are managed by the 149th Fighter Wing Air National Guard as well as other units. Currently, there is no indication that the use of these airspace elements is at, or approaching saturation. The relatively minor increase in operations associated with this assessment would not be expected to adversely impact the availability of this airspace or hinder the ability of aircrews to meet all training requirements.

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Chapter 5

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Chapter 6

References

6. REFERENCES

- ANSI. 1980. *Sound Level Descriptors for Determination of Compatible Land Use*. American National Standards Institute. ANSI S3.23-1980.
- ANSI. 1988. *Quantities and Procedures for Description and Measurement of Environmental Sound, Part 1*. American National Standards Institute. ANSI S12.9-1988.
- CPS. 2002. Personal Interview on Electrical Systems Capability with Richard Medina, City Public Service, San Antonio, Texas. October.
- Dewberry. 1996. *Land Development Handbook*. Dewberry and Davis. McGraw Hill New York.
- FAA. 1983. Advisory Circular 150/5060-5, *Airport Capacity and Delay*. US Department of Transportation, Federal Aviation Administration. September 23.
- FICON. 1980. *Guidelines for Considering Noise in Land Use Planning and Control*. Washington, D.C. NIIS PB83-184838. Federal Interagency Committee on Urban Noise.
- Finegold, et al. 1994. Finegold, L.S., C.S. Harris, and H.E. von Glerke. *Community Annoyance and Sleep Disturbance: Updated Criteria for Assessing the Impacts of General Transportation Noise on People*. Noise Control Engineering Journal. January-February.
- Harrison, et al. 1973. Harrison, R.T., L.A. Hartmann, and W.J. Makel. *Forest Background Sound*. Report to Record, ED&T 2428, USDA Forest Service, Technology and Development Center, San Dimas, California. Annoyance from Aircraft Overflights in Wilderness. NOISE-CON 90, University of Texas. Austin, Texas. October.
- Lee, Robert, et al. 1990. Lee, Robert A. and H.T. Mohlman. *Air Force Procedure for Predicting Aircraft Noise around Airbases: Airbase Operations Program (BASEOPS) Description*. Harry G. Armstrong Aerospace Medical Research Laboratory, Human Systems Division, Air Force Systems Command, Wright-Patterson AFB, OH. AAMRL-TR-90-012. January.
- Moulton, et al. 1990. Moulton, Carey. *Air Force Procedure for Predicting Aircraft Noise around Airbases: Noise Exposure Model (NOISEMAP) User's Manual*. Harry G. Armstrong Aerospace Medical Research Laboratory, Human Systems Division, Air Force Systems Command, Wright-Patterson AFB, OH. AAMRL-TR-90-011. February.

- Murphy, et al. 1976. Murphy, K.S. and S. Chatterjee. *Development of Predictive Criteria for Demolition and Construction Solid Waste Management*. Construction Engineering Research Laboratory, Champaign, Illinois. October.
- SAWS. 2002. Personal Interview with Santa Rivas, San Antonio Water Systems, San Antonio, Texas. October.
- TCEQ. 2004. *Municipal Solid Waste in Texas a Year in Review: 2003 Data Summary and Analysis*. Environmental Planning and Implementation Division, Texas Commission on Environmental Quality. AS-187/04. December.
- USAF. 1992. *Texas Air National Guard Master Plan*. Texas Air National Guard, San Antonio, Texas.
- USAF. 1994. *Air Force Handbook 32-1084 Standard Facility Requirements*.
- USAF. 1997a. *Programmatic Environmental Impact Statement, Disposal of Kelly AFB, Texas, Final*. Kelly AFB, Texas. May.
- USAF. 1997b. *Biological Opinion*. USAF, Texas.
- USAF. 2000. *Joint Use Supplemental Environmental Impact Statement*. Air Force Base Conversion Agency, San Antonio, Texas. August.
- USAF. 2001a. *Lackland Air Force Base Installation Compatible Use Zone (AICUZ) Study*. Lackland AFB, Texas. January.
- USAF. 2001b. *DUERS Report*. 37 CES/CE. Lackland AFB, Texas. August.
- USAF. 2002. *The General Plan*. Lackland Air Force Base. 37 CES/CE. July.
- USAF. 2004a. *Environmental Assessment Capital Improvements Program Lackland AFB, Texas*. 37 CES/CEV. November.
- USAF. 2004b. *Facts and Stats Reports*. Office of Financial Management. Lackland AFB, Texas.
- USAF. 2005a. *The 2030 Plan*. Lackland Air Force Base. 37 CES/CE. October.
- USAF. 2005b. *Biological Assessment for the Effect of Water Draw on the Edwards Aquifer by the Department of Defense Installations in the San Antonio Area*. Military Water Working Group. Headquarters Air Education and Training Command. April 2005.
- USAF. 2005c. *Environmental Impact Statement for the Relocation of the C-5 Formal Training Unit from Altus Air Force Base, Oklahoma*. Headquarters Air Force Reserve Command. January.

- USAF. 2005d. *Facts and Stats Report*. Office of Financial Management. Lackland AFB, Texas. 2005.
- USAF. 2005e. DUERS Report. 37 CES. Lackland AFB, Texas. December.
- USAF. 2005f. *Lackland Air Force Base BASEOPS Noise Files*. 37 CES/CE. Lackland AFB, Texas.
- USAF. 2006a. Interviews with 37 CES/CEOE Art Eng, Andy Hinojosa, Dean Lad. Lackland AFB, Texas. November 2005-January 2006.
- USAF. 2006b. Interview with 37 CES/CEV Mr. Luna. January.
- USEPA. 1974. *Information on Levels of Environmental Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety*. EPA Report 550/9-74-004.
- USEPA. 2006. Municipal Solid Waste: Trends in Municipal Solid Waste Generation 1960-2003. <http://www.epa.gov/epaowwer/non-hw/Muncpl/facts-text.htm>. January 23.
- Wasmer, et al. 2002. Wasmer, F. and F. Mausell. NMPlot Computer Program. Wasmer Consulting.

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Appendix A

Land Use Factors and Calculations for Projected Buildings and Pavements

**APPENDIX A
LAND USE FACTORS AND CALCULATIONS
FOR PROJECTED BUILDINGS AND PAVEMENTS**

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Land Use Density Formula, Tables, and Calculations

Information on the existing land use categories on Lackland Air Force Base (AFB) was provided by representatives from 37th Civil Engineering Squadron. The additional information required to define the existing and future land use plans for Lackland AFB was extracted from *The General Plan* and *The 2030 Plan* and incorporated into this effort (United States Air Force [USAF] 2002a and 2005a).

For non-flying missions where open space areas were available, potential development scenarios were identified and evaluated using a Geographic Information System (GIS) overlay analysis. Table A-1 identifies the potential developable parcels for Lackland AFB. Each parcel was evaluated to determine if the area was available or appropriate for development. Areas possessing physical or operational constraints were eliminated from further consideration in the evaluation. *The General Plan* and *The 2030 Plan* were used to define future land use and development constraints along with representatives from the 37th Civil Engineering Squadron (USAF 2002 and 2005a).

In order to determine utility consumption estimates for evaluating constraints, population and interior building space was calculated by applying previously developed land use density factors to the identified developable parcels. The parcel density factor for impervious cover (Table A-2) and the authorized number of floors established by local development practices were used along with authorized per capita space (Table A-3) and parking requirements established in Air Force Handbook (AFH) 32-1084 (USAF 1994) to determine the capability of the parcel to manage additional facilities and population. Although population values are only calculated for each parcel of land, these values are used as in interim step to estimate building space and pavements required to fully develop the parcel in accordance with procedures established in AFH 32-1084 (USAF 1994).

The following equations are used to calculate the estimated additional population, interior building space, and additional parking areas for developable parcels available:

Population Equation:

$$P = \frac{(A \times p_c)}{\left(\frac{d}{s} \times \frac{1}{43560}\right) + \left((p_f \times p_a) \times \left(\frac{1}{4840}\right)\right)}$$

Where:

P = Additional population

p_c = Density of parcel coverage by facility footprint and parking

A = Total parcel size (acres)

d = Density of occupancy in square foot per person (square feet [sf]/person) - (factors obtained from AFH 32-1084)

s = Number of stories of the building (defined by local practices)

p_f = The allowable percent of parking authorized for the occupancy - (factors obtained from AFH 32-1084)

p_a = The gross area for a parking space that includes a portion of the driveway and lanes (square yards [sy]) - (factors obtained from AFH 32-1084 and best practices)

Building Footprint Equation:

$$B_f = \frac{(P \times d)}{(s)} \times \left(\frac{1}{43560} \right)$$

Where:

B_f = Building footprint (acres)

P = Additional population

d = Density of occupancy in square foot per person (sf/person) - (factors obtained from AFH 32-1084)

s = Number of stories of the building (defined by local practices)

Total Building Area Equation:

$$A_b = B_f \times s$$

Where:

A_b = Total Building Area (sf)

B_f = Building footprint (acres)

s = Number of stories of the building (defined by local practices)

Total Parking Area Equation:

$$A_p = P \times p_f \times p_a$$

Where:

A_p = Total Parking Area (acres)

p_f = The allowable percent of parking authorized for the occupancy - (factors obtained from AFH 32-1084)

p_a = The gross area for a parking space that includes a portion of the driveway and lanes (sy) - (factors obtained from AFH 32-1084 and best practices)

P = Additional population

An example of the formula used for this analysis is provided below. For the purposes of this example, 47.42 acres of developable administrative land is assumed to be available for potential development. The typical administrative building is assumed to contain three floors for personnel and associated working space. Tables A-2 and A-3 provide the density of parcel coverage by facility footprint and parking and the authorized space for the associated land use. Table A-4 provides the population and building space calculations for each land use identified with developable land.

$$P = \frac{(47.42 \text{ acres} \times 0.6)}{\left(\frac{180 \text{ sf}}{3 \text{ stories}} \times \frac{1 \text{ acre}}{43560 \text{ sf}} \right) + \left((0.6 \times 35 \text{ sy}) \times \left(\frac{1 \text{ acre}}{4840 \text{ sy}} \right) \right)} = 4,977 \text{ people}$$

$$B_f = \frac{\left(4,977 \text{ people} \times \frac{180 \text{ sf}}{\text{people}} \right)}{(3 \text{ stories})} \times \left(\frac{1 \text{ acre}}{43560 \text{ sf}} \right) = 6.86 \text{ acres}$$

$$A_b = 6.86 \text{ acres} \times \left(\frac{43560 \text{ sf}}{1 \text{ acre}} \right) \times 3 \text{ stories} = 895,860 \text{ sf}$$

$$A_p = 4,977 \times 0.6 \times 35 \text{ sy} \times \frac{1 \text{ acre}}{4840 \text{ sy}} = 21.6 \text{ acres}$$

The calculations of building footprint and parking area will be incorporated into the subsequent environmental assessment to analyze impacts such as land disturbance, traffic, and stormwater runoff.

Based on the population and building area calculations, an interior building factor is developed for each land use. Table A-5 provides the developed interior building factors for Lackland AFB. The building factor is calculated by using the total building area and the available developable land for the land use⁵.

Interior Building Factor Equation:

$$IB_f = \left(\frac{A_b}{A} \right) \times \left(\frac{1acre}{43560} \right)$$

Where:

IB_f = Interior Building Factor

A_b = Total Building Area (sf)

A = Total parcel size (acres)

For the example provided above the interior building factor is calculated as follows:

$$IB_f = \left(\frac{895,860sf}{47.42acres} \right) \times \left(\frac{1acre}{43560sf} \right) = 0.43$$

⁵ This factor may also be calculated from Form 7113 data (where available) for current building spaces and using GIS to georeference building spaces to land use category.

Table A-1
Potential Developable Parcels

Parcel Number	Location	Land Use	Developable	Constraint
1	Lackland Training Annex	Training Indoor	Yes	--
2	Lackland Training Annex	Community Services	No	Steep Terrain
3	Lackland Training Annex	Open Space	No	Flood Plain
4	Lackland Training Annex	Outdoor Recreation	No	Flood Plain
5	Lackland Training Annex	Community Commercial	No	Under Construction
6	Lackland Training Annex	Open Space	No	Flood Plain
7	Lackland Training Annex	Training Outdoor	No	Building Currently Standing
8	Lackland Training Annex	Outdoor Recreation	No	Flood Plain
9	Lackland Training Annex	Open Space	No	Flood Plain
10	Lackland Training Annex	Outdoor Recreation	No	Road
11	Lackland Training Annex	Open Space	No	Building Currently Standing
12	Lackland Training Annex	Outdoor Recreation	No	Building Currently Standing
13	Lackland Training Annex	Training Outdoor	No	Drainage through Parcel
14	Lackland Training Annex	Open Space	Yes	--
15	Lackland Training Annex	Training Outdoor	Yes	--
16	Lackland Training Annex	Training Outdoor	No	Outdoor Training
17	Lackland Training Annex	Training Indoor	No	Flood Plain
18	Lackland Training Annex	Training Indoor	No	Flood Plain
19	Lackland Training Annex	Training Outdoor	Yes	--
20	Lackland Training Annex	Open Space	Yes	--
21	Lackland Training Annex	Open Space	Yes	--
22	Lackland Training Annex	Training Outdoor	No	Tech Training
23	Lackland Training Annex	Open Space	No	Training Dogs
24	Lackland Training Annex	Open Space	No	Training Dogs
25	Lackland Training Annex	Open Space	No	Impact Range
26	Lackland Training Annex	Training Outdoor	No	Training Dogs
27	Lackland Training Annex	Training Outdoor	No	Training Dogs
28	Lackland Training Annex	Training Outdoor	No	Training Dogs

Table A-1
Potential Developable Parcels (cont.)

Parcel Number	Location	Land Use	Developable	Constraint
29	Lackland Training Annex	Open Space	No	Archeological Site
30	Lackland Training Annex	Open Space	Yes	--
31	Main Base North West	Training Outdoor	Yes	--
32	Main Base North West	Housing Unaccompanied	No	Parcel Size
33	Main Base North West	Housing Unaccompanied	No	Construction
34	Main Base North West	Housing Unaccompanied	No	Building Currently Standing
35	Main Base North West	Housing Unaccompanied	No	Building Currently Standing
36	Main Base North West	Community Commercial	Yes	--
37	Main Base North West	Community Commercial	No	Building Currently Standing
38	Main Base North West	Outdoor Recreation	Yes	--
39	Main Base North West	Open Space	No	Parcel Size
40	Main Base North West	Housing Unaccompanied	Yes	--
41	Main Base North West	Community Commercial	Yes	--
42	Main Base North West	Open Space	Yes	--
43	Main Base North West	Open Space	Yes	--
44	Main Base North West - Main Base Central West	Outdoor Recreation	No	Outdoor Recreation Coarse
45	Main Base North West - Main Base Central West	Open Space	Yes	--
46	Main Base North West - Main Base Central West	Outdoor Recreation	No	Constrained by Federal Aviation Administration Tower
47	Main Base North West - Main Base Central West	Housing Unaccompanied	No	Constrained by Federal Aviation Administration Tower
48	Main Base North West - Main Base Central West	Outdoor Recreation	No	Area of Concern
49	Main Base North West - Main Base Central West	Community Commercial	No	Constrained by Federal Aviation Administration Tower

Table A-1
Potential Developable Parcels (cont.)

Parcel Number	Location	Land Use	Developable	Constraint
50	Main Base North West - Main Base Central West	Community Commercial	No	Constrained by Federal Aviation Administration Tower
51	Main Base North West - Main Base Central West	Community Commercial	No	Parking Lot
52	Main Base North West - Main Base Central West	Housing Unaccompanied	Yes	--
53	Main Base North West - Main Base Central West	Training Outdoor	Yes	--
54	Main Base North West - Main Base Central West	Outdoor Recreation	Yes	--
55	Main Base North West - Main Base Central West	Open Space	Yes	--
56	Main Base North West - Main Base Central West	Housing Unaccompanied	Yes	--
57	Main Base North West - Main Base Central West	Housing Unaccompanied	Yes	--
58	Main Base North West - Main Base Central West	Training Outdoor	Yes	--
59	Main Base North West - Main Base Central West	Community Commercial	Yes	--
60	Main Base North West - Main Base Central West	Training Indoor	No	Parcel Size
61	Main Base North West - Main Base Central West	Open Space	Yes	--
62	Main Base North West - Main Base Central West	Open Space	No	Plane Display
63	Main Base North West - Main Base Central West	Open Space	No	Plane Display
64	Main Base North West - Main Base Central West	Administrative	Yes	--
65	Main Base North West - Main Base Central West	Administrative	Yes	--
66	Main Base North West - Main Base Central West	Administrative	No	Parcel Size
67	Main Base North West - Main Base Central West	Housing Unaccompanied	Yes	--
68	Main Base North West - Main Base Central West	Administrative	Yes	--
69	Main Base North West - Main Base Central West	Training Outdoor	No	Building Currently Standing
70	Main Base North West - Main Base Central West	Housing Unaccompanied	Yes	--
71	Main Base North West - Main Base Central West	Administrative	No	Parcel Size
72	Main Base Central West	Open Space	Yes	--
73	Main Base Central West	Administrative	Yes	--
74	Main Base Central West	Administrative	Yes	--
75	Main Base Central West	Community Commercial	Yes	--

Table A-1
Potential Developable Parcels (cont.)

Parcel Number	Location	Land Use	Developable	Constraint
76	Main Base Central West	Industrial	Yes	--
77	Main Base Central West	Community Commercial	No	Building Currently Standing
78	Main Base Central West	Training Outdoor	Yes	--
79	Main Base Central West	Training Outdoor	Yes	--
80	Main Base Central West - Main Base South West	Community Commercial	Yes	--
81	Main Base Central West	Administrative	Yes	--
82	Main Base Central West - Main Base South West	Administrative	Yes	--
83	Main Base Central West - Main Base South West	Administrative	Yes	--
84	Main Base Central West - Main Base South West	Administrative	Yes	--
85	Main Base Central West - Main Base South West	Open Space	Yes	--
86	Main Base South West	Industrial	Yes	--
87	Main Base South West	Administrative	No	Building Currently Standing
88	Main Base South West	Administrative	Yes	--
89	Main Base South West	Outdoor Recreation	Yes	--
90	Main Base South West	Administrative	Yes	--
91	Main Base South West	Industrial	No	Building Currently Standing
92	Main Base South West	Industrial	No	Building Currently Standing
93	Main Base South West	Industrial	Yes	--
94	Main Base South West	Training Indoor	Yes	--
95	Main Base South West	Training Outdoor	No	Parcel Size
96	Main Base South West	Training Indoor	No	Parcel Size
97	Main Base South West	Training Outdoor	No	Training Dogs
98	Main Base South West	Training Outdoor	No	Training Dogs
99	Main Base South West	Training Indoor	Yes	--
100	Main Base South West	Training Outdoor	No	Training Dogs
101	Main Base South West	Training Outdoor	No	Training Dogs
102	Main Base South West	Training Outdoor	Yes	--
103	Main Base South West	Training Indoor	No	Training Dogs

Table A-1
Potential Developable Parcels (cont.)

Parcel Number	Location	Land Use	Developable	Constraint
104	Main Base South West	Training Indoor	No	Training Dogs
105	Main Base South West	Industrial	Yes	--
106	Main Base South West	Training Outdoor	No	Parcel Size
107	Main Base South West	Training Outdoor	Yes	--
108	Main Base South West	Training Indoor	No	Training Dogs
109	Main Base South West	Industrial	Yes	--
110	Main Base South West	Industrial	Yes	--
111	Main Base South West	Training Outdoor	No	Training Dogs
112	Main Base South West	Training Indoor	No	Training Dogs
113	Main Base South West	Training Indoor	No	Training Dogs
114	Main Base South West	Training Indoor	No	Building Currently Standing
115	Main Base South West	Training Outdoor	Yes	--
116	Main Base South West	Training Outdoor	No	Training Dogs
117	Main Base South West	Training Outdoor	No	Training Dogs
118	Main Base South West	Training Outdoor	No	Training Dogs
119	Main Base South West	Training Outdoor	No	Training Dogs
120	Main Base South West	Training Indoor	No	Training Dogs
121	Main Base South West	Training Indoor	No	Training Dogs
122	Main Base South West	Training Indoor	No	Training Dogs
123	Main Base South West	Industrial	No	Parcel Size
124	Main Base South West	Medical	Yes	--
125	Main Base South West	Training Indoor	No	Training Dogs
126	Main Base South West	Training Indoor	No	Training Dogs
127	Main Base South West	Training Indoor	No	Training Dogs
128	Main Base South West	Industrial	No	Training Dogs
128	Main Base South West	Training Indoor	No	Training Dogs
130	Main Base South West	Training Outdoor	No	Training Dogs
131	Main Base South West	Training Outdoor	No	ERP Site

Table A-1
Potential Developable Parcels (cont.)

Parcel Number	Location	Land Use	Developable	Constraint
132	Main Base South West	Training Outdoor	No	ERP Site
133	Main Base South West	Training Outdoor	No	ERP Site
134	Main Base South West	Training Outdoor	No	Training Dogs
135	Main Base South West	Training Outdoor	No	Training Dogs
136	Main Base South West	Training Outdoor	No	Training Dogs
137	59th Medical	Medical	No	Training
138	Main Base North West - 59th Medical	Open Space	No	Helipad Restriction
139	Main Base North West - 59th Medical	Open Space	No	Helipad Restriction
140	Main Base North West - 59th Medical	Open Space	Yes	--
141	Main Base North West - Main Base Central West - 59th Medical	Open Space	Yes	--
142	59th Medical	Open Space	Yes	--
143	59th Medical	Open Space	Yes	--
144	59th Medical	Open Space	Yes	--
145	59th Medical	Community Services	Yes	--
146	59th Medical	Training Outdoor	No	Training
147	59th Medical	Training Outdoor	No	Training
148	59th Medical	Training Outdoor	No	Area of Concern
149	59th Medical	Outdoor Recreation	No	Training
150	59th Medical	Open Space	No	Area of Concern, Terrain, Creek
151	59th Medical	Open Space	Yes	--
152	59th Medical	Open Space	Yes	--
153	Main Base North West - Main Base Central West - 59th Medical	Open Space	No	Creek and Flooding
154	Main Base North West - Main Base Central West - 59th Medical	Administrative	Yes	--
155	59th Medical - Main Base South East	Housing Unaccompanied	Yes	--
156	59th Medical - Main Base South East	Open Space	No	Steep Terrain
157	59th Medical - Main Base South East	Housing Accompanied	Yes	--
158	59th Medical - Main Base South East	Housing Unaccompanied	Yes	--

Table A-1
Potential Developable Parcels (cont.)

Parcel Number	Location	Land Use	Developable	Constraint
159	59th Medical - Main Base South East	Outdoor Recreation	No	Building Currently Standing
160	Main Base South East	Administrative	Yes	--
161	Main Base South East	Housing Unaccompanied	No	Building Currently Standing
162	Main Base South East	Administrative	Yes	--
163	Main Base South East	Administrative	Yes	--
164	Main Base Central West - Main Base South West - Main Base South East	Open Space	Yes	--
165	Main Base South West - Main Base South East	Open Space	Yes	--
166	Main Base South West - Main Base South East	Open Space	No	Parking Lot
167	Main Base South East	Community Services	No	School District Land
168	Main Base South East	Housing Accompanied	Yes	--
169	Main Base South East - 433rd Airlift Wing - 149th Training Wing	Open Space	No	Steep Terrain
170	Main Base South East	Housing Accompanied	Yes	--
171	Security Hill	Housing Accompanied	Yes	ERP Site - Clean up occur
172	Security Hill	Housing Accompanied	Yes	ERP Site – Clean up occur
173	Security Hill	Training Outdoor	No	Parking lot
174	Security Hill	Medical	No	Parking lot
175	Security Hill	Medical	No	Parking lot
176	Security Hill - 433rd Airlift Wing	Open Space	No	Creek and Flooding
177	Security Hill - 433rd Airlift Wing	Open Space	No	Creek and Flooding
178	Security Hill - 433rd Airlift Wing	Industrial	No	Parcel Size
179	Security Hill - 433rd Airlift Wing	Training Outdoor	No	Parking Lot
180	Security Hill - 433rd Airlift Wing	Training Outdoor	No	Building Currently Standing
181	Security Hill - 433rd Airlift Wing	Administrative	No	Parking lot
182	Security Hill - 433rd Airlift Wing	Community Services	Yes	--
183	Security Hill - 433rd Airlift Wing	Housing Unaccompanied	No	Parking lot
184	Security Hill - 433rd Airlift Wing	Administrative	No	Parking lot
185	Security Hill - 433rd Airlift Wing	Administrative	Yes	--

Table A-1
Potential Developable Parcels (cont.)

Parcel Number	Location	Land Use	Developable	Constraint
186	Security Hill - 433rd Airlift Wing	Community Services	No	Parcel Size
187	Security Hill - 433rd Airlift Wing	Community Commercial	No	Parcel Size
188	Security Hill - 433rd Airlift Wing	Community Commercial	No	Parcel Size
189	Security Hill - 433rd Airlift Wing	Training Indoor	Yes	--
190	433rd Airlift Wing - Security Hill	Open Space	No	Flood Plain and Federal Aviation Administration Restrictions
191	433rd Airlift Wing - Security Hill	Open Space	No	Paintball and BMX Track
192	433rd Airlift Wing - Security Hill	Training Outdoor	No	Parcel Size
193	433rd Airlift Wing	Industrial	Yes	--
194	433rd Airlift Wing	Airfield Open Areas	Yes	--
195	433rd Airlift Wing	Industrial	No	Building Currently Standing
196	149th Training Wing	Open Space	No	Flood Plain
197	149th Training Wing	Open Space	No	Flood Plain
198	433rd Airlift Wing	Industrial	No	Flood Plain
199	433rd Airlift Wing - 149th Training Wing	Industrial	No	Runway Restrictions (setbacks for wing clearance)
200	433rd Airlift Wing - 149th Training Wing	Open Space	No	Runway Restrictions (setbacks for wing clearance)
201	149th Training Wing	Open Space	No	Runway Restrictions (setbacks for wing clearance)
202	149th Training Wing	Industrial	Yes	--
203	149th Training Wing	Industrial	Yes	--
204	149th Training Wing	Industrial	No	Parcel Size
205	149th Training Wing	Industrial	Yes	--
206	149th Training Wing	Training Indoor	Yes	--
207	149th Training Wing	Industrial	Yes	--

Table A-2
Land Use Capability Facility Density Factors

Land Use Type	Percent Impervious Cover ¹ “p _c ”
Administrative	60%
Community Commercial	75%
Community Service	65%
Housing Accompanied	45%
Housing Unaccompanied	65%
Industrial	75%
Medical	65%
Open Space	0.5%
Outdoor Recreation	2%
Training Indoor	75%
Training Outdoor	1%
Airfield Open Areas	0%
Airfield Pavements	0%
Aircraft Maintenance	0%
¹ Land use density factors verified against <i>The General Plan</i> (USAF 2002). p _c = density of parcel coverage by facility footprint and parking % percent USAF United States Air Force	

Table A-3
Space Authorizations by Land Use

Land Use	Authorized Space ¹ (sf/person) “d”
Administrative	180
Community - Commercial	1000
Community - Services	500
Housing - Accompanied	450
Housing - Unaccompanied	475
Industrial	750
Medical	500
Open Space	NA
Outdoor Recreation ²	NA
Training - Indoor ²	100
Training - Outdoor	NA
Airfield Pavements ²	NA
Aircraft Maintenance	500
Airfield Open Areas ²	NA
¹ Data obtained from AFH-1084 (USAF 1994). ² No personnel would be assigned to these land uses. d = density of occupancy AFH Air Force Handbook NA not applicable sf square feet USAF United States Air Force	

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Table A-4
Design Factors and Calculations

Land Use	Developable Parcel (acres)	Impervious Cover (%)	Available Land Use (acres)	Authorized Space (sf/person)	Building Floors (stories)	Parking Factor (%)	Area for Parking (sy)	Building Footprint (sf)	Building Footprint (acres)	Total Building Area (sf)	Total Parking (sy)	Total Parking (acres)	Number of People
Equation Variable	A	p _c	NA	d	s	p _f	p _a	B _f	NA	A _b	A _p	NA	P
Administrative	47.00	60%	28.20	180	3.0	60%	35	295,998	6.8	887,994	103,599	21.40	4,933
Community Commercial	18.00	75%	13.50	1000	1.0	400%	35	260,204	6.0	260,204	36,428	7.53	260
Community Service	3.00	65%	1.95	500	1.5	200%	35	29,392	0.7	44,088	6,172	1.28	88
Housing Accompanied	19.00	45%	8.55	450	3.0	50%	35	181,677	4.2	545,031	21,196	4.38	1,211
Housing Unaccompanied	27.00	65%	17.55	475	2.0	70%	35	396,427	9.1	792,854	40,895	8.45	1,669
Industrial	32.00	75%	24.00	750	1.0	38%	35	901,552	20.7	901,552	15,988	3.30	1,202
Medical	0.00	65%	0.00	500	1.5	200%	35	0	0.0	0	0	0.00	0
Open Space	239.00	0.5%	1.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Outdoor Recreation	13.00	2%	0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Training Indoor	16.00	75%	12.00	100	3.0	60%	35	78,369	1.8	235,106	49,372	10.20	2,351
Training Outdoor	74.00	1%	0.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Airfield Open Areas	35.00	0%	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Airfield Pavements	0.00	75%	0.00	750	1.0	38%	35	NA	NA	NA	NA	NA	NA
Aircraft Maintenance	0.00	75%	0.00	750	1.0	38%	35	NA	NA	NA	NA	NA	NA
Totals	523.00	NA	107.95	NA	NA	NA	NA	2,143,618	49	3,666,829	273,650	57	11,715
<div>%percent</div> <div>NAnot applicable</div> <div>sf square feet</div> <div>sy square yards</div>													

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Table A-5
Interior Building Factors by Land Use

Land Use	Interior Building Factor “IB_f”
Administrative	0.43
Community - Commercial	0.33
Community - Services	0.34
Housing - Accompanied	0.66
Housing - Unaccompanied	0.67
Industrial	0.65
Medical	0.34
Open Space	NA
Outdoor Recreation	NA
Training - Indoor	0.34
Training - Outdoor	NA
Airfield Pavements	NA
Airfield Open Areas	NA
Aircraft Maintenance	NA
NA not applicable	

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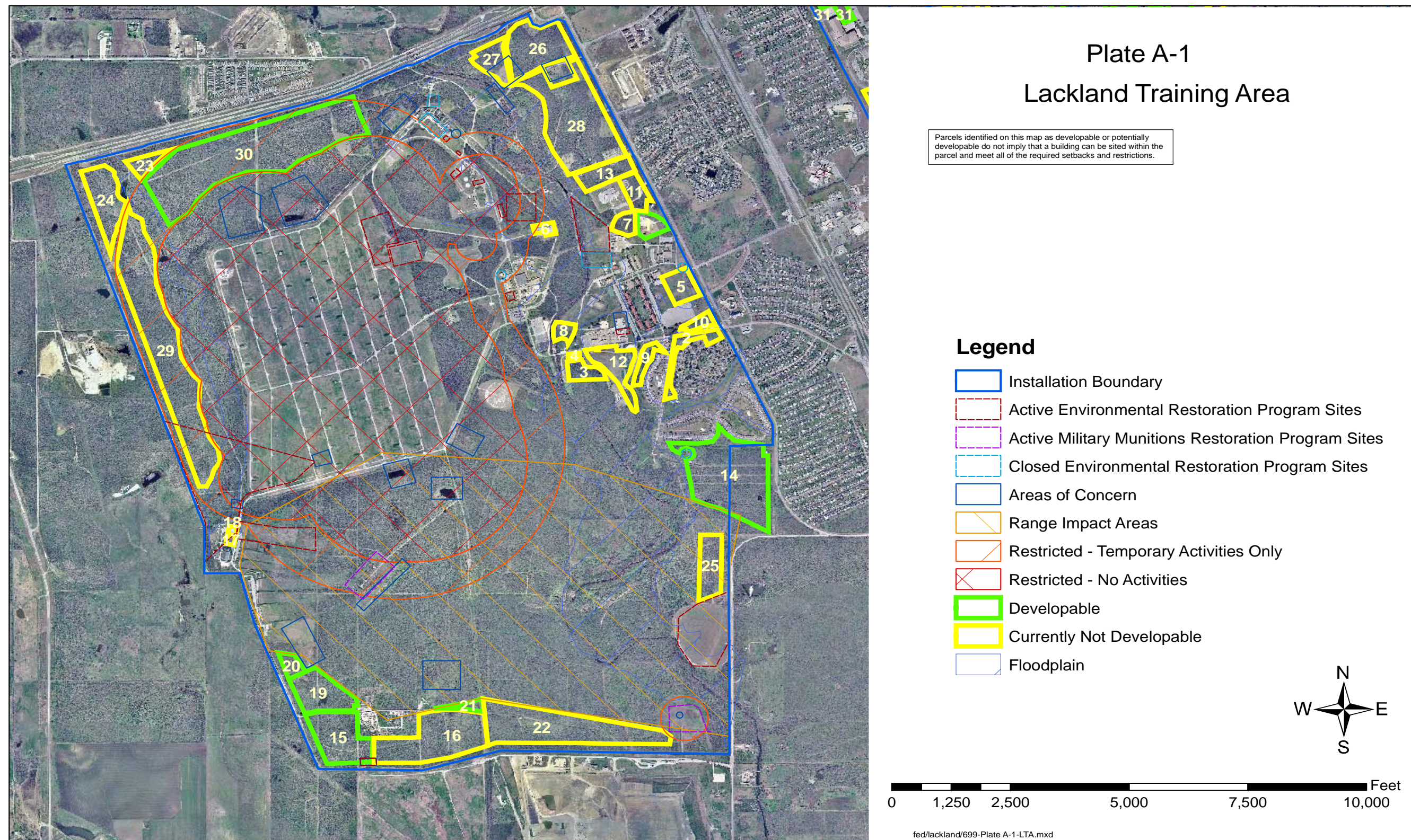


Plate A-1 Lackland Training Annex

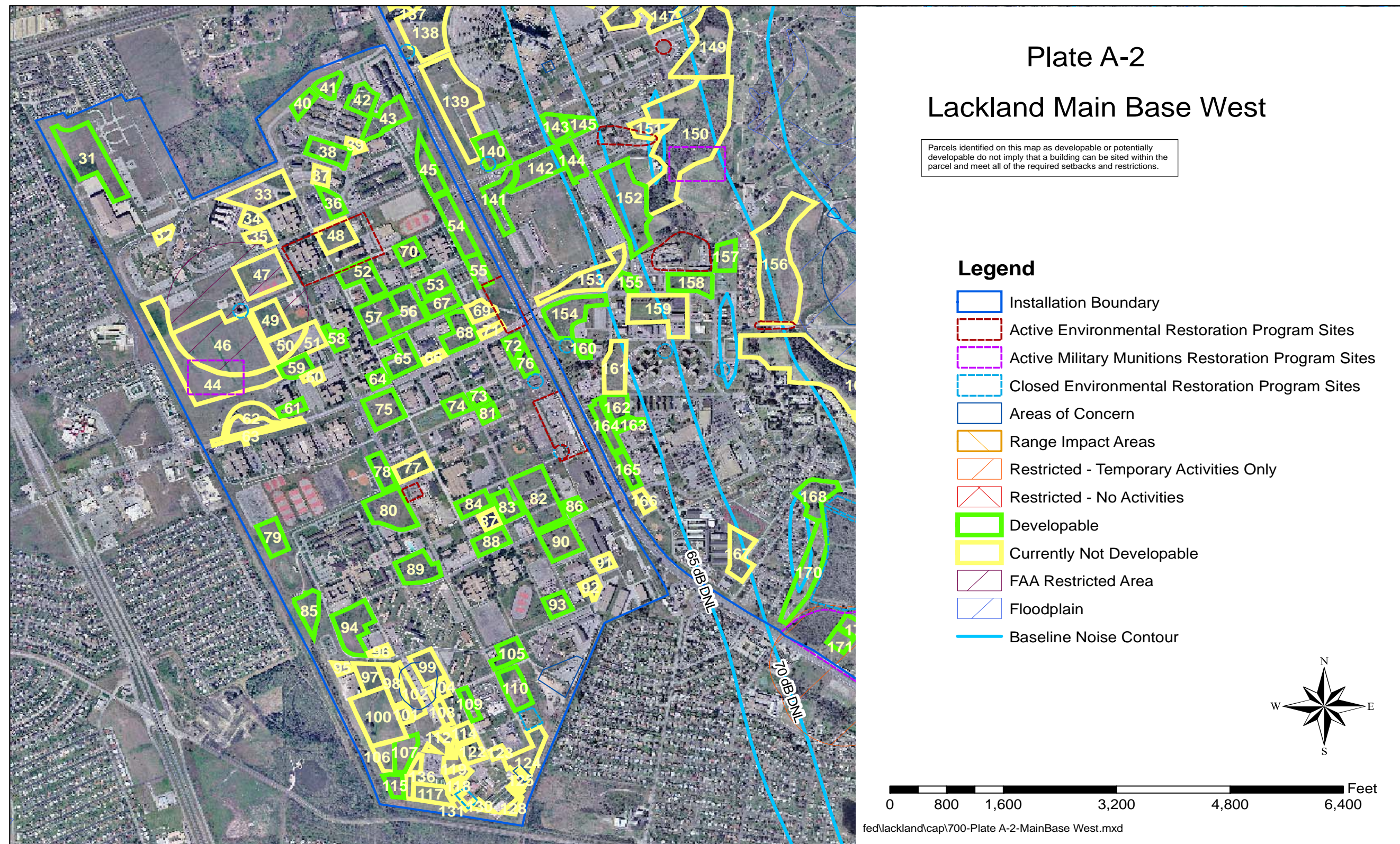


Plate A-2 Lackland Main Base West

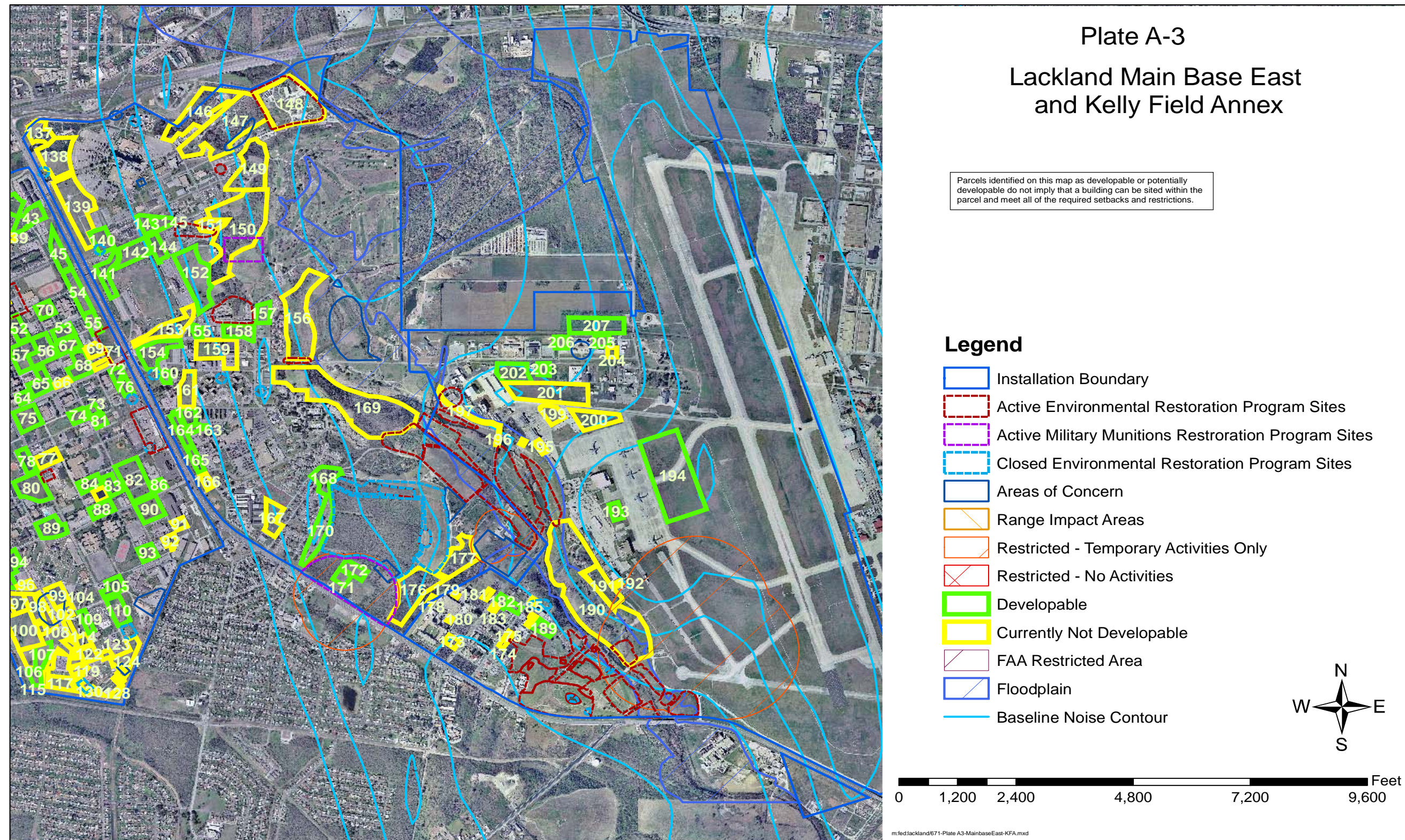


Plate A-3 Lackland Main Base East and Kelly Field Annex

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Appendix B

Utility Summary Data

**APPENDIX B
UTILITY SUMMARY DATA
SYSTEM CAPACITY DATA
CONSUMPTION DATA**

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WATER CONSUMPTION AND POPULATION-BASED WATER CONSUMPTION PROJECTIONS

Population Data	2000	2001	2002	2003	2004	2005
Base Population (8-hour)	20,404	24,793	24,795	26,035	26,885	27,385
Average Daily Student Load (24-hour)	9,667	10,169	10,545	10,257	10,557	10,557
On-base Residents ¹ (24-hour)	6,467	3,753	3,449	3,380	3,380	3,784
Total Population	36,538	38,715	38,789	39,672	40,822	41,726
Effective Population	22,935	22,186	22,259	22,315	22,899	23,469
Edwards Aquifer Consumption (acre-feet per year)	3,133	3,243	3,896	3,135	2,419	2,470
Headroom Based on 2008-2010 Allocation (ac-ft/yr)	966	856	203	964	1,680	1,629

Source: *Biological Assessment A* (United States Air Force 2005b)

* *Biological Assessment* used 101 gallons per day for 24-hour pop and 15 gallons per day for 8-hour pop (adjusted for 225 workdays/year), and 0.452 acre-feet per year per housing unit.

One 8-hour personnel =	0.010	acre-feet per year
One 24-hour resident or student =	0.113	acre-feet per year
One single family housing unit =	0.452	acre-feet per year

Added effective population is based on estimated headroom from 2005 BA water consumption.

Head Room (acre-feet per year)	1,629
Additional Population (effective)	14,399

Using water consumption factor of 0.113 acre-feet per year for one 24-hour person.

2005 Population Breakdown from BA

	Current Population	Effective Index	Current Effective Population	Current Effective Fraction	Added Effective Population	Added Total Population
Base Population (8-hour)	27,385	0.333	9,119	0.39	5,597	16,811
Average Daily Student Load (24-hour)	10,557	1	10,557	0.45	6,479	6,479
On-base Residents ¹ (24-hour)	3,784	1	3,784	0.16	2,322	2,322
Total	41,726		23,460		14,399	25,612

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WASTEWATER COLLECTION FY 2005

LACKLAND
TRAINING ANNEX

	# DAYS	29	29	32	31	31	28	31	29	32	31	28	34
CONTR-CITY/LCWB		Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05
DELIVERY POINT													
LACKLAND TRAINING ANNEX	KGL - Monthly	9181	10975	11671	9528	7287	9243	8264	8807	10750	12878	12379	11940
	KGL - CUM	9181	20156	31827	41356	48643	57886	66150	74957	85707	98585	110964	122905
	MGD	0.317	0.378	0.365	0.307	0.235	0.330	0.267	0.304	0.336	0.415	0.442	0.351

TOTAL	AVERAGE	MAX	MIN	LINE CAPACITY	% CAPACITY	BASIS
122905	10242					
	0.337	0.44	0.24			

LAFB MAIN

CONTR-CITY/SAN ANTONIO		Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05
DELIVERY POINT													
LAFB	KGL - Monthly	37918	49791	58870	24395	36096	40025	69664	40630	31114	39373	37957	38140
	KGL - CUM	37918	87709	146578	170973	207069	247094	316758	357388	388502	427875	465832	503973
	MGD	1.308	1.717	1.840	0.787	1.164	1.429	2.247	1.401	0.972	1.270	1.356	1.122

TOTAL	AVERAGE	MAX	MIN	LINE CAPACITY	% CAPACITY	BASIS
503973	41998					
	1.384	2.25	0.79			
626877	52239.76					
	1.72	2.69	1.02	9.79	27%	37TH CES/CEOE provided value of 3,574,080 KGal/year LAFB Main Base

LEASEBACK

CONTR-CITY/SAN ANTONIO		Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05
DELIVERY POINT													
	KGL - Monthly	5098	4663	4286	4740	4375	4733	4576	5234	5472	5517	6348	5913
	KGL - CUM	5098	9761	14046	18786	23161	27894	32470	37704	43175	48693	55041	60954
	MGD	0.176	0.161	0.134	0.153	0.141	0.169	0.148	0.180	0.171	0.178	0.227	0.174

TOTAL	AVERAGE	MAX	MIN	LINE CAPACITY	% CAPACITY	BASIS
60954	5080					
	0.168	0.23	0.13			

KELLY FIELD - ANNEX

CONTR-CITY/SAN ANTONIO		Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05
DELIVERY POINT													
KELLY	KGL - Monthly	3741	5248	4610	5690	4032	4205	3830	3876	3838	4135	3341	3341
	KGL - CUM	3741	8988	13598	19288	23321	27526	31355	35231	39069	43204	46545	49886
	MGD	0.129	0.181	0.144	0.184	0.130	0.150	0.124	0.134	0.120	0.133	0.119	0.098

TOTAL	AVERAGE	MAX	MIN	LINE CAPACITY	% CAPACITY	BASIS
49886	4157					
	0.137	0.18	0.10			
110840.61	9236.72					
	0.30	0.41	0.23	2.32	18%	37TH CES/CEOE provided value of 848,430 KGal/year for Kelly.

ELECTRICITY CONSUMPTION FY2005

LAFB MAIN		~~~~~ SUPPLIER-CITY PUBLIC SERVICE																	
MAIN BASE		END READ	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05		HIGHEST	CAPABILITY	% CAPABILITY	BASIS
		# DAYS	29	29	32	31	31	28	31	29	32	31	28	34					
CAMP BULLIS		BILLED kW	26943	25492	22208	22208	22208	22208	22208	22700	25310	28531	28213	29121		29121	50160	58%	3 19-MW circuits @ 88% Power Supplied
BC3		ACTUAL kW	26943	25492	19550	17191	16783	17645	21682	22700	25310	28531	28213	29121	.....	.....	
		POWER - %	88	88	88	88	88	88	88	88	88	88	88	88		TOTAL	AVERAGE	MIN	MAX
		LOAD - %	67.90%	69.18%	66.24%	69.56%	72.04%	70.27%	66.60%	69.80%	74.18%	76.93%	79.43%	76.83%		71.58%	66.24%	79.43%	
		MWh - MON	12733	12274	9945	8897	8995	8332	10743	11028	14419	16330	15060	18256	147013	12251	439402	33%	3 19-MW circuits 365 days 24 hours @ 88% Power Supplied
		MWh - CUM	12733	25007	34952	43849	52845	61177	71920	82948	97367	113697	128757	147013					
LAFB – ANNEX		~~~~~ SUPPLIER - CITY PUBLIC SERVICE																	
		END READ	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05		HIGHEST	CAPABILITY	% CAPABILITY	BASIS
		# DAYS	29	29	32	31	31	28	31	29	32	31	28	34					
		BILLED kW	6082	5648	4986	4986	4986	5000	5000	5278	5855	6628	6328	7168		7168	7980	90%	8.4-MW allotted from 10.059-MW circuit @ 95% Power Supplied
		ACTUAL kW	6082	5648	4256	4620	4318	4074	4710	5278	5855	6628	6328	7168	.....	.....	9556	75%	10.059-MW circuit @ 95% Power Supplied
		POWER - %	95	95	95	95	95	95	95	95	95	95	95	95		TOTAL	AVERAGE	MIN	MAX
		LOAD - %	72.76%	70.87%	72.90%	64.11%	71.03%	73.74%	69.20%	66.85%	73.23%	76.99%	79.67%	73.39%		72.06%	64.11%	79.67%	
		MWh - MON	3080	2786	2383	2204	2282	2019	2425	2456	3293	3797	3388	4292	34404	2867	69905	49%	8.4-MW circuit 365 days 24 hours @ 95% Power Supplied
		MWh - CUM	3080	5866	8249	10452	12734	14753	17178	19634	22926	26723	30111	34404			83711		
LEASEBACK		~~~~~ SUPPLIER - CITY PUBLIC SERVICE																	
		END READ	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05		HIGHEST	CAPABILITY	% CAPABILITY	BASIS
		# DAYS	29	33	29	29	28	30	31	29	32	30	29	34					
		BILLED kW	0	0	0	0	0	0	0	0	0	0	0	0		0			Not evaluated. The leaseback areas at Kelly East will eventually go west.
		ACTUAL kW	0	0	0	0	0	0	0	0	0	0	0	0	.....	.....	
		POWER - %	88	88	88	88	88	88	88	88	88	88	88	88		TOTAL	AVERAGE		
		LOAD - %	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA			
		MWh - MON	2969	2803	2534	2713	2490	2744	2860	2855	3444	3359	3237	3794	35803	2984			
		MWh - CUM	2969	5773	8307	11020	13510	16254	19114	21969	25413	28772	32009	35803					
KELLY FIELD - ANNEX		~~~~~ SUPPLIER - CITY PUBLIC SERVICE																	
		END READ	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05		HIGHEST	CAPABILITY	% CAPABILITY	BASIS
		# DAYS	29	32	30	31	28	30	31	29	32	30	29	34					
		BILLED kW	10434	10434	9350	9350	9350	9470	9684	10800	11330	5895	12305	11847		12305	14344	86%	(1) 7.7-MW and (1) 8.6-MW switch @ 88% Power Supplied
		ACTUAL kW	10434	10434	9339	9331	9260	9470	9684	10800	11330	5895	12305	11847	.....	.....	
		POWER - %	88	88	88	88	88	88	88	88	88	88	88	88		TOTAL	AVERAGE	MIN	MAX
		LOAD - %	65.76%	58.69%	70.56%	61.33%	64.08%	65.63%	64.98%	61.67%	63.64%	77.14%	62.84%	64.93%		65.10%	58.69%	77.14%	
		MWh - MON	4776	4703	4744	4258	3987	4475	4682	4636	5537	3274	5382	6277	56730	4728	125653	45%	(1) 7.7-MW and (1) 8.6-MW switch 365 days 24 hours @ 88% Power Supplied
		MWh - CUM	4776	9479	14223	18481	22468	26943	31625	36261	41798	45072	50454	56730				74%	Above capability with all leaseback areas included with KFA usage.

NATURAL GAS CONSUMPTION FY2005

# DAYS	29	29	32	31	31	28	31	29	32	31	28	34
	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05

MAIN BASE INCLUDING LTA AND WILFORD HALL W/TEP

SUPPLIER - EL PASO REATA ENERGY, L.P.

SUPPLIER - EL PASO REATA ENERGY, L.P.														TOTAL	AVERAGE	MAX	MIN	LINE CAPACITY	% CAPACITY	BASIS
LAFB	KCF - Monthly	72760	82273	103960	101925	84620	87440	80102	67822	56748	66739	85268	87616	977273	81439			3377710	29%	37TH CES/CEOE provided value of 3,377,710 KCF/year LAFB Main Base
	KCF - CUM	72760	155033	258993	360918	445538	532978	613080	680902	737650	804389	889657	977273							
	KCF/DAY	2509	2837	3249	3288	2730	3123	2584	2339	1773	2153	3045	2577		2684	3288	1773	9254	36%	37TH CES/CEOE provided value of 3,377,710 KCF/year LAFB Main Base
	MCF/DAY	2.509	2.837	3.249	3.288	2.730	3.123	2.584	2.339	1.773	2.153	3.045	2.577		2.684	3.288	1.773	9.254	36%	

KELLY FIELD ANNEX AND LEASEBACK AREAS

TOTAL KELLY	KCF - Monthly	5907	9408	18206	17556	17055	13781	8067	6034	4871	4697	4458	5082	115121				876000	13%	37TH CES/CEOE provided value of 876,000 KCF/year for Kelly
	KCF - CUM	5907	15314	33521	51077	68131	81912	89979	96013	100884	105581	110039	115121							
	KCF/DAY	204	324	569	566	550	492	260	208	152	152	159	149		316	569	149	2400	24%	37TH CES/CEOE provided value of 876,000 KCF/year for Kelly
	MCF/DAY	0.204	0.324	0.569	0.566	0.550	0.492	0.260	0.208	0.152	0.152	0.159	0.149		0.316	0.569	0.149	2.4	24%	

SUPPLIER - CITY PUBLIC SERVICE

														TOTAL	AVERAGE					
LEASEBACK	KCF - Monthly	3939	6286	10108	9824	9097	7005	4512	3554	2825	2451	2514	2919	65033	5419					
	KCF - CUM	3939	10224	20333	30157	39253	46258	50770	54324	57149	59600	62114	65033							

KELLY FIELD ANNEX

SUPPLIER - CITY PUBLIC SERVICE

														TOTAL	AVERAGE					
KELLY	KCF - Monthly	1968	3122	8098	7732	7958	6776	3555	2480	2046	2246	1944	2163	50088	4174					
	KCF - CUM	1968	5090	13188	20920	28878	35654	39209	41689	43735	45981	47925	50088							

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Appendix C

Air Quality Analysis

FINAL

Appendix C

*Installation Development
Lackland Air Force Base, Texas*

APPENDIX C

AIR QUALITY CALCULATIONS

December 1, 2006

FINAL

Appendix C

*Installation Development
Lackland Air Force Base, Texas*

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LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
Emissions Summary

Proposed Action

Construction

	Emissions (tons/year)				
	CO	VOC	NOx	SOx	PM
Construction	39.4	12.3	181.3	0.0	12.9
Demolition	0.1	0.0	0.1	0.0	0.0
Grading	1.4	0.2	1.7	0.2	2.9
Pavement	0.8	0.2	1.8	0.1	0.1
Total	41.8	12.8	185.0	0.3	15.9

Operation (Increase)

	Emissions (tons/year)				
	CO	VOC	NOx	SOx	PM
Aircraft (LTO)					
Other mobile sources					
Total	0.0	0.0	0.0	0.0	0.0

Stationary

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Indirect (Increase)

	Emissions (tons/year)				
	CO	VOC	NOx	SOx	PM
Commuting	11.9	1.0	0.9	0.1	0.7

Alternative Action

Construction

	Emissions (tons/year)				
	CO	VOC	NOx	SOx	PM
Construction	77.9	24.4	358.0	0.0	25.4
Demolition	0.0	0.0	0.0	0.0	0.0
Grading	10.8	1.7	10.5	1.0	14.4
Pavement	1.6	0.3	3.6	0.3	0.2
Total	90.3	26.4	372.1	1.3	40.0

Operation (Increase)

	Emissions (tons/year)				
	CO	VOC	NOx	SOx	PM
Aircraft (LTO)	161.2	42.9	274.6	11.4	22.1
Other mobile sources					
Total	161.2	42.9	274.6	11.4	22.1

Stationary

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Indirect (Increase)

	Emissions (tons/year)				
	CO	VOC	NOx	SOx	PM
Commuting	816.4	69.4	61.2	3.6	45.6

TOTAL Construction Emissions (tpy)	41.8	12.8	185.0	0.3	15.9
TOTAL Aircraft Operations Emissions (tpy)	0.0	0.0	0.0	0.0	0.0
TOTAL Indirect Emissions (tpy)	11.9	1.0	0.9	0.1	0.7
TOTAL Emissions, Proposed Action (tpy)	53.6	13.8	185.8	0.4	16.5

TOTAL Construction Emissions (tpy)	90.3	26.4	372.1	1.3	40.0
TOTAL Aircraft Operations Emissions (tpy)	161.2	42.9	274.6	11.4	22.1
TOTAL Indirect Emissions (tpy)	816.4	69.4	61.2	3.6	45.6
TOTAL Emissions, Alternative Action (tpy)	1067.8	138.7	707.9	16.2	107.7

LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
Construction (Prop&Alt)

Building Construction		
Bldg #	Construction project	sq ft
	Total	3,762,722

(from DOPAA sheet)

Proposed Action

Emission Factors (lbs/const period/1000 sq ft GFA)

Land Use	ROC	CO	NOx	SO2	PM10	Reference
General Industrial	32.8	104.8	481.9	0.0	34.2	CEQA 1993, Table 9-1

Emissions (tons)					
CO	VOC	NOx	SOx	PM	
197.1	61.7	906.6	-	64.4	

5	Yrs of construction				
---	---------------------	--	--	--	--

Emissions (tons/yr)					
CO	VOC	NOx	SOx	PM	
39.4	12.3	181.3	-	12.9	

Building Construction		
Bldg #	Construction project	sq ft
	Total	7,429,551

(from DOPAA sheet)

Alternative Action

Emission Factors (lbs/const period/1000 sq ft GFA)

Land Use	ROC	CO	NOx	SO2	PM10	Reference
General Industrial	32.8	104.8	481.9	0.0	34.2	CEQA 1993, Table 9-1

Emissions (tons)					
CO	VOC	NOx	SOx	PM	
389.3	121.8	1,790.1	-	127.1	

5	Yrs of construction				
---	---------------------	--	--	--	--

Emissions (tons/yr)					
CO	VOC	NOx	SOx	PM	
77.9	24.4	358.0	-	25.4	

Project

Demolition	Bldg #	Square Feet	Height (ft)	Cubic Feet
Total Demolition	various	855,032	10	8,550,320
TOTAL DEMOLITION			Cubic Feet	855,032

Demolition Emission Factor	0.00042	lb PM10/cubic foot
----------------------------	---------	--------------------

					PM10
Emissions (lb)					359
Emissions (tons)					0.2

Removal of pavement		sq ft
Pavement thickness		ft
volume to be removed	182,560	cu ft

Total volume to be removed (bldgs + parking)

Volume per truckload

Number of truckloads

Round trip mileage

Miles traveled

1,037,592	cu ft
38,429	cu yd
15	cu yd/truckload
2562	truckloads
20	miles/load
51239	miles

	CO	VOC	NOx	SOx	PM
	(g/mi)	(g/mi)	(g/mi)	(g/mi)	(g/mi)
Dump truck emission factors	11.22	2.16	10.81	0.08828269	1.652
Emissions (grams)	574903	110676	553895	4524	84647
Emissions (tons)	0.634	0.122	0.611	0.005	0.093

Reference

(from Jagelski & O'Brien, 1994 - HDDV)

		Emissions (tons/year)				
		CO	VOC	NOx	SOx	PM
Total for demolition and hauling		0.13	0.02	0.12	0.00	0.02

LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
Demolition (Alt)

Project

Demolition	Bldg #	Square Feet	Height (ft)	Cubic Feet
Total Demolition	various	0	10	0
TOTAL DEMOLITION			Cubic Feet	855,032

Demolition Emission Factor 0.00042 lb PM10/cubic foot

	PM10
Emissions (lb)	359
Emissions (tons)	0.2

Removal of pavement sq ft
Pavement thickness ft
volume to be removed 182,560 cu ft

Total volume to be removed (bldgs + parking)

Volume per truckload
Number of truckloads
Round trip mileage
Miles traveled

1,037,592	cu ft
38,429	cu yd
15	cu yd/truckload
2562	truckloads
20	miles/load
51239	miles

Dump truck emission factors
Emissions (grams)
Emissions (tons)

CO	VOC	NOx	SOx	PM
(g/mi)	(g/mi)	(g/mi)	(g/mi)	(g/mi)
11.22	2.16	10.81	0.08828269	1.652
574903	110676	553895	4524	84647
0.634	0.122	0.611	0.005	0.093

Reference
(from Jagelski & O'Brien, 1994 - HDDV)

Total for demolition and hauling

Emissions (tons/year)				
CO	VOC	NOx	SOx	PM
0.13	0.02	0.12	0.00	0.02

Surface disturbance (Grading)

Total area disturbed (sq ft)	
Days	
Acres	

Operational schedule (ground disturbance days) = 100

Fugitive Dust Sources

Project Duration (working days)	Graded Area (acres)	PM10 Emission Factor* (lb/acre/day)	Emissions (lbs/day)	Emissions (tons)
(grading) 100	115.0	55.0	275.0	13.75

* (SCAQMD Table 9-2)

Combustion (Off-road construction equipment)

Duration (days)	Operation		
	Trench Excavation	Site Grading	Paving
	0	100	20

# of Equip	Schedule** (hours/day)		
Backhoe			
Trencher			
Grader	2	8	
Asphalt Paver			
Scraper	2	8	
Rollers	2	8	

Total hours	Emissions (lbs)				
	CO	HC	NOx	SOx	PM10
0	0	0	0	0	0
0	0	0	0	0	0
1600	2004	752	5262	501	251
0	0	0	0	0	0
1600	4695	427	8110	854	640
1600	1109	317	3168	317	158
	7808	1495	16539	1672	1049
	3.90	0.75	8.27	0.84	0.52

5 years

Summary

	Emissions (tons)				
	CO	HC	NOx	SOx	PM10
Ground disturbing	3.9	0.7	8.3	0.8	13.8
Fuel Combustion	3.2	0.4	0.3		0.5
Worker Travel					0.0
TOTAL	7.1	1.2	8.6	0.8	14.3

Emissions (tons/year)

VOC	CO	NOx	SO2	PM10
1.2	7.1	8.6	0.8	14.3

Emissions (tons/year)

CO	VOC	NOx	SOx	PM
1.4	0.2	1.7	0.2	2.9

Equipment List	EF (lbs/Bhp-hr) *					Bhp**	EF (lbs/hr) *				
	CO	HC	NOx	SOx	PM10		CO	HC	NOx	SOx	PM10
Backhoe	0.0150	0.0030	0.0220	0.0020	0.0010	79	1.19	0.24	1.74	0.16	0.08
Trencher	0.0200	0.0030	0.0220	0.0020	0.0015	60	1.20	0.18	1.32	0.12	0.09
Grader	0.0080	0.0030	0.0210	0.0020	0.0010	157	1.25	0.47	3.29	0.31	0.16
Asphalt Paver	0.007	0.001	0.023	0.002	0.001	91	0.64	0.09	2.09	0.18	0.09
Scraper	0.011	0.001	0.019	0.002	0.0015	266.76	2.93	0.27	5.07	0.53	0.40
Rollers	0.0070	0.0020	0.0200	0.0020	0.0010	99	0.69	0.20	1.98	0.20	0.10

LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
Grading (Alt)

Surface disturbance (Grading)

Total area disturbed (sq ft)	
Days	
Acres	

Operational schedule (ground disturbance days) = 500

Fugitive Dust Sources

Project Duration (working days)	Graded Area (acres)	PM10 Emission Factor* (lb/acre/day)	Emissions (lbs/day)	Emissions (tons)
(grading) 500	523.0	55.0	275.0	68.75

* (SCAQMD Table 9-2)

Combustion (Off-road construction equipment)

Duration (days)	Operation			Total hours	Emissions (lbs)					
	Trench Excavation	Site Grading	Paving		CO	HC	NOx	SOx	PM10	
	5	500	500		47	9	70	6	3	
					48	7	53	5	4	
# of Equip Schedule** (hours/day)										
Backhoe	1	8		40	10022	3758	26309	2506	1253	
Trencher	1	8		40	5096	728	16744	1456	728	
Grader	2		8	8000	23475	2134	40548	4268	3201	
Asphalt Paver	2		8	8000	5544	1584	15840	1584	792	
Scraper	2		8	8000	44233	8221	99563	9825	5981	
Rollers	2		8	8000	22.12	4.11	49.78	4.91	2.99	

5 years

Emissions (tons)

VOC	CO	NOx	SO2	PM10
8.5	54.2	52.6	4.9	71.8

Emissions (tons)

CO	VOC	NOx	SOx	PM
10.8	1.7	10.5	1.0	14.4

Equipment List	EF (lbs/Bhp-hr) *					Bhp**	EF (lbs/hr) *				
	CO	HC	NOx	SOx	PM10		CO	HC	NOx	SOx	PM10
Backhoe	0.0150	0.0030	0.0220	0.0020	0.0010	79	1.19	0.24	1.74	0.16	0.08
Trencher	0.0200	0.0030	0.0220	0.0020	0.0015	60	1.20	0.18	1.32	0.12	0.09
Grader	0.0080	0.0030	0.0210	0.0020	0.0010	157	1.25	0.47	3.29	0.31	0.16
Asphalt Paver	0.007	0.001	0.023	0.002	0.001	91	0.64	0.09	2.09	0.18	0.09
Scraper	0.011	0.001	0.019	0.002	0.0015	266.76	2.93	0.27	5.07	0.53	0.40
Rollers	0.0070	0.0020	0.0200	0.0020	0.0010	99	0.69	0.20	1.98	0.20	0.10

* SCAQMD Table A9-8-B, Diesel-fired

** SCAQMD Table 9-8-C

Construction Worker Travel

For Each Worker:

Miles per day = 20 (estimated round trip)
Number of workers = 100
Duration of Project (working days) = 500

Emission Factors

	CO	VOC	NOx	PM10
grams/mi	29.09	4	2.59	0.085

VMT = 1000000 VMT= (mi/d-w) x (days) x (workers)

Emissions = (EF) x (VMT) x conversion

	CO	VOC	NOx	PM10
pounds	64131	8818	5710	187
tons	32.07	4.41	2.85	0.09

Summary

	Emissions (tons)				
	CO	HC	NOx	SOx	PM10
Ground disturbing	22.1	4.1	49.8	4.9	68.8
Fuel Combustion	32.1	4.4	2.9		3.0
Worker Travel					0.1
TOTAL	54.2	8.5	52.6	4.9	71.8

LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
New Pavement (Prop)

New Pavement		sq ft
TOTAL PAVEMENT ADDED	Square Feet	1,241,970
TOTAL PAVEMENT ADDED	Acres	
Paving Rate	sqft/day	5,000
Duration of paving activity	days	248.39

Dump Truck to Import Paving Materials

Pavement depth (ft)		
Pavement volume (cu ft)	620,985	
Pavement volume (cu yd)	22999	
Miles per round trip	20	Guesstimate
Size of truckload (cu yd)	15	Typical size of dump truck
Total trips	1533	(concrete volume) / (volume/truck)
Total miles	30666	(trips) x (miles/trip)

	Emission Factor (g/mi)				
Vehicle Type	VOC	CO	NOx	SOx	PM
HDDV	2.16	11.22	10.81	0.09	1.65

Emissions (tons/year)				
CO	VOC	NOx	SOx	PM
0.4	0.1	0.4	0.0	0.1

Paving Equipment Emissions

	Emission Factor (lb/hour)				
Emission Factor Ref.	CO	ROC	NOx	SOx	PM10
SCAQMD-Misc Diesel	0.675	0.15	1.7	0.143	0.14
Roller	0.300	0.065	0.870	0.067	0.050
Concrete Paver -Diesel	0.806	0.161	1.773	0.161	0.081
Asphalt Paver - Diesel	0.376	0.054	1.235	0.107	0.054

						Emissions (lb/const period)				
Equipment	Equipment	hr/day	Hrs/constr period		Emission Factor Ref.	CO	ROC	NOx	SOx	PM10
Bulldozers	2	8	3974.3		SCAQMD-Misc Diesel	2682.7	596.1	6756.3	568.3	556.4
Roller	2	8	3974.3		Roller	1192.3	258.3	3457.6	266.3	198.7
Concrete Paver -Diesel	2	8	3974.3		Concrete Paver -Diesel	3203.3	640.7	7047.2	640.7	320.3
					TOTAL	7078	1495	17261	1475	1075
Total (tons)						3.5	0.7	8.6	0.7	0.5

	Emissions (tons)				
	CO	VOC	NOx	SOx	PM
Total Emissions	0.78	0.16	1.80	0.15	0.12

LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
New Pavement (Alt)

New Pavement		sq ft
TOTAL PAVEMENT ADDED	Square Feet	2,482,920
TOTAL PAVEMENT ADDED	Acres	
Paving Rate	sqft/day	10,000
Duration of paving activity	days	248.29

Dump Truck to Import Paving Materials

Pavement depth (ft)		
Pavement volume (cu ft)	1,241,460	
Pavement volume (cu yd)	45980	
Miles per round trip	20	Guesstimate
Size of truckload (cu yd)	15	Typical size of dump truck
Total trips	3065	(concrete volume) / (volume/truck)
Total miles	61307	(trips) x (miles/trip)

	Emission Factor (g/mi)				
Vehicle Type	VOC	CO	NOx	SOx	PM
HDDV	2.16	11.22	10.81	0.09	1.65

Emissions (tons/year)				
CO	VOC	NOx	SOx	PM
0.8	0.1	0.7	0.0	0.1

Paving Equipment Emissions

	Emission Factor (lb/hour)				
Emission Factor Ref.	CO	ROC	NOx	SOx	PM10
SCAQMD-Misc Diesel	0.675	0.15	1.7	0.143	0.14
Roller	0.300	0.065	0.870	0.067	0.050
Concrete Paver -Diesel	0.806	0.161	1.773	0.161	0.081
Asphalt Paver - Diesel	0.376	0.054	1.235	0.107	0.054

						Emissions (lb/const period)				
Equipment	Equipment	hr/day	Hrs/constr period		Emission Factor Ref.	CO	ROC	NOx	SOx	PM10
Bulldozers	4	8	7945.3		SCAQMD-Misc Diesel	5363.1	1191.8	13507.1	1136.2	1112.3
Roller	4	8	7945.3		Roller	2383.6	516.4	6912.4	532.3	397.3
Concrete Paver -Diesel	4	8	7945.3		Concrete Paver -Diesel	6403.9	1280.8	14088.7	1280.8	640.4
					TOTAL	14151	2989	34508	2949	2150
Total (tons)						7.1	1.5	17.3	1.5	1.1

	Emissions (tons)				
	CO	VOC	NOx	SOx	PM
Total Emissions	1.57	0.33	3.60	0.30	0.24

LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
Aircraft EFs (Alt)

Aircraft	Similar Aircraft		Note	Type	Engine	No. Eng.	Engine Reference	EF Reference	Aircraft Emissions - Sorties (Military Mode) (lb/hr)					
									Fuel	CO	VOC	NOx	SOx	PM
C-5	C-5A (Lackland)			Transport (C-5)	TF39-GE-1C	4	USAF/IERA (2002), p. 32	USAF/IERA (2002), p. 42; SOx: p. 25,51 (TX)	55444.0	70.97	0.00	1810.80	46.57	65.42
F-16	F-16 (Lackland)			Combat	F100-PW-229	1	USAF/IERA (2002), p. 33	USAF/IERA (2002), p. 36; SOx: p. 25,51 (TX)	11490.0	7.58	6.20	662.40	9.65	15.28

Aircraft	Aircraft Emissions - Sorties (Intermediate Mode) (lb/hr)					
	Fuel	CO	VOC	NOx	SOx	PM
C-5	50164.0	81.77	0.00	1412.62	42.14	44.65
F-16	5838.0	0.88	1.75	102.34	4.90	12.03

Aircraft	Aircraft Emissions - LTOs (lb/LTO)					
	Fuel	CO	VOC	NOx	SOx	PM
C-5	6470.0	94.20	27.60	133.54	5.43	9.79
F-16	1107.6	5.68	0.43	21.23	0.93	2.11

Aircraft	Aircraft Emissions - TGOs (lb/TGO)					
	Fuel	CO	VOC	NOx	SOx	PM
C-5	4935.1	4.85	2.39	128.38	4.15	5.57
F-16	568.4	0.20	0.23	19.18	0.48	1.00

Alternative Action (assume "aircraft operation" is Landing and Takeoff Operation (LTO))

	Increase	
	LTO/day	Days/yr
Baseline		250
C-5	12	
F-16	28	
Total	40	
Other	0	Use operation ratio.
Grand Total	40	

Tons per year					
CO	VOC	NOx	SOx	PM	
141.3	41.4	200.3	8.2	14.7	
19.9	1.5	74.3	3.3	7.4	
161.2	42.9	274.6	11.4	22.1	
0.0	0.0	0.0	0.0	0.0	
161.2	42.9	274.6	11.4	22.1	

LAFB Pub Dr EA - AQ Calculations 10-22-06.xls
Commuting (Prop&Alt)

POV Emission Factors

(from AFIERA, 2002, pp 65-115)

AVR=Average vehicle ridership

#RT/day = #empl/day*(%commuters/100)/AVR

#miles/yr = #miles/RT * RT/wk * wk/yr

Action Year	2007
Altitude	Low

Change based on action
year, altitude, and model
year.

See pp. 65-112

Same for all (pp. 113, 115)

	on-road pct	Model Year	CO (g/mi)	VOC (g/mi)	NOx (g/mi)	SOx (g/mi)	PM10 (g/mi)	PM2.5 (g/mi)	Pb (g/mi)	Carbon (g/mi)
LDGV	68.9%	2000	22.6	1.8	1.4	0.072	0.71	0.20	0.0015	0.0043
LDGT-1	11.4%	2000	24.6	2.0	1.6	0.096	1.08	0.29	0.0020	0.0043
LDGT-2	8.5%	2000	26.0	2.1	1.7	0.098	2.58	0.66	0.0021	0.0043
HDGV	1.5%	2000	18.3	2.2	3.3	0.154	5.51	1.42	0.0033	0.054
LDDV	3.9%	2000	1.5	0.6	1.2	0.116	0.80	0.28	0.0000	0.100
LDDT	1.9%	2000	1.8	0.9	1.4	0.157	1.59	0.48	0.0000	0.109
HDDV	2.9%	2000	11.3	2.0	6.5	0.512	7.73	2.01	0.0000	0.213
MC	1.0%	2000	23.7	5.2	0.9	0.032	0.08	0.03	0.0012	0.0000
Weighted Avg			21.5	1.8	1.6	0.1	1.2	0.3	0.0	0.0

POV Commuting Data

Commuting Distance =

Weekly schedule =

Annual schedule =

AVR =

% of Employees Living On-Base

Proposed Action

20	miles/RT
5	days/week
50	weeks
1.17	commuters/RT
-	%

Emission Calculation

	Manpower	Daily Trips (RT/day)
Baseline	41,726	35,663
Proposed Action	41,843	35,763
Increase	117	100

Proposed Action

Annual

Miles	CO	VOC	NOx	SOx	PM	PM2.5	Pb	Carbon
(miles)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)
178,316,239	4229.4	359.7	316.8	18.5	236.0	64.3	0.3	3.3
178,816,239	4241.3	360.7	317.7	18.5	236.7	64.4	0.296	3.31
500,000	11.9	1.0	0.9	0.1	0.7	0.2	0.0	0.0

POV Commuting Data

Commuting Distance =

Weekly schedule =

Annual schedule =

AVR =

% of Employees Living On-Base

Alternative Action

20	miles/RT
5	days/week
50	weeks
1.70	commuters/RT
-	%

Emission Calculation

	Manpower	Daily Trips (RT/day)
Baseline	41,726	35,663
Alternative Action	53,411	42,547
Increase	11,685	6,884

Alternative Action

Annual

Miles	CO	VOC	NOx	SOx	PM	PM2.5	Pb	Carbon
(miles)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)	(tons)
178,316,239	4229.4	359.7	316.8	18.5	236.0	64.3	0.3	3.3
212,734,501	5045.8	429.2	378.0	22.0	281.5	76.7	0.352	3.93
34,418,262	816.4	69.4	61.2	3.6	45.6	12.4	0.1	0.6

LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
9-1>Total Const EF's

Screening Table for Estimating Total Construction Emissions
(SCAQMD, 1993, Table 9-1, page 9/19)
Includes on-site construction equipment and workers' travel

Land Use	Unit of Measure	Emission Factors (lb/construction period)				
		ROC	CO	NOx	SO2	PM10
RESIDENTIAL						
Single Family Housing	1000 ft2 GFA	23.66	75.62	347.74		24.69
Apartments	1000 ft2 GFA	21.97	70.22	322.9		22.93
Condominiums	1000 ft2 GFA	21.3	68.06	312.97		22.22
Mobile Homes	1000 ft2 GFA	21.3	68.06	312.97		22.22
EDUCATIONAL						
Schools	1000 ft2 GFA	46.99	150.16	690.52		49.03
COMMERCIAL						
Business Park	1000 ft2 GFA	55.44	177.17	814.72		57.85
Day Care Center	1000 ft2 GFA	31.87	101.55	466.97		33.16
Discount Store	1000 ft2 GFA	31.78	101.55	466.97		33.16
Fast Food	1000 ft2 GFA	31.78	101.55	466.97		33.16
Government Office Complex	1000 ft2 GFA	55.44	177.17	814.72		57.85
Hardware Store	1000 ft2 GFA	31.78	101.55	466.97		33.16
Hotel	1000 ft2 GFA	41.58	132.87	611.04		43.39
Medical Office	1000 ft2 GFA	55.44	177.17	814.72		57.85
Motel	1000 ft2 GFA	41.58	132.87	611.04		43.39
Movie Theater	1000 ft2 GFA	31.78	101.55	466.97		33.16
Office	1000 ft2 GFA	55.44	177.17	814.72		57.85
Resort Hotel	1000 ft2 GFA	41.58	132.87	611.04		43.39
Restaurant	1000 ft2 GFA	31.78	101.55	466.97		33.16
Shopping Center	1000 ft2 GFA	31.78	101.55	466.97		33.16
Supermarket	1000 ft2 GFA	31.78	101.55	466.97		33.16
INDUSTRIAL						
General Industrial	1000 ft2 GFA	32.79	104.79	481.88		34.22

Notes:

E = Daily construction emissions = (GFA/1000 x EF) / days to construct

For on-site construction equipment and material handling construction emissions, subtract emissions obtained by using Table 9-3.

For on-site construction equipment emissions, subtract emissions obtained by using Tables 9-3 and 9-4.

Emission Factor (lb/1000sqft)					
ROC	NOx	CO		PM10	
32.79	481.88	104.79		34.22	Total industrial
0.00	0.00	0.04		0.00	Construction worker's travel (industrial)
4.68	68.77	14.96		4.88	Construction material handling (industrial)
28.11	413.11	89.79		29.34	Onsite construction equipment (industrial)

LAFB Pub Dr EA - AQ Calculations 10-16-06.xls
9-2>Fugitive Dust EF's

Screening Table for Estimating Construction PM10 Emissions - Fugitive Dust
(SCAQMD, 1993, Table 9-2, page 9-20)

Land Use	Unit of Measure	Emission Factors (lb/day)
		Lbs of PM10
UNPAVED ROADS		
Passenger Vehicles	VMT	5.56
Trucks	VMT	23
PAVED ROADS		
Passenger Vehicles	VMT	0.33
Trucks	VMT	2
DEMOLITION	Cubic Foot	0.00042
GRADING	Acres/Day	55
ASBESTOS	Cubic Foot	0.00006

Notes:

The grading emission factor is lb/day per acre/day.

So one must multiply the EF times acres/day to get emissions in lb/day.

Appendix D

Notice of Availability

FINAL

Appendix D

*Installation Development
Lackland Air Force Base, Texas*

APPENDIX D

NOTICE OF AVAILABILITY

December 1, 2006

FINAL

Appendix D

*Installation Development
Lackland Air Force Base, Texas*

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PUBLIC NOTICE

The United States Air Force Invites Public Comment Environmental Assessment for Installation Development at Lackland Air Force Base, Texas

The US Air Force has prepared a draft environmental assessment (EA) and proposed Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) for installation development at Lackland AFB, Texas.

The EA, prepared in accordance with the National Environmental Policy Act and Air Force instructions, evaluates potential impacts of the proposed action, alternative action, and no-action alternative on the environment. The EA evaluated: noise, land use, air quality, earth resources, water resources, hazardous materials and wastes, biological resources, utilities and infrastructure, and socioeconomics.

A copy of the EA, proposed FONSI, and FONPA will be maintained at the San Antonio Public Library, 600 Soledad, San Antonio, Texas, 78205.

Written comments may be submitted through November 28, 2006 and should be directed to Mr. John Wildie, 37 CES/CEV, 1555 Gott Street, Lackland AFB, Texas, 76236.

PRIVACY ADVISORY: Comments on this draft EA are requested. Letters or other public comment documents provided may be published in the final EA. Information provided will be used only to improve analysis of issues in the draft EA. Comments will be addressed in the final EA and made available to the public. However, only the name of the individual and specific comments will be disclosed.

FINAL

Appendix D

*Installation Development
Lackland Air Force Base, Texas*

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