FINAL

ENVIRONMENTAL ASSESSMENT FOR PHASE III INFRASTRUCTURE UPGRADE AND EXPANSION AT BUCKLEY AIR FORCE BASE

Colorado

November 2003

United States Air Force

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ACRONYMS

460 ABW	460th Air Base Wing
AADT	annual average daily traffic
AAFES	Army Air Force Exchange Service
ACM	asbestos containing materials
ADF	Aerospace Data Facility
AFB	Air Force Base
AFI	Air Force Instruction
AFSPC	Air Force Space Command
AGE	aerospace ground equipment
AGL	above ground level
ANG	Air National Guard
ANGB	Air National Guard Base
APEN	Air Pollution Emission Notice
AQCC	Air Quality Control Commission
AST	aboveground storage tank
BASH	Bird-Aircraft Strike Hazard
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAS	Central Accumulation Site
Ccf	hundred cubic feet
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CITS	Combat Information Transport System
CNHP	Colorado Natural Heritage Program
CO	carbon monoxide
COANG	Colorado Air National Guard
CWA	Clean Water Act
CZ	Clear Zone
DIA	Denver International Airport
DoD	U.S. Department of Defense
DRMO	Defense Reutilization and Marketing Office
E-470	Expressway 470
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EMO	Environmental Management Office
EO	Executive Order
ERP	Environmental Restoration Program
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
gpd	gallons per day
HAP	hazardous air pollutant
I	Interstate
IAP	initial accumulation point
ID	Identification
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
ITN	Information Transfer Node
kV	kilovolt
kWh	kilowatt-hours
L_{dn}	day-night average sound level
LOS	level of service
mgd	million gallons per day
MSA	Munitions Storage Area
MSGP	Multi-Sector General Permit
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGB	National Guard Bureau
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
OAQPS	Office of Air Quality Planning and Standards
Pb	lead
PCPI	per capita personal income
PM_{10}	particulate matter less than 10 microns in diameter
PMSA	Primary Metropolitan Statistical Area
POL	petroleum, oil, and lubricants
PSC	Public Service Company
QD	Quantity-Distance
R&D	Research and Development
RAQC	Denver's Regional Air Quality Council
RCRA	Resource Conservation and Recovery Act
RD	Requirements Document
ROG	Reactive Organic Gas
ROI	region of influence
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SWDA	Solid Waste Disposal Act
TPI	total personal income
tpy	tons per year
USACOE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VOC	volatile organic compound

FINDING OF NO SIGNIFICANT IMPACT
FOR PROPOSED INFRASTRUCTURE UPGRADE AND EXPANSION
AT BUCKLEY AIR FORCE BASE
COLORADO

AGENCY: United States Air Force (USAF), 460th Air Base Wing

1.0 BACKGROUND

Pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing the Act (40 Code of Federal Regulations [CFR] 1500-1508), Department of Defense Directive 6050.1, Regulation 5000.2-R, and Air Force Instruction 32-7061, The Environmental Impact Analysis Process as promulgated in 32 CFR Part 989, and other applicable federal regulations, the USAF conducted an assessment of the potential environmental consequences of the proposed action, an alternative to exclude optional components of the proposed action, and the No-Action Alternative at Buckley Air Force Base (AFB). The proposed action is to provide the USAF with an adequate and updated infrastructure system to support Buckley AFB mission objectives. The Environmental Assessment (EA) for Infrastructure Upgrade and Expansion, dated November 2003, is incorporated by reference.

2.0 PROPOSED ACTION

The proposed action addressed in this EA comprises the third phase out of four phases of a multi-year infrastructure upgrade and expansion program that was generated in response to the 1993 Facility Assessment.

3.0 FACTORS CONSIDERED IN DETERMINING THAT NO ENVIRONMENTAL IMPACT STATEMENT IS REQUIRED

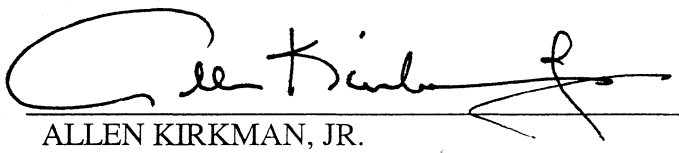
The EA analyzed the environmental impacts of alternatives to the proposed action taking into account all relevant environmental resource areas and conditions. The Air Force has examined the following resource areas and conditions and found that the proposed action and its alternatives would either have no, or inconsequential impacts to all resource areas.

4.0 PUBLIC NOTICE

NEPA, 40 CFR 1500-1508, and 32 CFR 989 require public review of the EA before approval of the Finding of No Significant Impact (FONSI) and implementation of the proposed action. The public review period ended on 4 November 2003 and comments were incorporated as part of the final EA.

5.0 FINDING OF NO SIGNIFICANT IMPACT

After careful review of the potential impacts of this proposed action and the alternative actions, including the No-Action Alternative, I have concluded that the action's implementation would not have a significant impact on the quality of the human or natural environment or generate significant controversy. A notice of availability for public review was published in the Denver Post on 5 October 2003 indicating a 30-day review period. A hard copy of the Draft EA and Draft FONSI was placed in the Denver and Aurora public libraries for dissemination. The signing of this FONSI fulfills the requirements of the NEPA and CEQ regulations.



18 DEC 2003

ALLEN KIRKMAN, JR.
Colonel, USAF
Commander, 460th Air Base Wing

Date

EXECUTIVE SUMMARY

This Environmental Assessment (EA) evaluates potential environmental and human resource impacts associated with the proposed infrastructure upgrade and expansion program at Buckley Air Force Base (AFB) in Arapahoe County, Colorado. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) Regulations on Implementing NEPA (40 Code of Federal Regulations [CFR] § 1500-1508), and Air Force Instruction (AFI) 32-7061, Environmental Impact Analysis Process.

The purpose of the infrastructure upgrade and expansion program is to meet the base's existing mission and facility requirements, and to support the recent establishment and mission of the 460th Air Base Wing (460 ABW). The need for the infrastructure upgrade and expansion program exists due to facility deficiencies or shortcomings caused by the expanding mission requirements of Buckley AFB. The proposed action consists of upgrades to the base's natural gas distribution system, electrical distribution systems, water and wastewater systems, and roadway and circulation system. Proposed construction projects include replacement of Building 39 with the construction of a new gas house and underground storage vault, and construction of a new road to improve traffic flow and safety conditions in the eastern portion of the base. All other proposed infrastructure improvements would occur primarily along existing utility alignments throughout the base. Ongoing routine maintenance of the entire base transportation network is also proposed. These projects would improve operational efficiency, utilities, and circulation safety. Two alternatives were considered during preparation of the EA, including: 1) exclude "optional" components of the proposed action; and 2) no action.

The findings of this EA indicate that implementation of the proposed action would not result in any significant impacts to the natural or human environment. Long-term, operational impacts associated with the proposed action have been determined to be either beneficial or insignificant for all resource areas investigated. The EA also includes an analysis of cumulative impacts of other actions proposed in the vicinity of the installation in the foreseeable future; based on this analysis, cumulative impacts are expected to be insignificant.

ENVIRONMENTAL ASSESSMENT
FOR INFRASTRUCTURE UPGRADE AND EXPANSION
AT
BUCKLEY AIR FORCE BASE

CONTENTS

CONTENTS
(continued)

CONTENTS
(continued)

CONTENTS
(continued)

CONTENTS
(continued)

APPENDICES

A AIR FORCE FORM 813
B PHOTOS
C IICEP CORRESPONDENCE
D NOTICE OF AVAILABILITY
E RESPONSE TO COMMENTS

LIST OF FIGURES

LIST OF TABLES

SECTION 1
OVERVIEW

1.1 INTRODUCTION

In 1993, a *Facility Assessment* was conducted at Buckley Air National Guard Base (ANGB) to identify, summarize, and consolidate findings regarding the physical status of facilities and infrastructure at the base. The assessment found several underground and overhead components of the base's infrastructure and utilities system to be undersized or in unacceptable states of disrepair. (In October 2000, Buckley ANGB was realigned and became an Air Force Base [AFB] under Air Force Space Command [AFSPC].)

The proposed action to be addressed in this Environmental Assessment (EA) comprises the third out of four phases of a multi-year infrastructure upgrade and expansion program that was originally generated in response to the 1993 *Facility Assessment*. In addition, the proposed action is also a response to expanding mission requirements of Buckley AFB. The first two phases have been implemented and comprised the following primary corrective measures:

- Phase I included the following: 1) widen Aspen Road from two to four lanes between the Main Gate and East Steamboat Avenue (construction would include a raised median); 2) upgrade sanitary sewer lines in the northwestern portion of the base; 3) upgrade natural gas distribution lines in the northwestern portion of the base; 4) upgrade potable water distribution lines in the northwestern portion of the base; 5) upgrade electrical distribution lines along Aspen Drive in the northwestern portion of the base; and 6) upgrade communication lines between the base's northern entrance and the intersection of Aspen Drive and East Crested Butte Avenue. Phase I was categorically excluded from detailed analysis under the National Environmental Policy Act (NEPA) of 1969.

- Phase II included the following: 1) upgrade of existing natural gas lines in the northwestern portion of the base; 2) removal and replacement of overhead electrical lines with buried infrastructure; 3) repair, upgrade, and replacement of existing, substandard sewer lines; 4) installation of new potable water distribution lines; 5) upgrade of existing and construction of new roadways; 6) upgrade of communication lines in the northwest portion of the base; and 7) construction of a new detention

pond and repair of existing subterranean stormwater drainage lines. An EA was prepared to address potential impacts of Phase II—a Finding of No Significant Impact (FONSI) was signed in 1999.

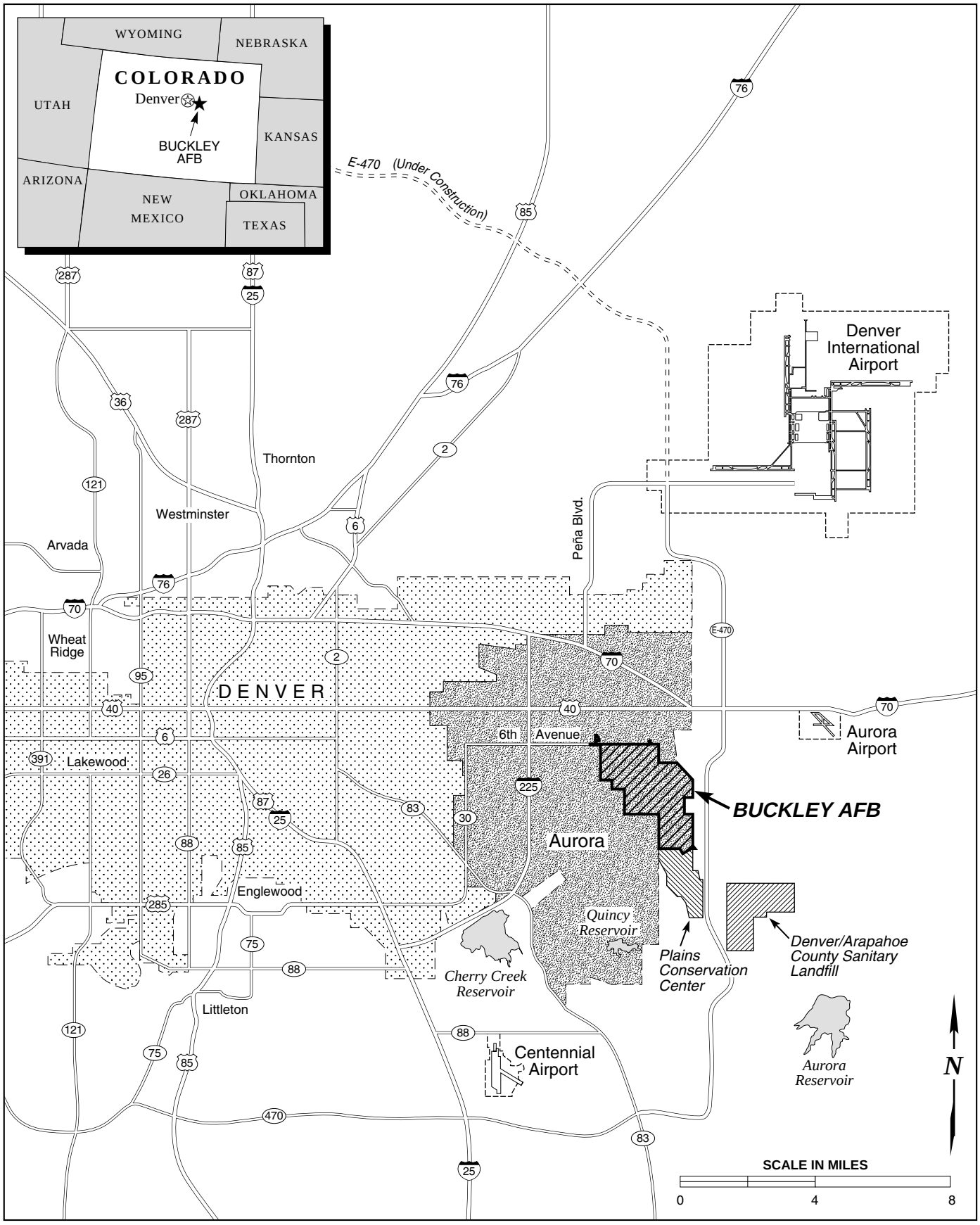
1.2 LOCATION

Buckley AFB is located in Arapahoe County, about 5 miles southeast of Denver, in central Colorado (Figure 1-1). Regional access to the base is provided by Interstate 25 (I-25), I-225, I-70, I-76, and Expressway 470 (E-470). Predominant land use activities in the area include high-density residential, commercial, and light industrial to the north and west of the base. The Plains Conservation Center, located south of the base, has been annexed to facilitate additional residential development (500 of the 1,600 acres remain under preservation). East of the base are several large undeveloped parcels, a small municipal airport (Aurora Airport), the Denver/Arapahoe County Sanitary Landfill, and smaller areas under various phases of residential expansion. The base comprises about 3,313 acres (Figure 1-2), approximately half of which have been disturbed or developed to support U.S. Air Force (USAF) missions.

1.3 PURPOSE AND NEED

Subsequent to the establishment of Buckley AFB under AFSPC in October 2000, the 460th Air Base Wing (460 ABW) was established at the base in October 2001. These changes resulted in increased personnel levels and facilities requirements at the base. The objective of this third phase of the infrastructure upgrade program at Buckley AFB is to provide reliable utilities and serviceable roads to support both existing and future facilities at Buckley AFB. The base requires an infrastructure system upgrade and expansion to bring primary roads, communication duct banks, and utilities up to current safety and functional standards.

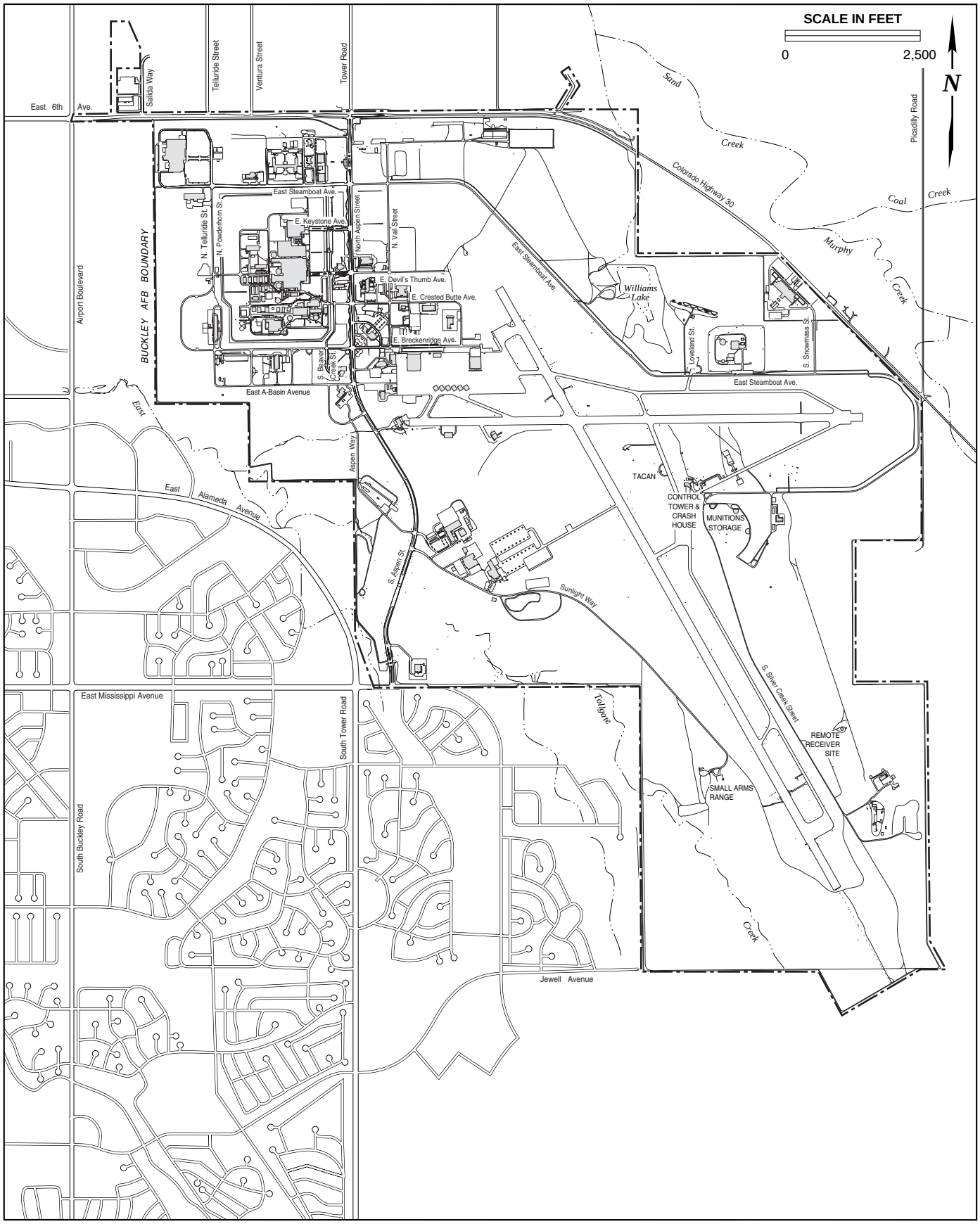
In general, the infrastructure system at Buckley AFB is old, deteriorating, and undersized. Consequently, it cannot adequately support current levels of activity, planned short- or long-term facility construction, advancing technology, or recently increased tenant loading.



EA

Location of Buckley AFB
Aurora, Colorado

1-1



EA	Buckley AFB	1-2

1.3.1 Natural Gas

Existing natural gas distribution lines—many of which have been in place at Buckley AFB since 1942 when the base was originally developed—were designed for a base with fewer tenants and a limited mission. Many of these lines are nearing the end of their design lifespan, leaking, and serving end users with a continually expanding demand for natural gas. The third phase of the infrastructure upgrade and expansion program would correct this problem by upgrading or replacing approximately 30,000 linear feet of existing lines throughout the base. In addition to improvements to the linear natural gas distribution system, the base has proposed to construct a new gas metering house—to replace Building 39—that would include installation of a new underground vault. The site for the proposed new gas house would be approximately 170 feet south of the existing Building 39. Further details on this project component are provided in Section 2.

1.3.2 Electrical

Improvements to the electrical distribution system have been proposed as part of the infrastructure upgrade program. The electrical system upgrades would fall into three general categories: 1) new underground lines, 2) existing underground lines to be replaced (underground), and 3) existing aboveground lines to be removed or replaced with underground lines. Most of the upgraded and expanded components would be implemented in the southern and eastern portions of the base. The specifics of this project component are provided in Section 2.

1.3.3 Sewerage

During the first two phases of the infrastructure upgrade program at Buckley AFB, most of the base's original sanitary sewer system was replaced or upgraded. (The original system was constructed more than 50 years ago using vitrified clay pipe—a brittle material prone to cracking.) The third phase of the upgrade program would complete necessary improvements to the sanitary sewer system by installing a new sewer collection line in the northwestern

portion of the base. Further details describing this project component are provided in Section 2.

1.3.4 Potable Water

The base's potable water distribution system currently experiences pressure and flow problems during periods of heavy usage. To correct these problems, the base has proposed to install new lines and upgrade components of the existing distribution system. Further details on this project component are included in Section 2.

1.3.5 Roadways

The transportation and circulation component of the third phase of the infrastructure upgrade program includes upgrades to South Aspen Street from just south of A-Basin Avenue to just north of the base's south entrance (Gate 7). To improve safety conditions, the base also proposes to establish a new asphalt-paved, two-lane road on the eastern side of the base that would reroute traffic away from the Munitions Storage Area (MSA). The base has also proposed smaller-scale improvements to A-Basin Avenue—from Telluride Street to Aspen Street—and the unpaved perimeter patrol road, which is rutted and deteriorated. Finally, ongoing routine maintenance of the entire base transportation network, including pothole maintenance, re-paving, and grading of the perimeter dirt road, has been proposed. These projects are described in further detail in Section 2.

1.3.6 Stormwater Drainage

No physical changes are currently proposed for the base's stormwater drainage system. Currently, a drainage study for the main industrial area is planned that would determine the adequacy of the existing system to accommodate current and anticipated demands. This study would also assess the need for construction of new—or expansion of existing—detention ponds. The conduct of this study would not have the potential to impact the human or natural environment on or around Buckley AFB; therefore, it would not be assessed in the EA.

1.4 SUMMARY OF ENVIRONMENTAL STUDY REQUIREMENTS

The Environmental Impact Analysis Process (EIAP) is the process by which federal agencies facilitate compliance with environmental regulations. The primary legislation affecting these agencies' decision-making process is NEPA. This act and other facets of the EIAP are described below.

1.4.1 National Environmental Policy Act

NEPA requires that federal agencies consider potential environmental consequences of proposed actions in their decision-making process. The law's intent is to protect, restore, or enhance the environment through well-informed federal decisions. The Council on Environmental Quality (CEQ) was established under NEPA for the purpose of implementing and overseeing federal policies as they relate to this process. In 1978, the CEQ issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] §1500-1508 [CEQ 1978]). These regulations specify that an EA be prepared to:

- briefly provide sufficient analysis and evidence for determining whether or not to prepare an Environmental Impact Statement (EIS) or a FONSI;
- aid in an agency's compliance with NEPA when an EIS is deemed unnecessary; and
- facilitate EIS preparation when one is necessary.

Further, to comply with other relevant environmental requirements (e.g., the Safe Drinking Water Act, Endangered Species Act, and National Historic Preservation Act) in addition to NEPA, and to assess potential environmental impacts, the EIAP and, subsequently, the decision-making process for the proposed action involves a thorough examination of all environmental issues pertinent to this action proposed at Buckley AFB.

While this EA provides information with which to make better decisions about the proposed and alternative actions, it does not infer project approval or authorization, which is obtained by the 460 ABW Facilities Board.

1.4.2 Interagency and Intergovernmental Coordination for Environmental Planning

NEPA and CEQ regulations require intergovernmental notifications prior to making any statement of potential environmental impacts. Through the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process, the USAF notifies relevant federal, state, and local agencies and allows them sufficient time to make known their environmental concerns specific to the proposed action. Comments and concerns submitted by these entities during the IICEP process would be incorporated into the analysis of potential environmental impacts conducted as part of the EA.

SECTION 2
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

To correct identified deficiencies and to ensure that sufficient systems are in place to support base missions at Buckley Air Force Base (AFB), the U.S. Air Force (USAF) proposed a four-phase infrastructure upgrade and expansion project. The current proposed action at Buckley AFB comprises the third phase of a multi-year infrastructure upgrade and expansion program developed in response to findings of the 1993 *Facility Assessment* summarized in Section 1. The first and second phases of this program have already been implemented and environmental analyses required for those actions have been completed. This third phase of the infrastructure upgrade program would complete several remaining infrastructure needs relevant to the base's existing mission and facilities requirements.

In general, the proposed action includes the following primary components:

- Upgrades to the base's natural gas distribution system, including construction of a new gas vault, a new service line extending to the east side of the base, and replacement of lateral extensions to multiple facilities.

- Upgrade and expansion of the electrical distribution and communications duct banks, including upgrade of the electrical distribution loop, replacement of distribution lines under an active runway, and placement underground of remaining aboveground line.

- Installation of a new sewer collection line in the northwestern portion of the base.

- Upgrades to the base water system, including establishment of new water mains. (The base also requires that computer-generated models of the base's water distribution system be generated.)

- Roadway upgrades and construction, including the completion of a new median along Aspen Street, a new road on the east side of the base, upgrades to A-Basin Avenue and the base perimeter patrol road,

and ongoing routine maintenance of the entire base transportation network.

This third phase of the base's infrastructure upgrade program would also accommodate increased numbers of personnel and facilities associated with establishment of the 460th Air Base Wing (460 ABW) at Buckley AFB.

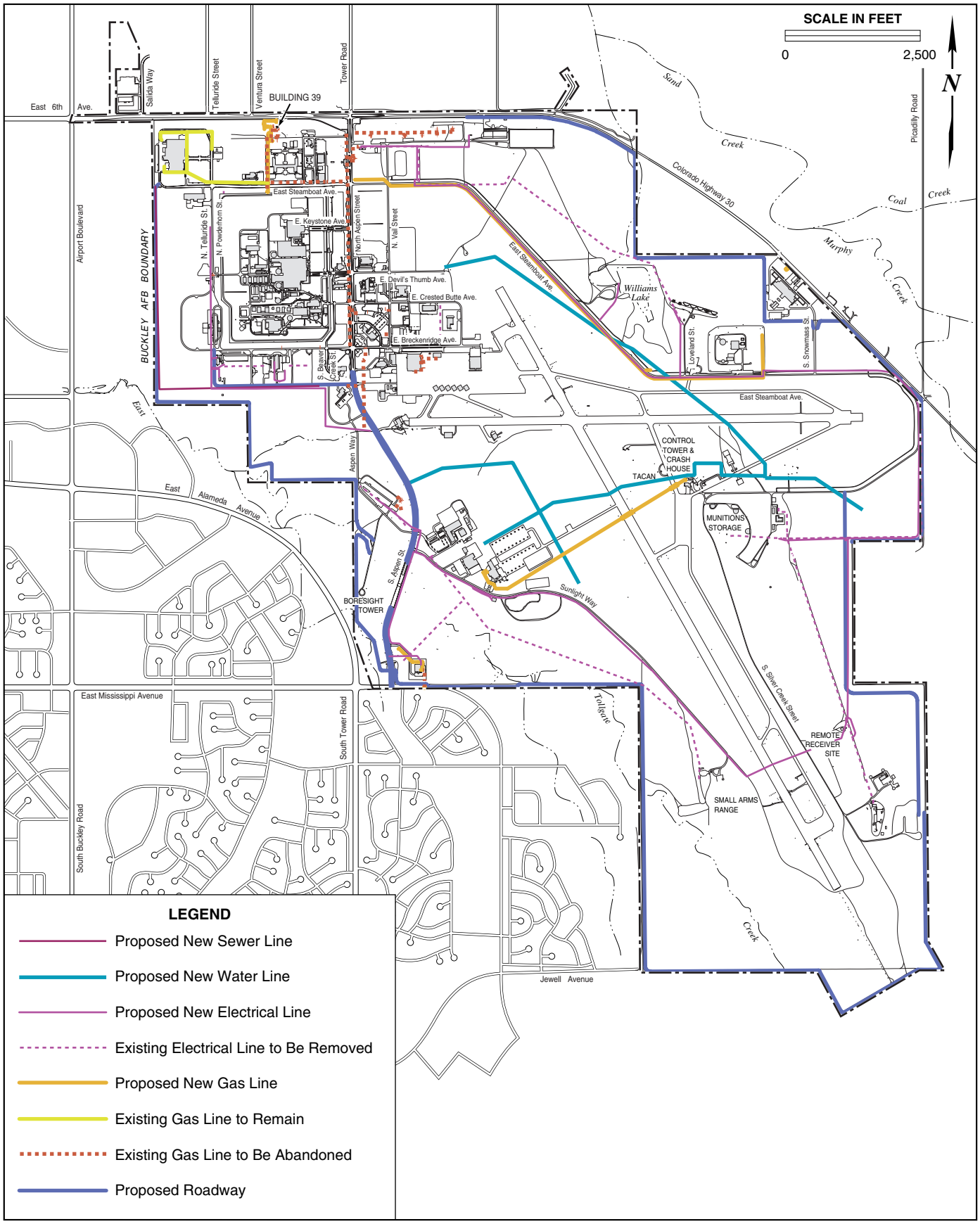
Implementation of the proposed action would bring existing operating systems and utilities up to current standards and in conformance with existing codes, reduce health and safety hazards, and provide utility extensions and sufficient capacities to accommodate current loading and to service areas of ongoing and future growth. Further, by consolidating construction and installation activities (i.e., improvements to the road network would coincide with placement and replacement of underground utilities within road easements), the need for future road work and associated traffic disruption and adverse environmental impacts would be minimized.

2.2 PROPOSED ACTION

The proposed upgrade and expansion of infrastructure at Buckley AFB would occur primarily along existing utility alignments throughout the base. In many cases, the alignments proposed for upgrade or expansion coincide, thereby enabling the upgrade or expansion of multiple utilities simultaneously. For example, proposed electrical and potable water distribution lines would occur within nearly identical alignments in many areas; therefore, upgrade and expansion of these systems could be implemented concurrently, reducing potential environmental effects, construction duration, and project costs. A summary of all proposed infrastructure and roadway components is represented in Figure 2-1.

2.2.1 Natural Gas Distribution System

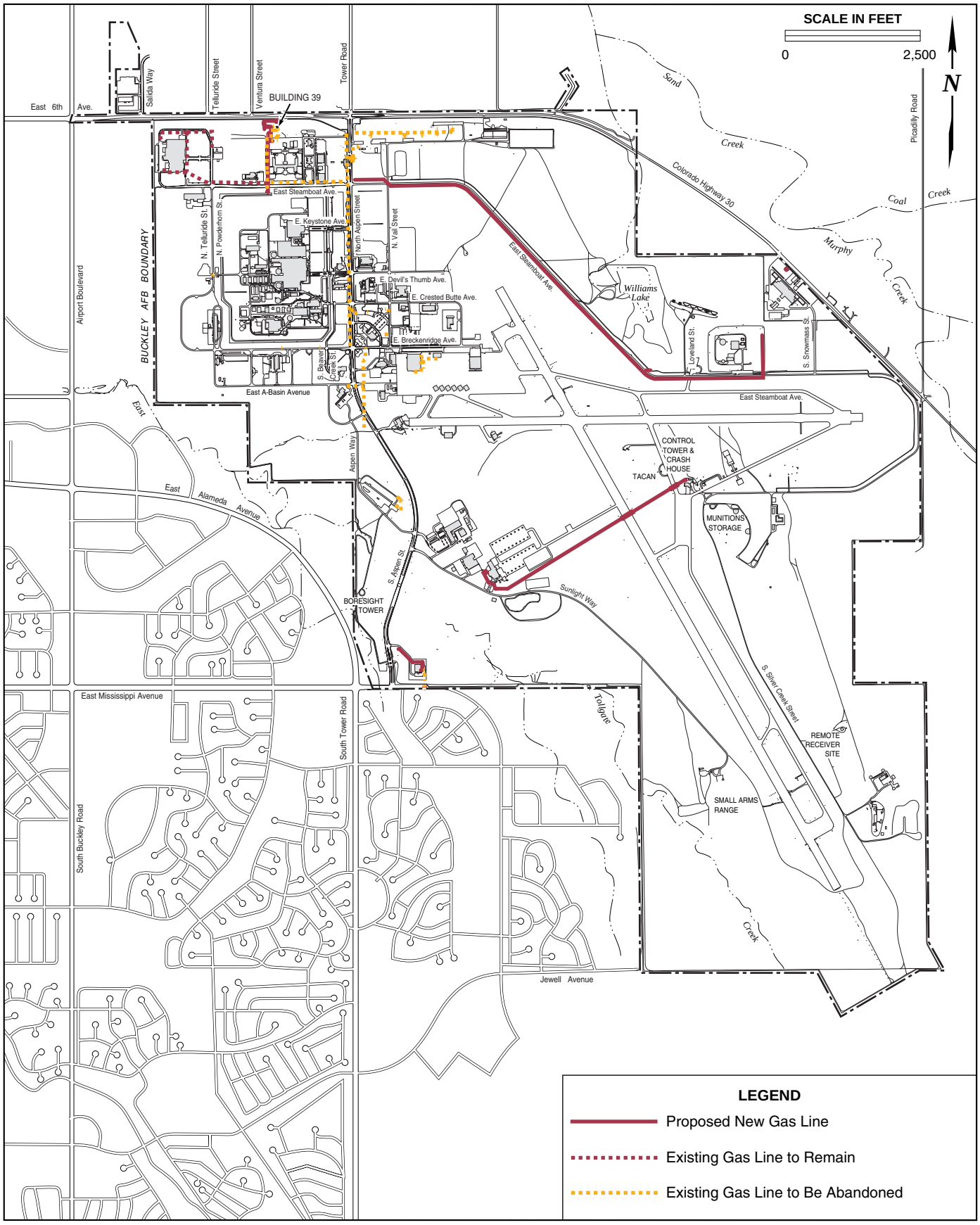
The USAF proposes to upgrade the natural gas distribution system at Buckley AFB, affecting approximately 30,000 linear feet of service and distribution lines (Figure 2-2). This project component also calls for construction of a new gas metering house and underground vault that would replace Building 39. Other



EA

Proposed Project Components at Buckley AFB

2-1



EA

Proposed Natural Gas Distribution Line Upgrades at Buckley AFB

2-2

details of the proposed improvements to the natural gas distribution system include the following:

- Installation of a new natural gas line extension to the campground located in the northern portion of the base.
- Installation of a new gas line that would serve the entire eastern section of the base—this line would be connected to the eastern Public Service Company (PSC) line.
- Abandonment of the southeast gas line that currently connects to the PSC line.
- Completion of the natural gas distribution loop to the Aerospace Data Facility (ADF) area.
- Replacement of lateral extensions in six locations—each extension serves multiple buildings.
- Consolidation of multiple metering locations to two primary meters—one for the base's gas main and one for the ADF's gas main.

2.2.2 Electrical Distribution System

The electrical distribution system upgrades associated with the proposed action fall into three general categories: 1) new underground lines, 2) existing underground lines to be replaced (underground), and 3) existing aboveground lines to be removed or replaced with underground lines.

New underground lines would be established in three primary areas: along Sunlight Way and adjacent to the boundary in the west-southwest portion of the base; along East Steamboat Avenue and part of the eastern perimeter road; and along North Telluride Street and East A-Basin Avenue. A new underground line would also follow South Aspen Street and would be aboveground and attached to the bridge where it crosses the floodplain (Appendix B, P-11). Existing underground lines that would be rerun or replaced with new lines are located in the southern portion of the base, and would run under the runway and future high-speed taxiway. Aboveground lines that would be removed are located in several areas throughout the base. The total length of subterranean electrical distribution lines that would be installed under implementation of the proposed

action would be approximately 25,000 linear feet. Proposed upgrades to the base's electrical distribution system are depicted in Figure 2-3.

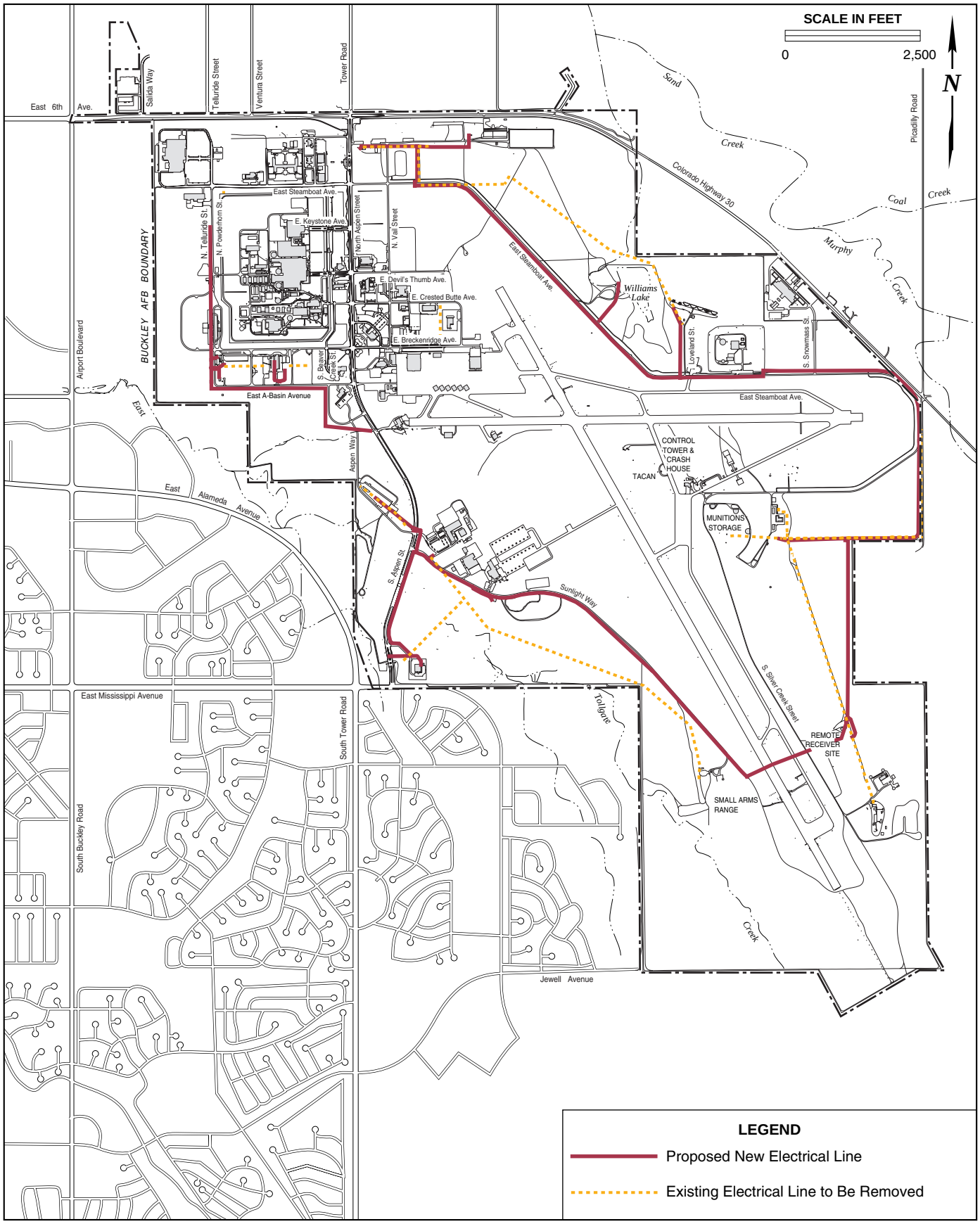
2.2.3 Sewerage

As mentioned previously, most of the base's original sanitary sewer system was replaced or enhanced during the first two phases of the infrastructure upgrade program. (The original system had been constructed more than 50 years ago using vitrified clay pipe.) This third phase of the upgrade program would complete necessary improvements by installing a new sewer collection line in the northwestern portion of the base. This new line would be connected at MH 11, just west of the intersection of North Telluride Street and Steamboat Avenue. The new system would run approximately 6,400 linear feet—first southward 3,600 then eastward 2,800 feet—and the alignment would correspond roughly with the base's boundary fence and then along East A-Basin Avenue (Figure 2-4).

2.2.4 Potable Water

The potable water distribution system at Buckley AFB has undergone several changes over time in an effort to accommodate changing mission requirements and personnel levels. Consequently, it has been proposed that the water distribution system throughout the base be modeled hydraulically in an effort to identify problem areas and to determine appropriate sizing requirements for new lines. In the meantime, several water distribution system issues have been identified and corrective measures are proposed as follows:

- Currently, the most severe pressure and flow problems occur at the Munitions Storage Area (MSA). A new 12-inch loop would be added to the existing distribution system, and run east of the Control Tower and Crash House, then northwest under the runway and connect near East Devil's Thumb Avenue.
- The petroleum, oil, and lubricants (POL) facilities would be relocated due to currently being located in a non-compatible land use area (administration, community services, housing) versus an industrial area, and would require additional fire protection capabilities around the facilities. A new 12-inch line would be installed, connecting to an existing 12-inch line, crossing the runway and ultimately joining an 8-inch supply line on Aspen Street.



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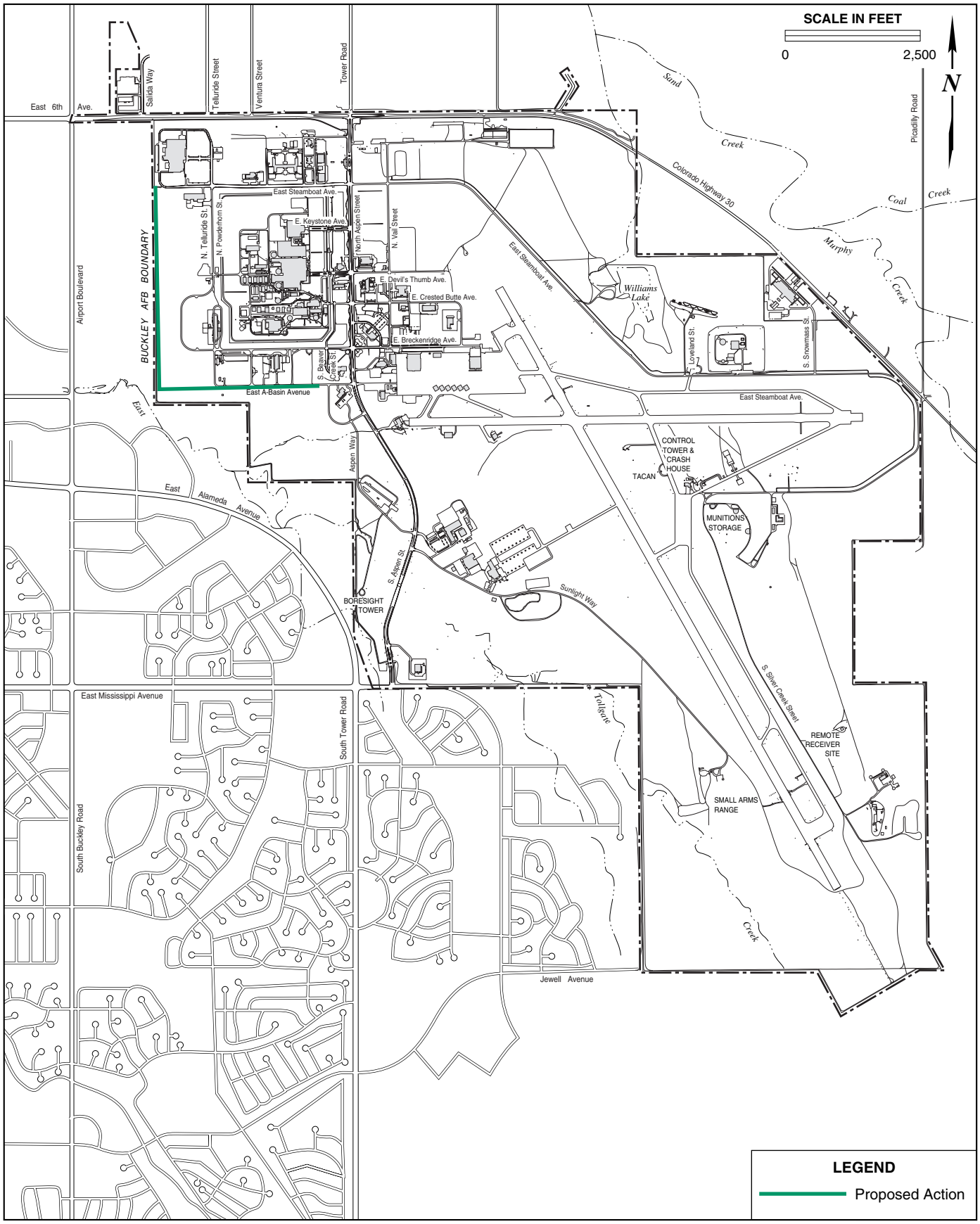
Proposed Electrical Distribution Line Upgrades at Buckley AFB

2-3



EA

Proposed New Sanitary Sewer Line at Buckley AFB

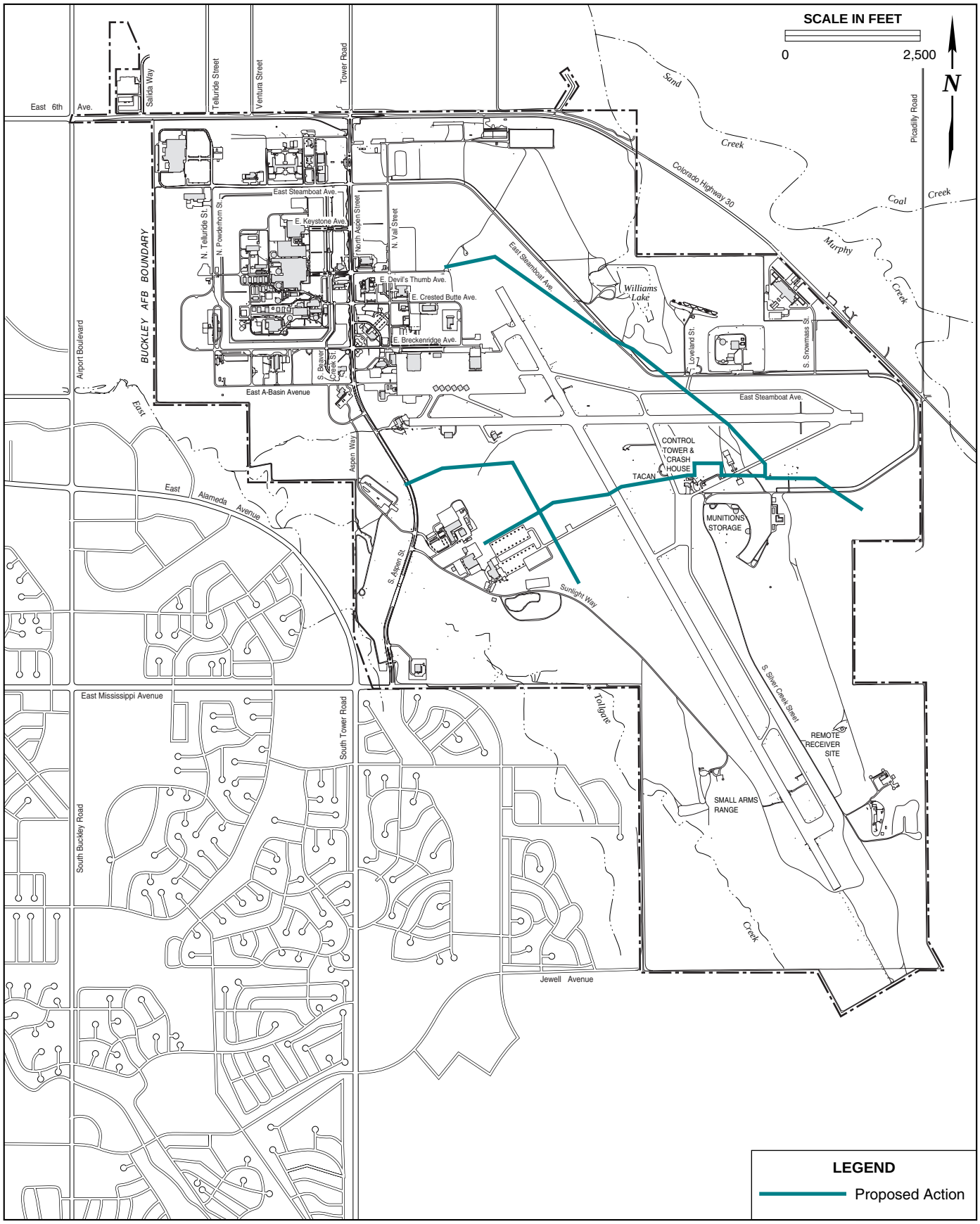
2-4

Once computer modeling of the basewide water distribution system has been accomplished, additional projects may be proposed; however, the actions described above and depicted in Figure 2-5 would remedy the most problematic issue areas currently identified.

2.2.5 Roadways

There are five primary components of the roadway improvements proposed at Buckley AFB, shown in Figure 2-6 and summarized below:

- *Upgrades to South Aspen Street*. A segment of South Aspen Street between the base's south entrance (Gate 7) and A-Basin Avenue requires median improvements, establishment of inside lanes, and installation of curbs and/or gutters (Appendix B, P-6). The new lanes and median features would match the existing roadway design of areas upgraded in previous phases of the infrastructure upgrade program. All upgrades to South Aspen Street would occur outside the floodplain.
- *Construction of a new road*. To improve traffic flow and safety conditions in the eastern portion of the base, it is proposed that a new asphalt-paved, two-lane road be established that would reroute traffic away from the MSA and provide direct access to the U.S. Marines complex. The proposed alignment would mostly follow the existing perimeter road east of the MSA, then run south to a terminus in a cul-de-sac near the existing rock crusher area east of the Marines complex.
- *Improvements to A-Basin Avenue*. It is proposed that the segment of A-Basin Avenue between Telluride Street and Aspen Street be widened and reconfigured to include curbs and gutters.
- *Upgrades to the Perimeter Patrol Road*. The unpaved perimeter patrol road along the base's perimeter fence is severely rutted and deteriorated. It is proposed that the road be re-graded and covered with a new aggregate surface (Appendix B, P-34, 36).
- *Routine Maintenance*. It is proposed that ongoing routine maintenance of the entire base transportation network, including pothole maintenance, re-paving, and grading of the perimeter road, occur as needed.



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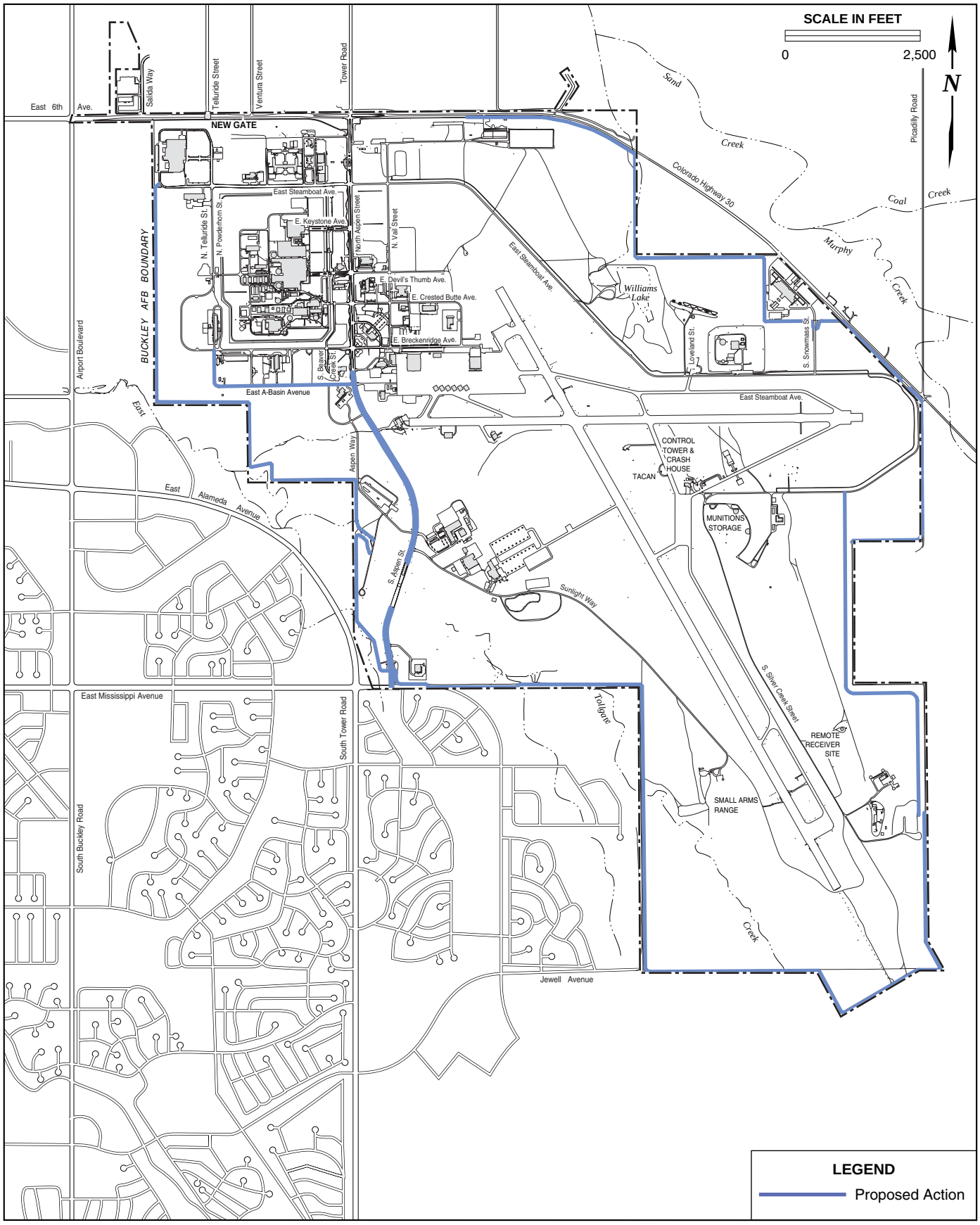
Proposed Potable Water Distribution Line Improvements at Buckley AFB

2-5



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Proposed Roadway Improvements at Buckley AFB

2-6

2.3 ALTERNATIVES

Considering the infrastructure upgrade program was developed over several years and that the program's third phase presented herein represents the findings of a Requirements Document (RD) prepared by the base, the locations and alignments of infrastructure changes comprise what would be the environmentally and functionally superior set of upgrades. However, to enable comparison with other scenarios and to comply with NEPA requirements, alternatives to the proposed action would be presented.

2.3.1 Alternative 1: Exclude "Optional" Components of the Proposed Action

As the RD was being developed, certain aspects of the infrastructure upgrade program were identified as "priority" items while others were deemed "optional." It is likely that the cumulative environmental impact of the overall program would not greatly differ from the impact of implementing one of the two subsets; however, one alternative to the proposed action would be to select only the "priority" components of the upgrade program. If this alternative were selected, the following items would *not* be implemented:

- Improvements to A-Basin Avenue—lack of curbs and gutters would remain.
- Upgrades of the perimeter patrol road—existing deteriorated conditions would remain.
- Rebuilding of the underground electrical distribution line running under the active runway—would leave the eastern portion of the base with substandard electrical service.
- Placement of the remainder of the electrical distribution system underground—would not accomplish long-term goal of having all utilities placed in subterranean alignments.
- Drainage study for the future industrial area—no impact beyond lack of planning documentation.

Selection of this alternative would remedy the most serious shortcomings of the base's existing infrastructure system but would leave longer-term problems unsolved. Further, optional components would likely become priority issues within a few years and to delay their implementation would likely result in

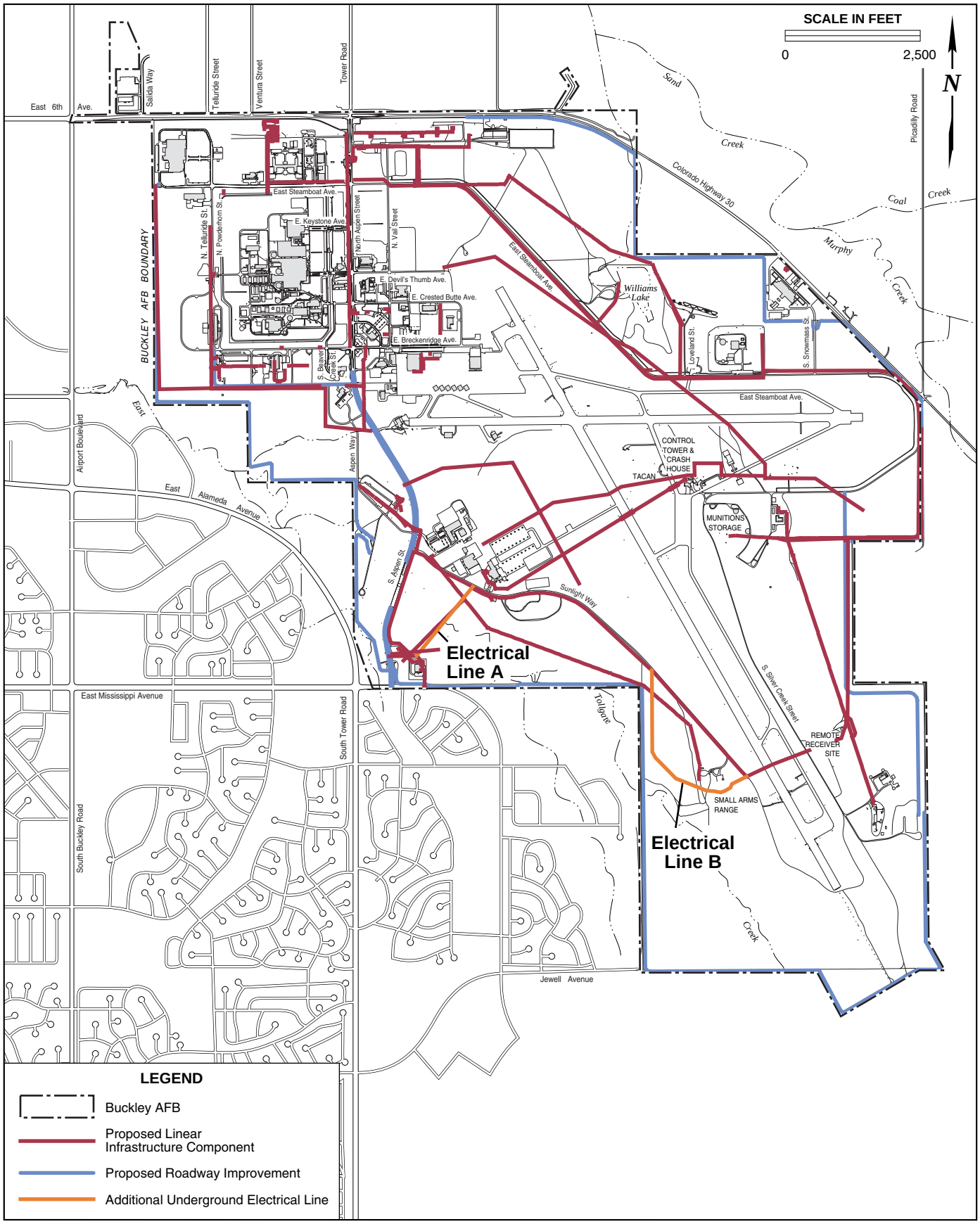
increased environmental impacts, additional costs, and unnecessary disruption of infrastructure services at the base.

2.3.2 Alternative 2: No Action

Selection of the No-Action Alternative would result in the proliferation of safety hazards, increased operations and maintenance requirements, and inadequate provision of utilities and infrastructure support at Buckley AFB. Current systems are dilapidated and do not meet safety standards or system demands and failure to repair and upgrade utilities and infrastructure systems at the base would leave deficiencies uncorrected. Nevertheless, per Council on Environmental Quality (CEQ) requirements, the No-Action Alternative would be carried forward for further analysis in the EA.

2.3.3 Alternative Considered and Eliminated

As the proposed infrastructure upgrades were being planned, alternative routes for underground electrical lines were considered. One of the underground electrical routes considered would have run southwest from Sunlight Way towards the Mississippi Gate (Line A), the second line considered (Line B) would have run south from Sunlight Way and loop east through the small arms range. If implemented, Line A would cross a floodplain and Environmental Restoration Program (ERP) site (Appendix B, P-3) and Line B would border the floodplain and go through a small arms range (Appendix B, P-21); thereby creating potential impacts to specific resource areas (i.e., Water Resources, Hazardous Materials, and Land Use). These issues were recognized during earlier phases of the planning process, subsequently these alternative electrical routes were eliminated from consideration.


SCALE IN FEET
0
2,500
N
East 6th Ave.
Salida Way
Telluride Street
Ventura Street
Tower Road
Sand Creek
Colorado Highway 30
Picadilly Road
Coal Creek
Murphy Creek
BUCKLEY AFB BOUNDARY
East Steamboat Ave.
N. Telluride St.
N. Powderhorn St.
E. Keystone Ave.
North Aspen Street
N. Vail Street
E. Devil's Thumb Ave.
E. Crested Butte Ave.
E. Breckenridge Ave.
S. Beaver Creek St.
Williams Lake
Loveland St.
S. Shoshone St.
East Steamboat Ave.
East Airport Boulevard
Aspen Way
CONTROL TOWER & CRASH HOUSE
TACAN
MUNITIONS STORAGE
East Alameda Avenue
S. Aspen St.
Sunlight Way
Electrical Line A
East Mississippi Avenue
South Tower Road
Tollgate
S. Silver Creek Street
REMOTE RECEIVER SITE
SMALL ARMS RANGE
Electrical Line B
South Buckley Road
Jewell Avenue
LEGEND
Buckley AFB
Proposed Linear Infrastructure Component
Proposed Roadway Improvement
Additional Underground Electrical Line

SECTION 3
AFFECTED ENVIRONMENT

This section describes relevant existing environmental conditions for resources potentially affected by the proposed action. In compliance with guidelines contained in the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and Code of Federal Regulations (CFR) (32 CFR § 989), the description of the affected environment focuses on only those resources potentially subject to impacts.

Resource descriptions focus on the following areas: utilities, transportation and circulation, geology and soils, water resources, land use, socioeconomics and environmental justice, cultural resources, visual resources, air quality, hazardous materials and hazardous wastes, biological resources, and safety.

3.1 UTILITIES

3.1.1 Definition of Resource

In any given community, a variety of basic services are provided by public and private entities for the purpose of providing necessary functions and enhancing the quality of life. Existing utilities provided at Buckley Air Force Base (AFB), including natural gas, wastewater, potable water, solid waste disposal, and electricity, are described in this section.

3.1.2 Existing Conditions

The region of influence (ROI) for utilities is limited to Buckley AFB and the City of Aurora.

3.1.2.1 Buckley AFB

Gas and Electricity

Natural gas is currently provided to Buckley AFB by Xcel Energy of Colorado. The regional natural gas system has a capacity of 130 billion cubic feet.

Distribution lines associated with the natural gas system at the base were put in place in 1942. Total gas usage for 2002 was 1,344,167 hundred cubic feet (Ccf). The existing distribution system, which provides natural gas through a gas main beneath 6th Avenue, currently does not serve areas proposed for future development.

Electricity is also provided to Buckley AFB by Xcel Energy. The Xcel Energy East Substation, located at the intersection of Colfax Avenue and I-225, provides electrical power to Buckley AFB through 13.2 kilovolt (kV) overhead distribution lines. In 2002, the facilities at Buckley AFB used 98,952,436 kilowatt-hours (kWh) of electricity (Buckley AFB 2003b).

Similar to the natural gas distribution system, the electrical distribution system at the base is outdated, brittle, deteriorating, does not adequately serve existing facilities (e.g., lighting for parking areas), and requires updating to satisfy modern safety regulations.

Wastewater

Buckley AFB generates both industrial and domestic wastewater. The industrial wastewater consists of water from oil/water separators and does not require pre-treatment. The base has a wastewater permit that is issued by the Metro Wastewater Reclamation District. The most recently reported wastewater emissions for Buckley AFB were 3.56 million gallons of wastewater discharge per month during the winter, spring, and fall, and 9.8 million gallons of wastewater discharge per month in the summer (Buckley AFB 2003b). Buckley AFB reported an average daily flow of 150,000 gallons per day, and an average maximum daily flow of approximately 338,000 gallons per day for the year 2002 (Buckley AFB 2003b). The Metro Wastewater Region treatment plant was designed to meet regional population estimates through 2010, with a hydraulic capacity of 185 million gallons per day (mgd).

Domestic sewer service at Buckley AFB is provided primarily by Metro Wastewater Reclamation District; however, some of the base's wastewater is still handled by a series of septic tanks. Most of the City's sewer system—including the portion servicing the base—was constructed of vitrified clay pipe more than

50 years ago. Most of the system was replaced or enhanced during the first two phases of the base's infrastructure upgrade program.

Potable Water

Potable water is supplied to the base by a system originally built, maintained, and operated by the City of Aurora. Buckley AFB maintains and operates this system on base. Portions of the distribution system were upgraded in the 1980s; however, certain segments remain undersized and are inadequate to accommodate current demand. Buckley AFB has requested a new 8-inch meter from the City since the current meter is at capacity. Buckley AFB has a total annual capacity of 128,060,000 gallons of potable water. The base used approximately 102,448,000 gallons in 2002 (Buckley AFB 2003b).

The City of Aurora is currently recovering from a Stage II drought; therefore, water allocations from the City would increase in fall of 2003. Buckley AFB was allocated 8.3 million gallons of water per month during of May and June of 2003, and 12.4 million gallons of water per month for July, August, and September. Allocations from the City would increase to approximately 16 million gallons of water per month in October 2003 (City of Aurora Utilities Department 2003).

Solid Waste

Solid waste collection and disposal services at Buckley AFB are handled by a private contractor. Waste is collected in dumpsters located throughout the base and routinely transported to the Denver-Arapahoe Disposal Site in Arapahoe County. The permitted portion of the landfill occupies 2,680 acres with an estimated design life of 40 to 50 years (COANG 1998).

Communications

Prior to the transfer of host responsibilities to Air Force Space Command (AFSPC) in October 2000, a telephone switch upgrade and "Buckley 2000" project to upgrade the base infrastructure was already being implemented by the Colorado Air National Guard's (COANG's) 140th Wing. A new Lucent (AVAYA) telephone switch was operational in December 2000, capable of

accommodating 5,000 lines, of which approximately 3,800 are currently in use. The "Buckley 2000" project also put new conduit runs in the main base area. The Air Force is currently supplementing this effort with a Combat Information Transport System (CITS) project that would complete the infrastructure at Buckley AFB and add redundancy and diversity to all Information Transfer Nodes (ITNs). Buckley AFB would have ATM, SONET and Gigabit ethernet paths to support both personnel and mission traffic. This project is scheduled for completion in March 2003 (Buckley AFB 2002h).

3.2 TRANSPORTATION AND CIRCULATION

The ROI for transportation and circulation includes Buckley AFB's circulation network and roads surrounding the base, which could be affected by base traffic.

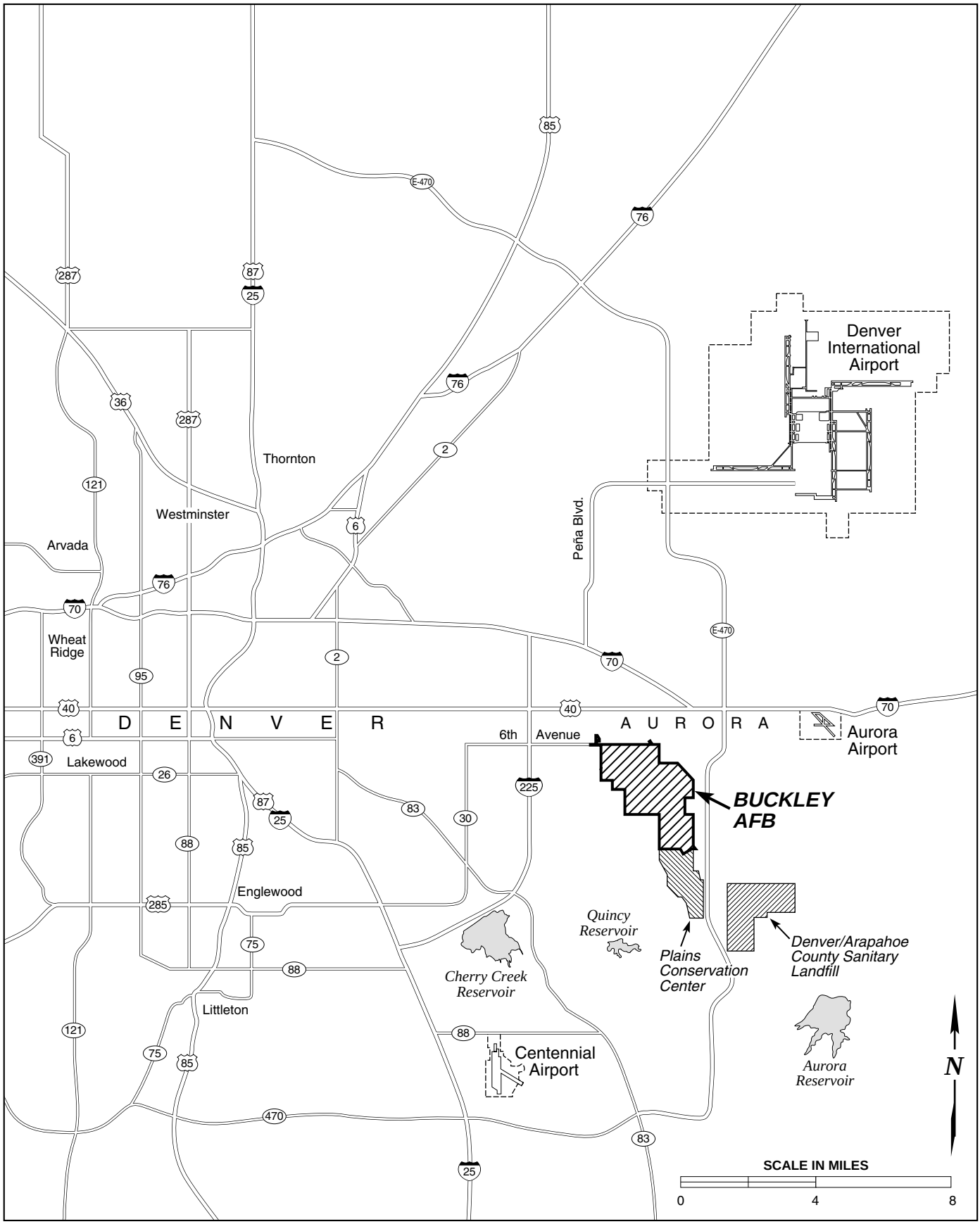
3.2.1 Definition of Resource

Transportation and circulation refer to the movement of vehicles throughout a road and highway network. *Primary* roads are principal arterials, such as major interstates, designed to move traffic but not necessarily to provide access to all adjacent areas. *Secondary* roads are arterials such as rural routes and major surface streets, which provide access to residential and commercial areas, hospitals, and schools.

3.2.2 Existing Conditions

3.2.2.1 Regional and Local Circulation

Regional access to Buckley AFB is provided by Interstate 25 (I-25), I-225, I-70, and Expressway 470 (E-470) (Figure 3-1). Located about 12 miles west of the base, I-25 facilitates travel from north and south of Denver and links to I-225 which runs north-south through the City of Aurora, about 3 miles west of Buckley AFB. I-225 provides access to the two base entries via 6th Avenue, East Alameda Avenue, and Mississippi Avenue. I-70 runs east-west, providing access to Buckley AFB from the north. E-470 runs north-south near the eastern boundary of the base. Since the completion of the E-470 and Jewell Avenue Extension projects, the base has major highways on both its east and west sides with access



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Regional Transportation Network

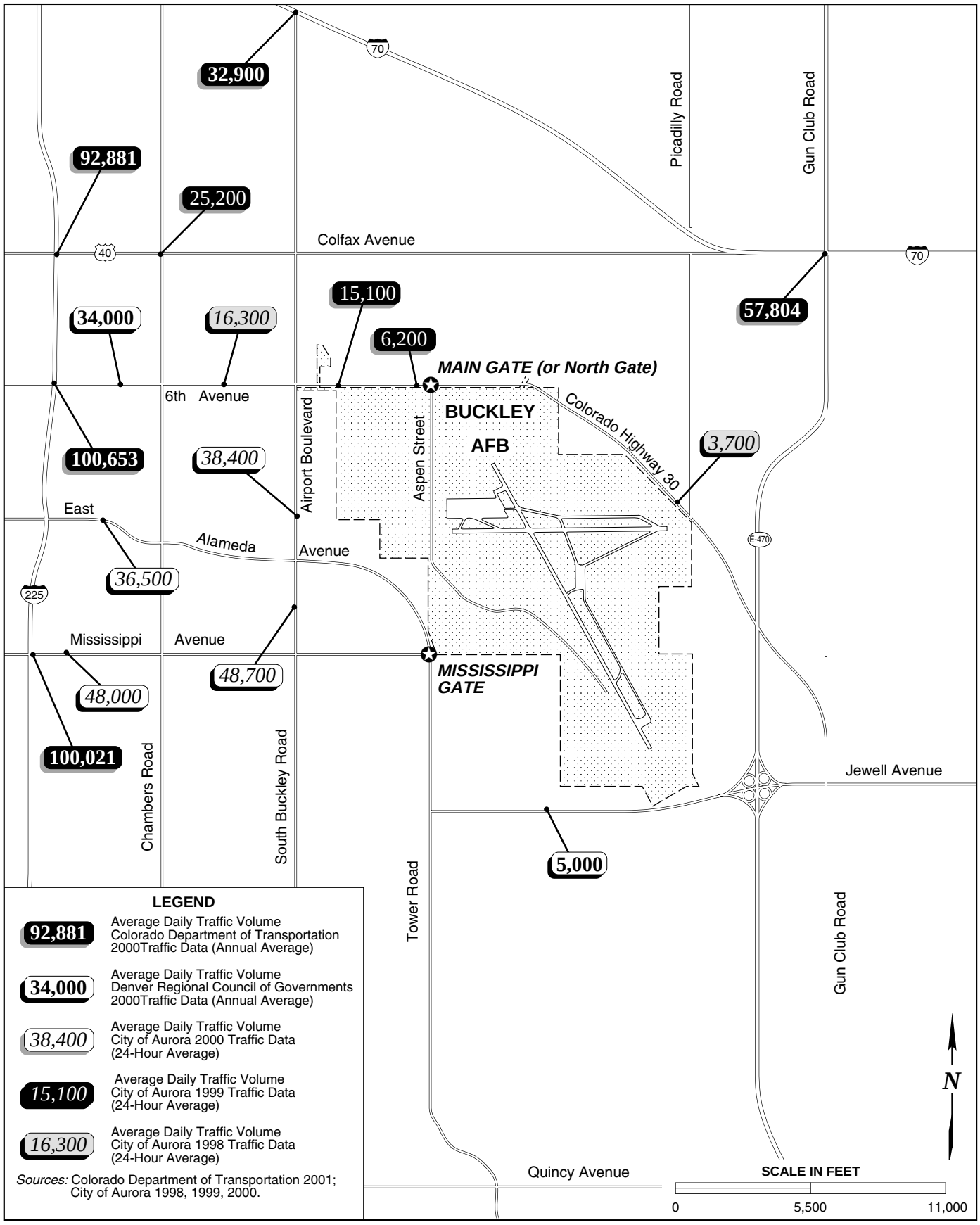
3-1

to both the north and south gates. In addition, the two-lane Jewell Avenue Extension has provided more access to the development occurring on the southeast and northeast corners of Tower Road and Iliff Avenue (Denver Regional Council of Governments 2002).

Primary access to the base is provided by the North Gate entry at 6th Avenue. From west to east, 6th Avenue comprises six lanes at I-225, four lanes at Airport Boulevard, and two lanes east of Airport Boulevard. Annual average daily traffic (AADT) volume on 6th Avenue near the entrance to the base is 15,100 (Figure 3-2). AADT on I-225 where it intersects with 6th Avenue was 100,653 vehicles in 2000; traffic at this intersection is projected to increase by 40 percent within 20 years (Colorado Department of Transportation 1997). Signalized intersections directly impacted by base traffic include Airport Boulevard at 6th Avenue, Aspen Street at 6th Avenue, and East Alameda Avenue at Mississippi Avenue where the south gate entrance to Buckley AFB is located.

A traffic study conducted at Buckley AFB (Colorado Air National Guard [COANG] 1997a) evaluated existing and projected traffic conditions on the base. The study evaluated the relationship between a street's traffic volume and its capacity; these data determined the street's level of service (LOS), a measure of motorist delay, discomfort, and irritation associated with traffic congestion. LOS rankings assigned to roads and intersections range from "A" (indicating free flow) to "F" (indicating forced flow). At the time of the traffic study, the Airport Boulevard/6th Avenue intersection operated at LOS E during weekday morning and evening traffic peaks, primarily due to high volumes of through traffic on 6th Avenue. During other times, the intersection operated at an acceptable LOS. The intersection at East Alameda Parkway and East Mississippi Avenue operated at LOS B for all peak hours (COANG 1997a).

Future transportation projects in the region include widening and extending 6th Avenue to an existing interchange with E-470 and extending Tower Road north to Colfax Avenue (Denver Regional Council of Governments 2002).



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Average Daily Traffic Volumes in the Vicinity of Buckley AFB

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3.2.2.2 Buckley AFB

In the past, primary access to the base was provided by the Main (North) Gate at 6th Avenue and North Aspen Street. According to a gate design and traffic study conducted in January 2003, peak traffic volumes are similar at North Gate and Mississippi Gate. North Gate processes about 46 percent of the morning peak hour traffic (Buckley AFB 2003a). The City has installed a traffic signal at the intersection of 6th Avenue and North Aspen Street intersection to improve on- and off-base traffic flow. To alleviate off-base traffic disruptions and congestion, a Visitor Pass and Identification (ID) Center was constructed adjacent to the North Gate in 2000.

Mississippi Gate (South Gate) is located at the intersection of South Aspen Street and East Mississippi Avenue, which is open daily during normal duty hours, and is the commercial vehicle entrance where all deliveries, waste removal trips, etc. are made. This gate has experienced increased traffic in recent years, currently processing approximately 54 percent of the morning peak hour inbound traffic (Buckley AFB 2003a). Access efficiency through this gate is limited not only by restricted hours of operation but also by the narrow, two-lane South Aspen Street; and distance between the gate and the base Cantonment Area (see Figure 3-3).

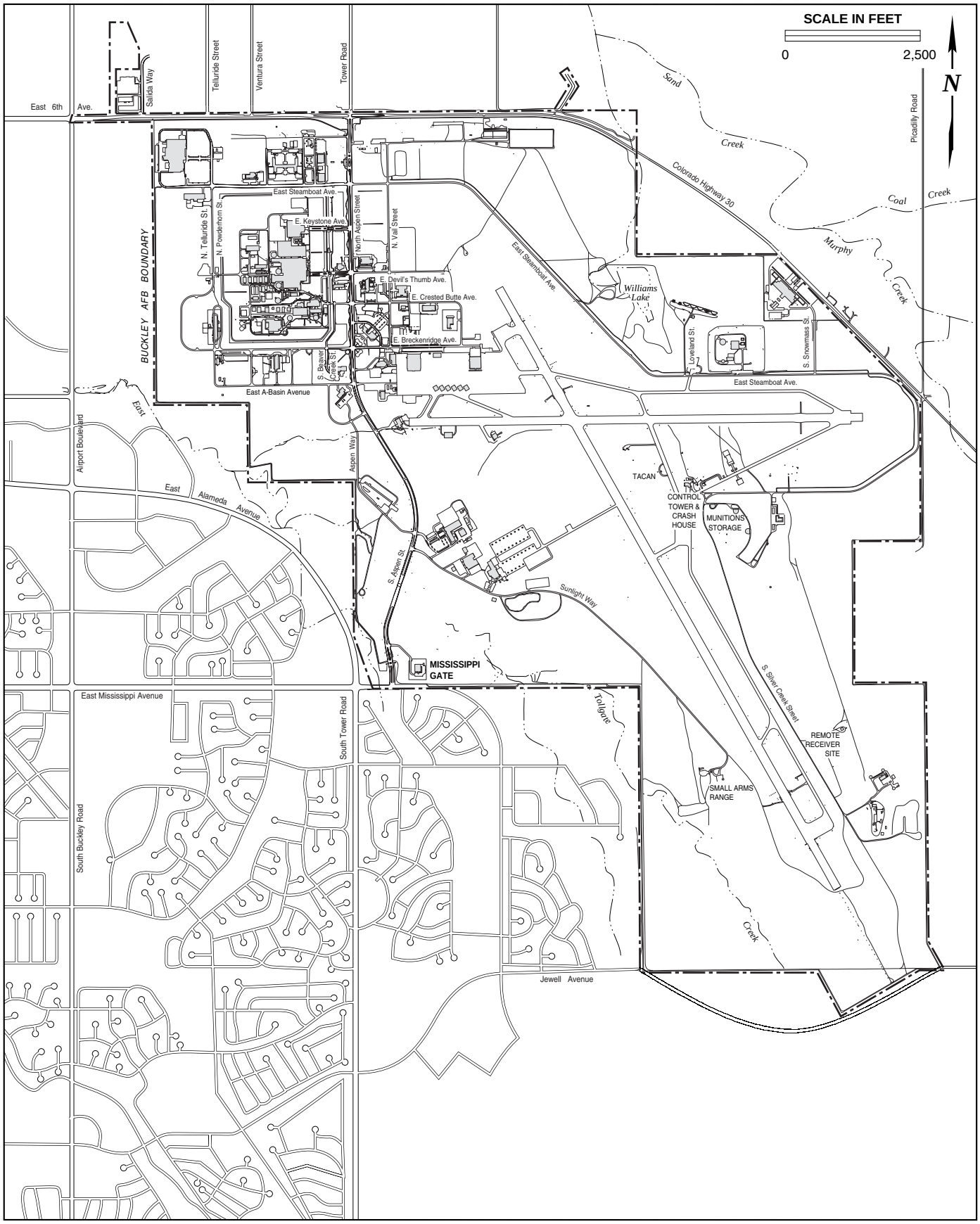
Once on base, privately owned vehicles generally travel on three arterial roads: Aspen Street, Steamboat Avenue, and North Telluride Street. All un-signalized base intersections were rated at satisfactory LOS overall (COANG 1997a).

Many existing base roadways—including South Aspen Street and South Vail Street—are deteriorated, too narrow, and lack stable shoulders, curbs, and proper drainage channels.

3.3 GEOLOGICAL RESOURCES

3.3.1 Definition of Resources

Geological resources of an area typically consist of surface and subsurface materials and their inherent properties. Principal geologic factors influencing the



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Buckley AFB and Vicinity Transportation Network

3-3

ability to support structural development are seismic properties (i.e., potential for subsurface shifting, faulting, or crustal disturbance), soil stability, and topography.

3.3.2 Existing Conditions

The ROI for geological resources is limited to Buckley AFB.

3.3.2.1 Regional Setting

Buckley AFB is located above the Denver Basin in the western portion of Colorado's central high plains, approximately 50 miles east of the Continental Divide. The base and the Denver metropolitan area (immediately west of the base) lie in the lowlands of the South Platte River, and are surrounded on three sides by higher terrain: the Palmer Lake Divide to the south, the Rampart Range and Rocky Mountains to the west, and Cheyenne Ridge to the north. To the east lie the Great Plains. Most of Arapahoe County is characterized by broadly rolling topography with major streams in wide valleys.

3.3.2.2 Buckley AFB

Geology

Buckley AFB is located in the Denver Basin, a structural depression that was formed approximately 67 million years ago during a mountain building event called the Laramide Orogeny. The Denver Basin covers 6,700 square miles, extending from Greeley in the north to Colorado Springs in the south and from Limon westward to the Front Range. It is part of the larger Denver structural basin that extends north and east into Wyoming, Nebraska, and Kansas.

Geologic layers within the basin are in excess of 13,000 feet thick and range in age from Late Pennsylvanian through Quaternary. The Denver Basin is comprised of 7 principal sedimentary formations, in descending order within the basin: the Castle Rock Conglomerate; the Dawson Arkose; the Denver, Arapahoe, and Laramie formations; the Fox Hills Sandstone; and an

8,000 foot-thick, relatively impermeable shale formation, the Pierre Shale, which forms the bottom of the basin (COANG 1999a).

Surficial deposits consist of unconsolidated, wind-blown (or *eolian*), and water-deposited (or *alluvial*) sediments that may reach a thickness of 30 feet; these sediments were initially deposited during the Pleistocene epoch and continue to be deposited today.

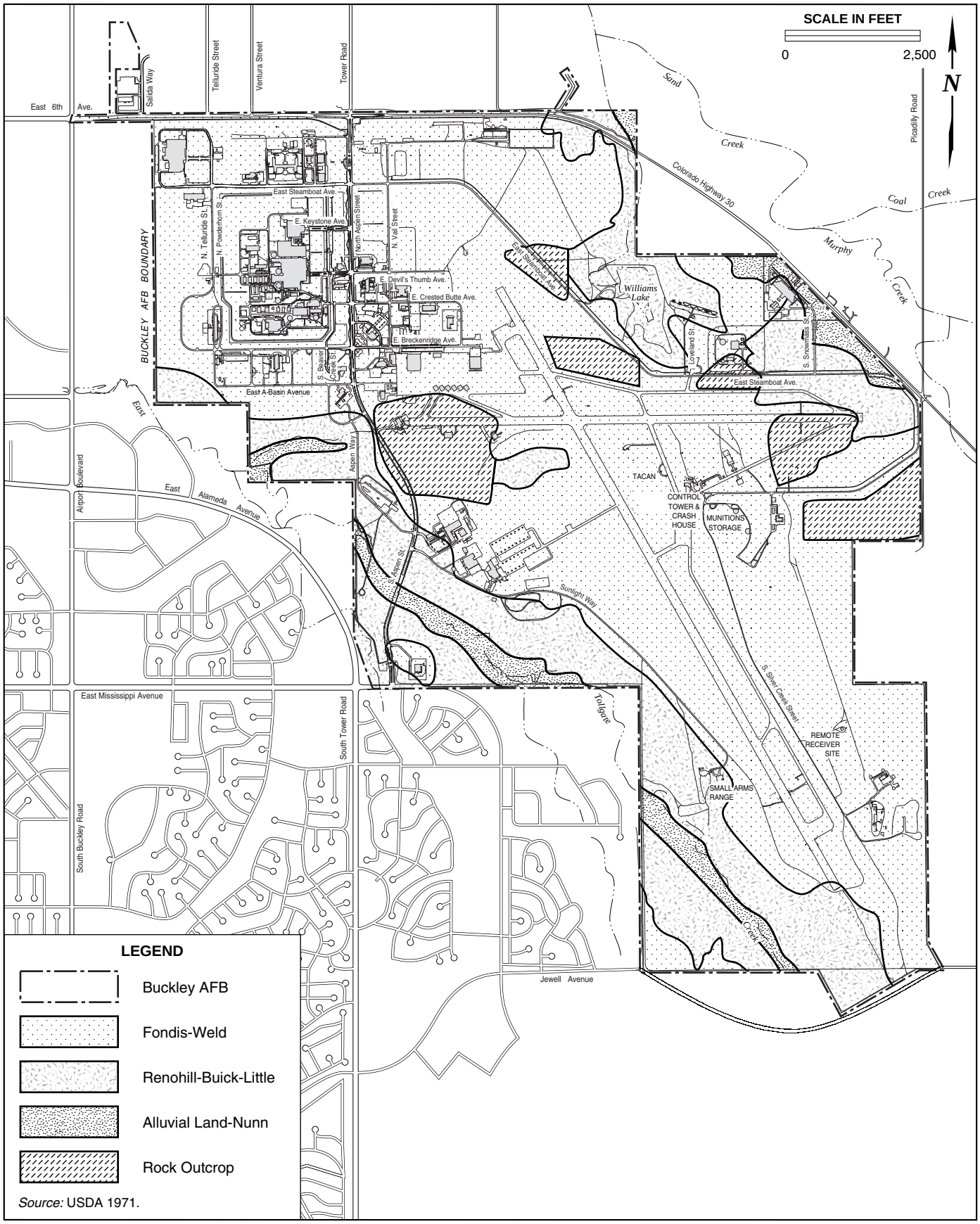
Topography

Elevations on the base range from approximately 5,500 feet to 5,700 feet above mean sea level (msl). Topography at the base is generally level and provides few constraints to development. Nonetheless, stream drainages and areas of rock outcrops do limit the feasibility of some building development (see *Soils*, below, and Section 3.4.2.2, *Surface Water*).

Soils

The Soil Conservation Service has identified 15 surficial soil types on Buckley AFB, most of which have been classified as moderately to highly erodible. These can be grouped into three general soil associations: Alluvial Land-Nunn, Renohill-Buick-Little, and Fondis-Weld (Figure 3-4) (U.S. Department of Agriculture [USDA] 1971). The presence of highly expansive soil series on base can require incorporation of specialized construction and landscaping design for new facilities to prevent long-term facility damage and increased erosion potential. Engineering modifications to foundation designs and extensive site-specific drainage plans can compensate for expansive soil conditions.

Alluvial Land-Nunn Association. This soil association consists of deep, nearly level, loamy and sandy soils and is found along floodplains, terraces, and major streams, such as East Tollgate Creek. These soils have moderate permeability and high water-holding capacity. Alluvial land and the Nunn series are soils where protection from or control of flooding is needed to control water erosion and gullying (USDA 1971).



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Soil Associations at Buckley AFB

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Renohill-Buick-Little Association. The Renohill-Buick-Little soil association consists of moderately deep, well-drained, loamy to clayey soils and is found on the East Tollgate Creek uplands and south of Coal and Sand creeks. Within this association, the dominant Renohill soils have medium internal drainage, moderately slow to slow permeability, and moderate available water-holding capacity, but are susceptible to soil blowing and water erosion. The most common types of soil of this association found on the base are the Renohill-Buick loam and the Renohill-Little complexes (USDA 1971).

Fondis-Weld Association. The Fondis-Weld association consists of deep, nearly level, loamy soils formed mainly in silty eolian material. These soil types cover most of the Buckley AFB surface area. Fondis soils are well-drained and gently sloping (1-5 percent), with moderately slow permeability and high water-holding capacity. They are high in natural fertility but susceptible to wind and water erosion (USDA 1971).

Rock Outcrop. In the northcentral portion of the base, bedrock and shales are exposed at the surface. These areas are sloping to nearly level and cover areas as large as 15 acres. Shale is dominant and resists water penetration; therefore, little vegetation grows in these areas with the exception of certain weedy species. Hazards of water and wind erosion are severe (USDA 1971).

3.4 WATER RESOURCES

3.4.1 Definition of Resource

Water resources analyzed in this study include surface water and groundwater. Surface water resources include lakes, rivers, and streams and are important for a variety of reasons including ecological, economic, recreational, aesthetic, and human health. Groundwater comprises subsurface water resources and is an essential resource in many areas as it is used for potable water, agricultural irrigation, and industrial purposes. Other issues relevant to water resources include watershed areas affected by existing and potential runoff and hazards associated with 50-, 100-, and 500-year floodplains.

3.4.2 Existing Conditions

The ROI for water resources includes surface waters on Buckley AFB and associated drainage basins.

3.4.2.1 Regional Setting

The primary surface water drainage system for northeastern Colorado is the South Platte River, located approximately 15 miles northwest of Buckley AFB.

Cherry Creek, a tributary of the South Platte River, is located approximately 7 miles southwest of the base. Smaller drainages located within and adjacent to the base include Sand, East Tollgate, Coal, and Murphy creeks and two smaller, unnamed creeks (Figure 3-5). Regional surface drainage trends to the northwest.

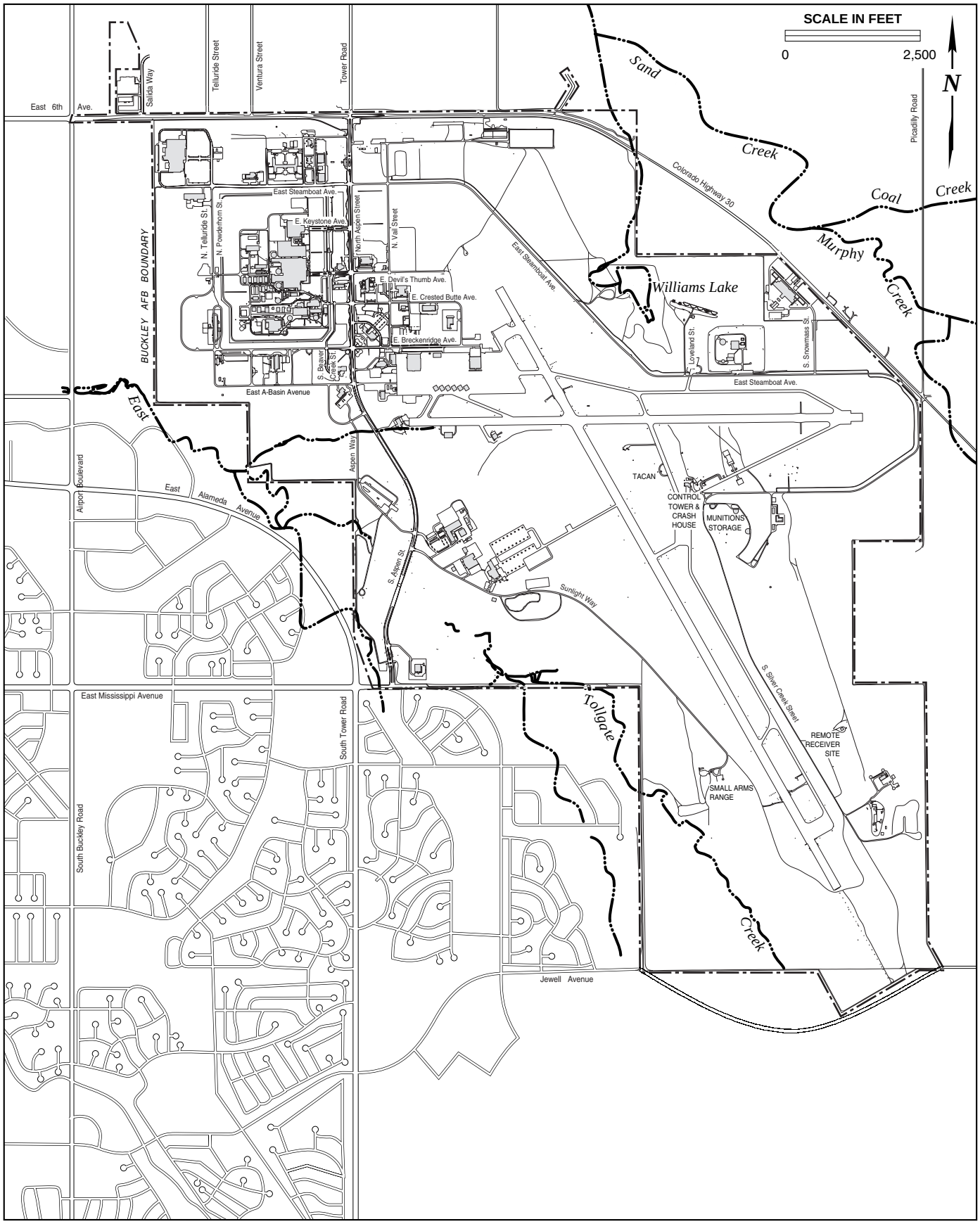
3.4.2.2 Buckley AFB

Surface Water

The principal surface water body at Buckley AFB is Williams Lake, which is used primarily for recreational purposes (e.g., fishing). Williams Lake was constructed in 1961 with a maximum surface area of 30 acres, although the average size of the lake since 1975 has been approximately 10 acres. Water supply for Williams Lake consists of well water augmented by local runoff (Buckley AFB 2003b).

Other surface water features at the base include East Tollgate Creek (which flows across the southwestern portion of the base toward the northwest) and an unnamed tributary of Sand Creek which drains northward from Williams Lake (see Figure 3-5).

Buckley AFB received a National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit (MSGP) on 4 April 2001. Buckley AFB is required to have a NPDES permit primarily for conducting aircraft deicing, refueling, and some maintenance on a runway that is exposed to precipitation (Buckley AFB 2002f). The permit is also required for general industrial processes



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Surface Water Resources of Buckley AFB

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(e.g., aircraft and vehicle maintenance) and for regulating the former landfill (Buckley 2003h). A Stormwater Pollution Prevention Plan has recently been developed for the base, and a stormwater drainage study is currently being developed, which would assess the need for new detention ponds (Buckley AFB 2003b). Stormwater generally flows southwest across the base, towards East Tollgate Creek, except near the eastern boundary where stormwater flows toward the eastern perimeter of the base. Buckley AFB's stormwater network drains to a total of seven outfalls spread out along the outer limits of the base (Buckley AFB 2003c).

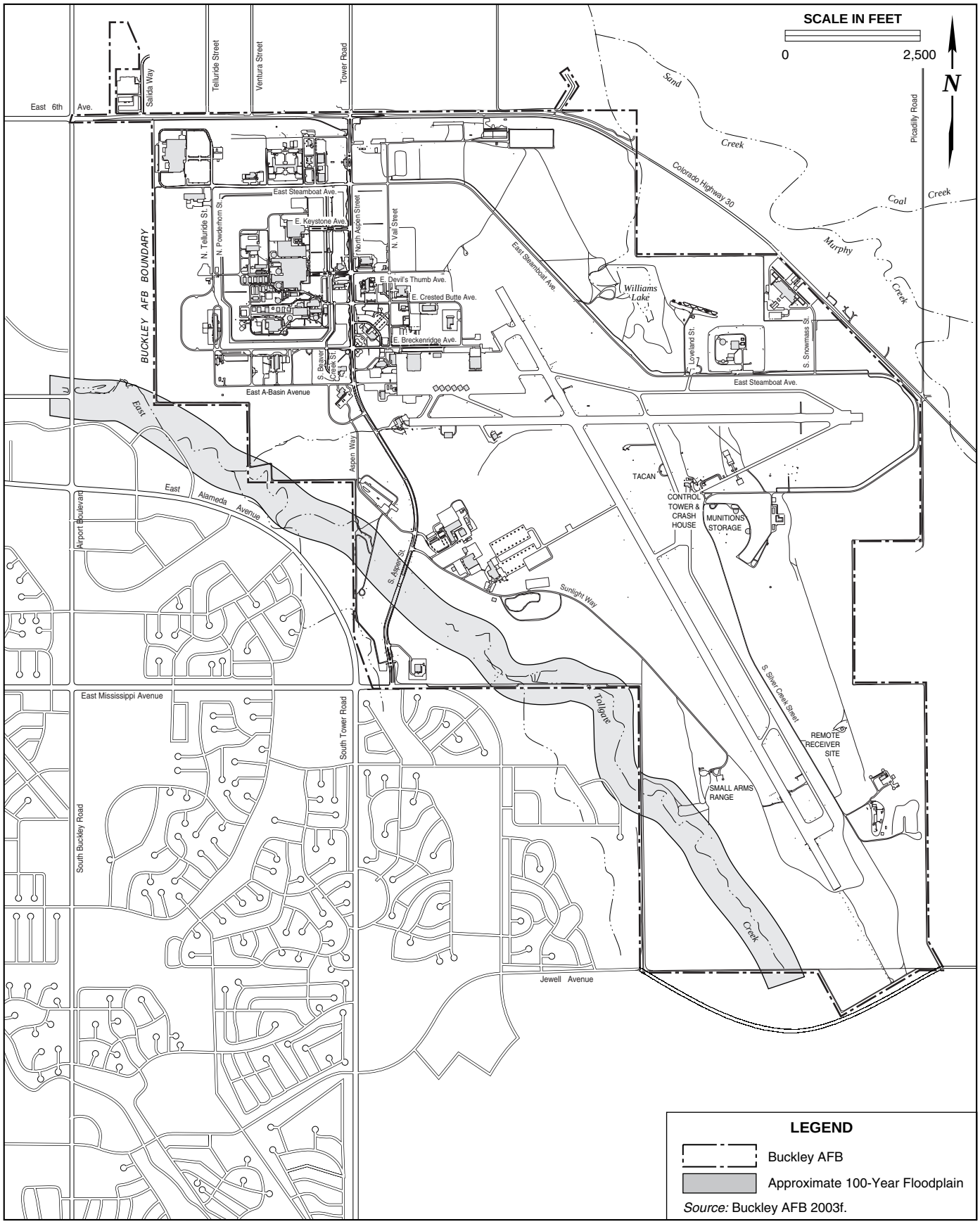
Floodplains

The 100-year floodplains associated with East Tollgate Creek and its smaller tributaries cross the southwestern portion of Buckley AFB (Figure 3-6). Along the northeastern border of Buckley AFB, small sections of Sand Creek's 100-year floodplains cross the base boundary. These portions of the floodplains are estimates only as the base had not been surveyed. Floodplains designated by the Federal Emergency Management Agency (FEMA) stop at the base boundary (FEMA 1995).

Groundwater

Four principal bedrock aquifers occur in the Denver Basin above which Buckley AFB is located (see Section 3.3, *Geological Resources*). They are, from deepest to shallowest, the Laramie-Fox Hills, Arapahoe, Denver, and Dawson aquifers. The base of the Denver Basin aquifer system comprises the Pierre shale formation, a layer of great thickness and low water permeability (COANG 1999a). There are also surface alluvial deposits, located near East Tollgate and Sand creeks, which bear water at Buckley AFB.

Groundwater flow is generally downstream and toward stream channels. On Buckley AFB, groundwater flow is to the northwest, following the trend of stream drainages toward the South Platte River, north of Denver. Based on previous surveys conducted as part of the Denver International Airport (DIA) Water Quality Study, groundwater in the Denver Formation is generally of good



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Approximate 100-Year Floodplain in the Vicinity of Buckley AFB

3-6

chemical quality and meets drinking-water standards for public water supplies (Wright Water Engineers Inc. 1988).

3.5 LAND USE

3.5.1 Definition of Resource

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.

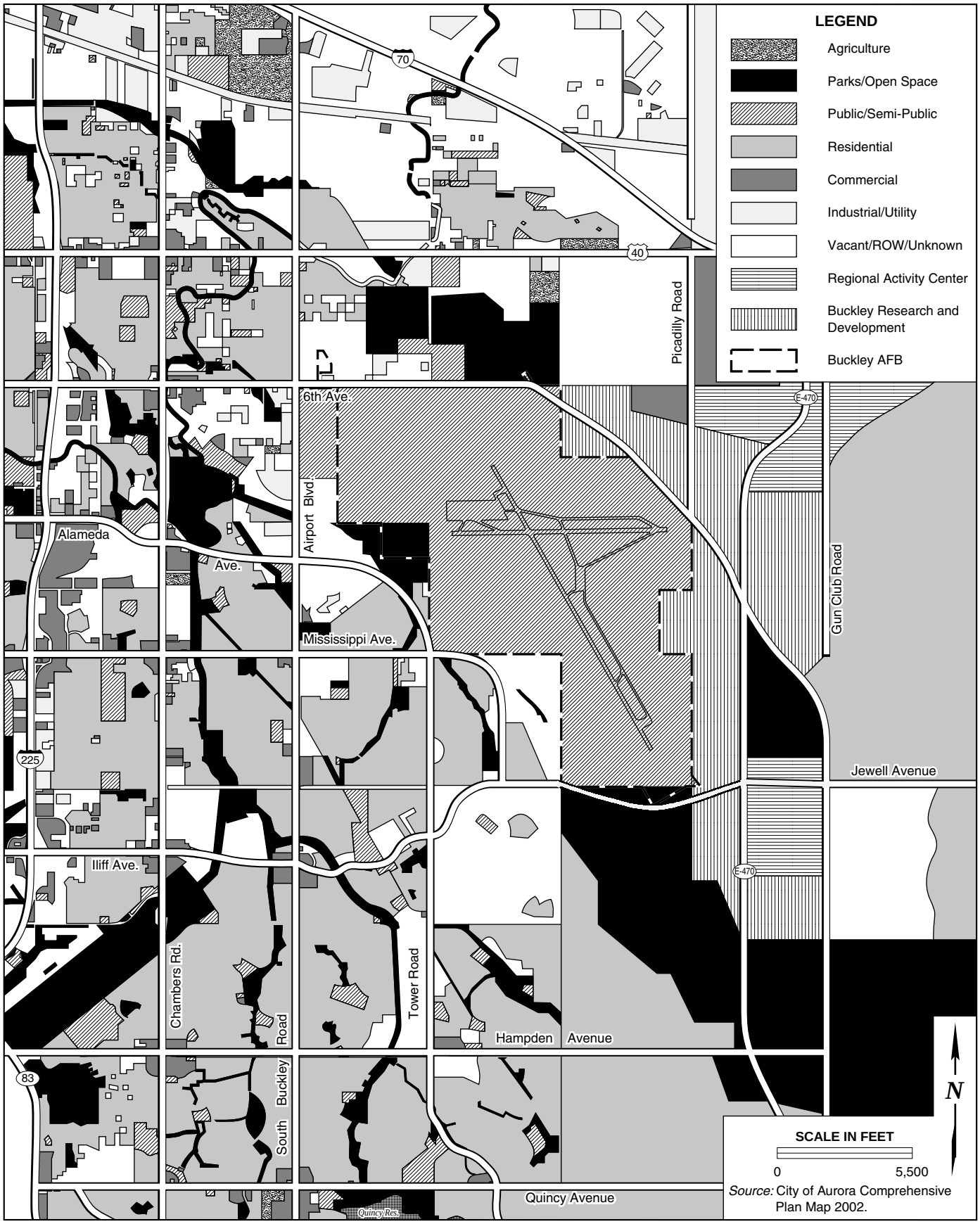
3.5.2 Existing Conditions

The ROI for land use is limited to Buckley AFB and its immediate environs.

3.5.2.1 Regional Setting

Land use northwest of the base is primarily light industrial, and to the north, light industrial use is mixed with pockets of open space (Figure 3-7). Land use southeast of the base is primarily open space—either in the form of agricultural land or as part of the Plains Conservation Center. To the south and southwest, land use is mainly residential or open space designated to undergo residential expansion.

In 2000, the E-470 Corridor Zoning Regulations were adopted by the City of Aurora to enable residential and commercial development within this high-growth corridor in accordance with the Aurora Comprehensive Plan. The E-470 Corridor District includes 10 subareas, dedicated to specific purposes. In general, the subareas northeast and southeast of Buckley AFB are designated to allow for medium density residential development and open space, with regional activity centers and light industrial areas throughout. The areas directly east of Buckley AFB are within the 60 day-night average sound level (L_{dn}) noise contours, and have been determined to be unfit for residential development. In the E-470 Zone District Plan, the City zoned this high-noise subarea a Research and Development (R&D) area (City of Aurora Planning Department 2002). The



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Land Use in the Vicinity of Buckley AFB

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R&D designation is intended to encourage the development of high-quality R&D centers that take advantage of the close proximity to the base. The centers are expected to take the form of low-scale, campus-oriented developments, with large amounts of open space as part of the site (City of Aurora Planning Department 2000). A new all-inclusive Comprehensive Plan for the City is due to be published in 2003 (City of Aurora Planning Department 2002).

3.5.2.2 Buckley AFB

According to the most recent base General Plan, land use on Buckley AFB is divided into twelve land use categories. The predominant land use category at Buckley AFB is *Open Space*, comprising approximately 2,388 acres on base. This category includes all areas within the base boundaries not specifically designated for other uses. Included are: airfield imaginary surfaces; explosive safety zones; Aerospace Data Facility (ADF) exclusionary zones; environmental conservation areas; terrain with slopes exceeding ten percent; and greenbelt buffers.

Remaining land use categories represented on base include *Airfield*; *Aircraft Operations and Maintenance*; *Mission Operations and Maintenance; Industrial*; *Administrative*; *Medical*; *Community Commercial*; *Community Service*; *Accompanied Housing*; *Unaccompanied Housing*; and *Outdoor Recreation* (Buckley AFB 2002a).

In the current General Plan for the base, each land use category has been evaluated to identify areas where incompatible land uses occur (Buckley AFB 2002a). Three land use incompatibilities were identified and are associated with more stringent airfield criteria and new mission requirements. Four buildings are located wholly or partially in the Northern Clear Zone, two buildings are within Quantity-Distance (QD) arcs, and the Security Forces Kennel is located within the space operations exclusionary zone (Buckley AFB 2002a).

Residential dormitories were completed at Buckley AFB in 2000. The dormitories have a holding capacity of approximately 236 personnel (Buckley AFB 2002d).

3.6 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.6.1 Definition of Resource

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Human population is affected by regional birth and death rates, as well as net in- or out-migration. Economic activity typically comprises employment, personal income, and industrial growth. Impacts on these fundamental socioeconomic indicators can also influence other components such as housing availability and public services provision.

In 1994, Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, was issued to focus attention of federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. In order to provide a thorough Environmental Justice evaluation, this socioeconomics presentation gives particular attention to the distribution of race and poverty status in areas potentially affected by implementation of proposed actions.

Because children may suffer disproportionately from environmental health risks and safety risks, EO 13045, *Protection of Children From Environmental Health Risks and Safety Risks*, was introduced in 1997 to prioritize the identification and assessment of environmental health risks and safety risks that may affect children and to ensure that federal agencies' policies, programs, activities, and standards address environmental health risks and safety risks to children. This socioeconomics section identifies the distribution of children and locations where numbers of children may be proportionally high (e.g., schools, child care centers, and family housing) in areas potentially affected by implementation of proposed actions.

3.6.2 Existing Conditions

The ROI for socioeconomics and environmental justice includes Buckley AFB and Arapahoe County.

3.6.2.1 Regional Setting

Buckley AFB is located in Arapahoe County, which is designated by the U.S. Bureau of the Census as a component of the Denver Primary Metropolitan Statistical Area (PMSA), a five-county area with a single population center surrounded by numerous communities characterized by high degrees of economic and social interaction and interdependence. For the purposes of this study, the geographic area examined with regard to socioeconomics includes both Arapahoe County and the Denver PMSA, which includes Adams, Arapahoe, Denver, Douglas, and Jefferson Counties.

Population

In the 2000 Census, the Denver PMSA population was 2,109,282 people, an increase of 30 percent from 1990 (1,622,980 people). The rate of population change between 1990-2000 for the Denver PMSA, if continued, would result in a population of 4,060,000 in 2025, which would be 92.5 percent larger than the 2000 population.

Approximately 23.1 percent of the Denver PMSA populace is located in Arapahoe County, which in 2000 had a population of 487,967, a 2.2 percent increase from 1990 (Colorado Department of Labor and Employment 2000).

Employment

The industrial sectors providing the greatest number of private industry jobs in Arapahoe County are *services*, *retail trade*, and *finance, insurance, and real estate*. In combination, these three sectors provide jobs for an estimated 66.2 percent of the non-farm workforce, which totaled 372,951 people in 1999 (U.S. Bureau of Economic Analysis 1999).

Table 3-1 represents the distribution of jobs by employment sector in Arapahoe County for 1980, 1990, 1995, and 1999. In 1980, *services* (with 33,878 jobs, or 25 percent of all jobs), *retail trade* (22 percent), and *government* (13 percent) were the largest employment sectors of the county economy, together accounting for 60 percent of all jobs in Arapahoe County (U.S. Bureau of Economic Analysis 1997). In 1999, *services* (30.5 percent of all jobs) and *retail trade* (18.1 percent) still accounted for the two largest employment sectors, but government was replaced by *finance, insurance, and real estate* (14.7 percent) as the third-largest category. Between 1995 and 1999, the fastest growing sector was *services* with a gain of 27,575 jobs (78 percent). Despite decreasing as a percentage of overall employment, jobs in *government* increased by approximately 3,844 jobs between 1995 and 1999, a net increase of over 14 percent.

Table 3-1. Arapahoe County Annual Employment by Industry (1980, 1990, 1995 and 1999)

Employment Sector	1980	1990	1995	1999
Farm	693	464	354	386
Non-Farm	136,154	242,431	305,293	372,951
Ag. Services, Forestry, Fisheries	1,385	2,109	3,485	3,977
Mining	4,224	4,589	4,113	2,702
Construction	11,157	10,823	19,123	26,198
Manufacturing	12,501	13,900	14,082	14,843
Transportation & Public Utilities	3,084	12,205	21,555	29,003
Wholesale Trade	6,748	13,547	16,565	18,456
Retail Trade	29,971	46,100	55,473	59,360
Finance, Insurance, Real Estate	15,021	36,380	40,160	56,256
Services	33,878	79,813	103,733	131,308
Govt. and Govt. Enterprises	18,185	22,965	27,004	30,848
Federal, Civilian	2,098	1,614	1,972	2,428
Military	1,950	1,990	2,062	2,312
State and Local	14,137	19,361	22,970	26,108

Source: U.S. Bureau of Economic Analysis 1999.

Unemployment

Since 1985, unemployment rates in Arapahoe County have remained consistently lower than Denver PMSA, state, and national averages. Unemployment rates have decreased since 1992 to an annual average in 2000 of 2.02 percent for the

county, 4.08 percent for Denver PMSA, 4.40 percent for the state, and 4.0 percent for the nation (U.S. Bureau of Labor Statistics 2000).

Earnings

In 1999, Denver had a per capita personal income (PCPI) of $36,058. This PCPI ranked 16th in the United States and was 126 percent of the national average, $28,546. In 1999, the state PCPI reflected an increase of 6.3 percent from 1998 and the national change was 4.5 percent (U.S. Bureau of Economic Analysis 1999).

The economic climate in Arapahoe County has been one of growth over the last 10 years. Average earnings per job in Arapahoe County increased from $28,467 in 1990 to $42,207 in 1999, an increase of 48.3 percent (see Table 3-2). The largest industries in 1999 were *services* (30.5 percent of earnings); *transportation and public utilities*, (18.1 percent); and *finance, insurance, and real estate* (14.7 percent). Of the industries that accounted for at least 5 percent of earnings in 1999, the slowest growing from 1998 to 1999 was state and local government (6.0 percent of earnings in 1999), which increased 5.7 percent; the fastest growing was *finance, insurance, and real estate*, which increased 24.7 percent (U.S. Bureau of Economic Analysis 1999). The total personal income (TPI) for Arapahoe County in 1999 was $19,368,842. This TPI ranked 2nd in the state and accounted for 15.1 percent of the state total. In 1999, growth in the Arapahoe County TPI surpassed the state and national growth rates with an increase of 8.3 percent from 1998, while the state change was 7.9 percent and the national change was 5.4 percent (U.S. Bureau of Economic Analysis 1999).

In addition, Arapahoe County had a PCPI of $40,177 in 1999. This PCPI ranked 3rd in the state, and was 127 percent of the state average ($31,533) and 141 percent of the national average ($28,546) (U.S. Bureau of Economic Analysis 1999). In 1999, growth in the Arapahoe County PCPI once again surpassed the state and national numbers with a 6.1 percent increase from 1998, while the state increase was 5.6 percent and the national increase was 4.5 percent (U.S. Bureau of Economic Analysis 1999).

Table 3-2. Economic Indicators, Arapahoe County, Colorado, and United States (1980, 1990, 1995, and 1999)

	1980	1990	1995	1999
Arapahoe County				
Total Jobs	136,847	242,895	305,647	373,337
Civilian Jobs	134,897	240,905	303,585	371,025
Military Jobs	1,950	1,990	2,062	2,312
Military Jobs/Total Jobs	1.4%	0.8%	0.7%	0.6%
Average Earnings per Job	$27,967	$28,467	$31,680	$42,207
Per Capita Personal Income	$24,182	$28,081	$29,931	$40,177
State of Colorado				
Total Jobs	1,658,204	2,073,333	2,439,755	2,846,268
Average Earnings per Job	$26,598	$26,113	$27,153	$33,514
Per Capita Personal Income	$19,814	$22,417	$23,958	$31,533
United States				
Total Jobs	114,471,900	139,891,300	149,290,100	163,757,900
Average Earnings per Job	$27,117	$28,353	$28,910	$32,718
Per Capita Personal Income	$18,551	$22,320	$23,196	$28,546

Source: U.S. Bureau of Economic Analysis 1999

3.6.2.2 Buckley AFB

Currently, approximately 9,232 full-time personnel are employed at Buckley AFB. Of that number, 2,987 are active-duty military employees, 1,561 are ANG/AF part-time employees, 836 are appropriated-fund civilians, 1,396 are contract or private employees, 281 are Base Exchange employees, and 2,171 are Army/Navy/Marine reservists.

Total expenditures by the base are estimated at more than $373 million per year, including $315.6 million in payroll; $6.6 million in construction; $29.6 million in services; and $21.3 million in materials, equipment and supplies.

In addition to direct payroll and operations spending, the local economy benefits from indirect spending (i.e., spending by base personnel of portions of their wages for personal goods and services in the local area). The estimated total economic effect of local direct and indirect spending by Buckley AFB employees is $547.3 million per year (Buckley AFB 2002b). Secondary employment created in the local economy as a result of direct and indirect spending for goods and services associated with activity at Buckley AFB was estimated at 3,862 jobs with an average annual payroll of $159.9 million (Buckley AFB 2002b).

3.6.3 Environmental Justice

3.6.3.1 Minority and Low-Income Populations

In order to comply with EO 12898 (*Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*), ethnicity and poverty status in the vicinity of Buckley AFB were examined and compared to city, regional, state, and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the proposed action.

Based on data contained in the 2000 Census of Population and Housing, residents in communities near the base are not considered to be low-income. The percentage of Aurora's population living below the poverty level (5 percent) is less than the percentage for Arapahoe County (6.1 percent), Colorado (9.9 percent), and the nation (13.3 percent) (U.S. Bureau of the Census 2000).

Minority residents comprise 31.1 percent of Aurora's total population. By comparison, minority residents comprise smaller percentages in Arapahoe County (20.1 percent), Colorado (17.2 percent) and the nation (24.9 percent) (U.S. Bureau of the Census 2000).

3.6.3.2 Protection of Children from Environmental Health Risks and Safety Risks

In order to comply with EO 13045 (*Protection of Children From Environmental Health Risks and Safety Risks*) the number of children under age 18 in the vicinity of Buckley AFB was examined and compared to county, state, and national levels. Additionally, locations where populations of children may be concentrated, such as child care centers, schools, and parks, were determined. The purpose of this analysis is to address potential disproportionate health and safety risks to children that may result from implementation of the proposed action.

Age Distribution

Aurora has the highest percentage of total population under age 18 compared to Arapahoe County, the State of Colorado, and the nation. In 2000, there were 83,488 children under age 18 in Aurora, comprising 30.2 percent of the overall population as compared to 29.1 percent for Arapahoe County, 28.4 percent for Colorado, and 28.6 percent for the nation (U.S. Bureau of the Census 2000).

Schools

The Aurora Public School District—serving the City of Aurora—is the sixth-largest district in Colorado, with a total enrollment of nearly 30,000 students in elementary, secondary, and high schools (Aurora Public Schools 2002). Schools located in the vicinity of Buckley AFB include five elementary schools with a combined enrollment of approximately 2,900 students and three secondary schools with a combined enrollment of approximately 4,000 students (Aurora Public Schools 1997). No schools are located on Buckley AFB.

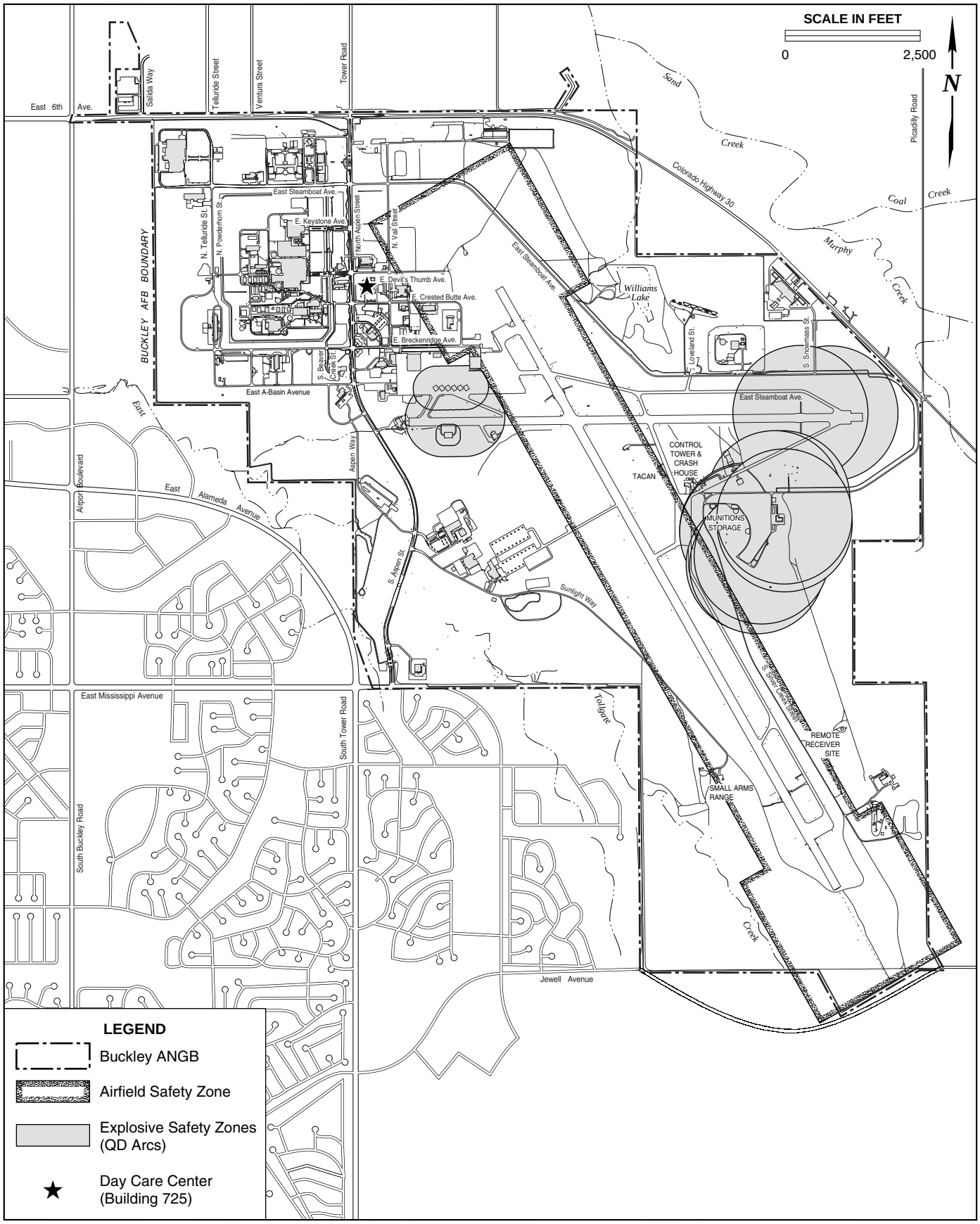
Buckley AFB

No family housing currently exists on Buckley AFB and, accordingly, no children live on base. The only facility on base that caters to children is a day care center located in Building 725 in the central area of the base. Building 725 is located outside of all restricted zones including Clear Zones (CZs), Accident Potential Zones (APZs), and quantity-distance (QD) arcs (Figure 3-8).

3.7 CULTURAL RESOURCES

3.7.1 Definition of Resource

Several federal laws and regulations have been established to manage cultural resources, including the National Historic Preservation Act (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resource Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990). In



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Day Care Center (Building 725) and Restricted Safety Zones at Buckley AFB

3-8

order for a cultural resource to be considered significant, it must meet one or more of the following criteria for inclusion on the National Register of Historic Places (NRHP):

> "The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and: 1) that are associated with events that have made a significant contribution to the broad patterns of our history; or 2) that are associated with the lives or persons significant in our past; or 3) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or 4) that have yielded, or may be likely to yield, information important in prehistory or history" (36 CFR § 60:4).

3.7.2 Existing Conditions

The ROI for cultural resources is limited to Buckley AFB.

3.7.2.1 Regional Setting

The earliest recorded European explorers in northeastern Colorado were the Spanish, whose expeditions reached the Great Plains in the 1540s. The early 1700s saw the influx of French fur traders, and in 1803, northeastern Colorado—and the land now occupied by Buckley AFB—became part of the United States through purchase of the Louisiana Territory from France.

3.7.2.2 Buckley AFB

Architectural Resources

The only building affected by the Proposed Action (Building 39) was deemed ineligible for inclusion on the NRHP. Correspondence with the Colorado State Historic Preservation Office (SHPO) in 2003 confirmed this building's lack of characteristics necessary for consideration (NRHP 2003). Because no cultural resources would be impacted by the proposed action, an analysis of potential

impacts was eliminated from Section 4, *Environmental Consequences* (Buckley AFB 2003b).

3.8 VISUAL RESOURCES

3.8.1 Definition of Resource

Visual resources are defined as the natural and manufactured features that comprise the aesthetic qualities of an area. These features form the overall impressions that an observer receives of an area or its landscape character. Landforms, water surfaces, vegetation, and manufactured features are considered characteristic of an area if they are inherent to the structure and function of a landscape.

3.8.2 Existing Conditions

The ROI for visual resources is limited to Buckley AFB facilities and open space.

3.8.2.1 Regional Visual Character

Topography surrounding Buckley AFB is generally level to gently rolling and is dominated by suburban development to the southwest and northwest. Some commercial, industrial, and recreational development exists to the north. Areas to the south and east are mostly undeveloped (the former Plains Conservation Center, located south of the base, comprises 3 square miles of undeveloped grassland); however, planned future developments for these areas would change the region's visual character.

There are no wild and scenic rivers, designated scenic roads or vistas, or other sensitive visual resources near Buckley AFB. State parks and federal wildlife refuges located near the base include: Cherry Creek State Park, 6 miles to the southwest; Barr Lake State Park, 18 miles to the north; Chatfield State Park, 20 miles to the southwest; Roxborough State Park, 24 miles to the southwest; Golden Gate Canyon State Park, 36 miles to the northwest; and Rocky Mountain Arsenal National Wildlife Refuge, 10 miles to the north.

3.8.2.2 Buckley AFB

Buckley AFB is located on the eastern side of the City of Aurora with a visual environment characteristic of a large military facility. Most structures are one-story and have been constructed with a variety of materials and in a variety of styles. The East Tollgate Creek drainage at the southwest border of the base serves as a physical and visual break between the base and surrounding residential areas. Seedlings were planted along the north, west, and southwest borders of the base to create a greenbelt buffer.

3.9 AIR QUALITY

3.9.1 Definition of Resource

Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. Air quality is affected by stationary sources (e.g., urban and industrial development) and mobile sources (e.g., motor vehicles); consequently, increases in population and urbanization tend to affect air quality. Air quality at a given location is a function of several factors, including the quantity and type of pollutants emitted locally and regionally, and the dispersion rates of pollutants in the region. Primary factors affecting pollutant dispersion are wind speed and direction, atmospheric stability, temperature, the presence or absence of inversions, and topography.

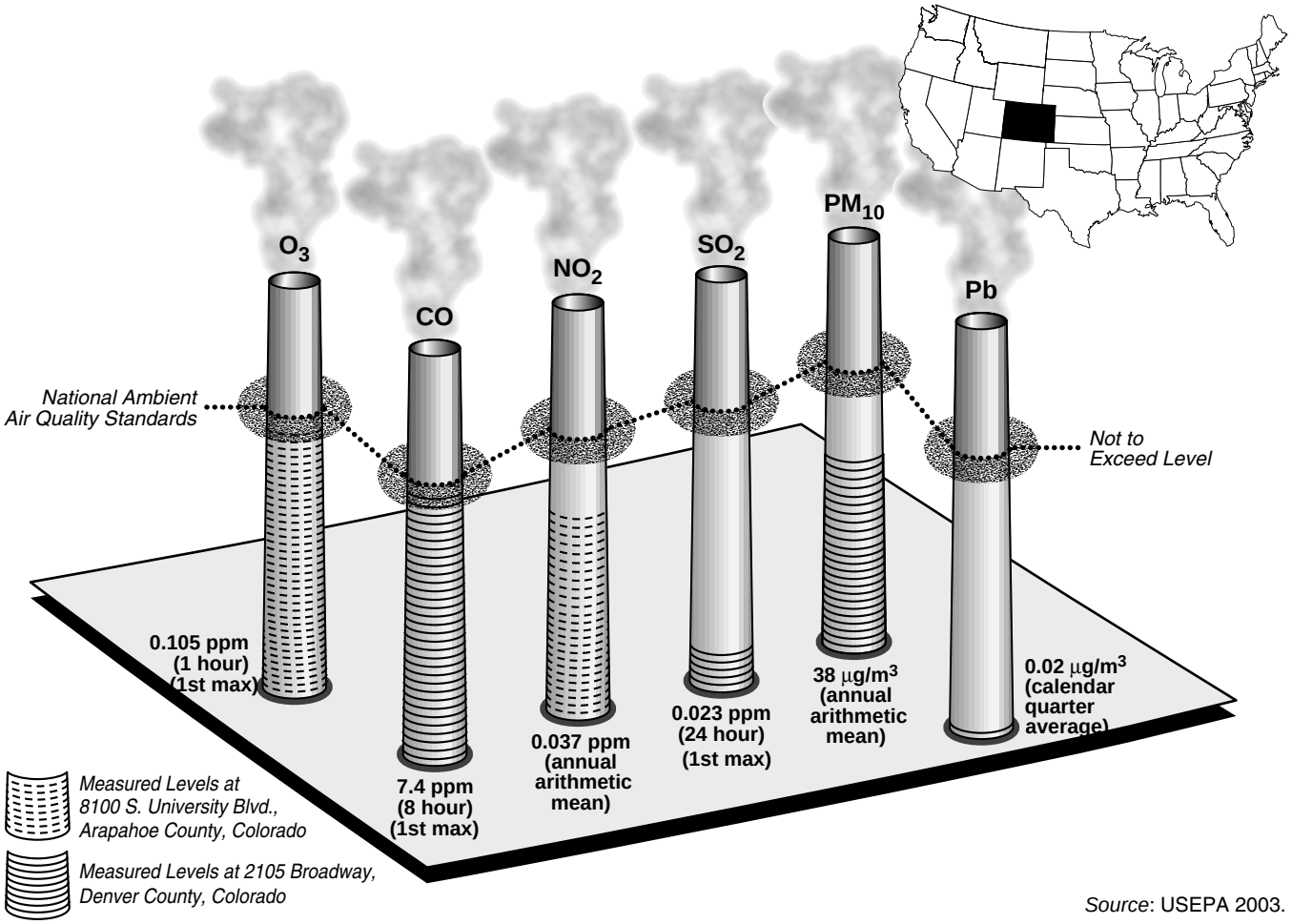
3.9.1.1 Criteria Pollutants

The U.S. Environmental Protection Agency's (USEPA's) Office of Air Quality Planning and Standards (OAQPS) has established National Ambient Air Quality Standards (NAAQS) for six principal, or "criteria", pollutants, including: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal or less than ten microns in diameter (PM_{10}), and lead (Pb). NAAQS establish maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare (Figure 3-9). Descriptions and effects of the criteria pollutants are listed below.

POLLUTANT	AVERAGING TIME	NATIONAL STANDARDS (1)		
		Primary	Secondary	Method
Ozone (O_3) (2)	1 Hour	0.12 ppm (235 μg/m^3)	Same as Primary Standards	Ethylene Chemiluminescence
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	Same as Primary Standards	Nondispersive Infrared Spectroscopy
	1 Hour	35 ppm (40 mg/m^3)		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm (100 μg/m^3)	Same as Primary Standards	Gas Phase Chemiluminescence
Sulfur Dioxide (SO_2)	Annual Average	0.03 ppm (80 μg/m^3)	•	Pararosaniline
	24 Hour	0.14 ppm (365 μg/m^3)	•	
	3 Hour	•	0.50 ppm (1300 μg/m^3)	
Suspended Particulate Matter (PM_{10})	Annual Arithmetic Mean	50 μg/m^3	Same as Primary Standards	Inertial Separation and Gravimetric Analysis
	24 Hour	150 μg/m^3		
Lead (Pb)	Calendar Quarter	1.5 μg/m^3	Same as Primary Standards	Atomic Absorption

ppm – parts per million
μg/m^3 – micrograms per cubic meter
mg/m^3 – milligrams per cubic meter

(1) Not to be exceeded more than once a year except for annual standards; new ozone standard can be exceeded 3 times per year.
(2) USEPA has recently revised the ozone standard. The new averaging time is 8 hours and the Primary Standard is 0.08 ppm. The USEPA will designate attainment and non-attainment areas for 8-hour ozone by April 2004.
(3) USEPA intends to designate attainment and non-attainment areas for $PM_{2.5}$ by December 2004.



Source: USEPA 2003.

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National Ambient Air Quality Standards and Measured Emission Levels in 2002 Denver and Arapahoe Counties, Colorado

3-9

Carbon Monoxide. CO is a colorless, odorless, poisonous gas produced by incomplete burning of carbon in fuel. The health threat from CO is most serious for those who suffer from cardiovascular disease, particularly those with angina and peripheral vascular disease. Other probable risk groups include fetuses, young infants, and pregnant women.

Particulate Matter. PM_{10} is typically composed of dust, ash, soot, smoke, or liquid droplets emitted into the air by industrial sources. Fires, construction activities, use of unpaved roads, and natural sources (e.g., volcanic eruptions and wind-blown dust) also contribute to PM_{10} levels. Small-size particulates are most likely to cause adverse health effects because they can be inhaled into the thoracic or lower regions of the respiratory tract where they can cause aggravation of existing respiratory disease and decline in lung function.

Sulfur Dioxide. SO_2 is emitted primarily from stationary-source coal and oil combustion, steel mills, refineries, pulp and paper mills, and from non-ferrous smelters. High concentrations of SO_2 may aggravate existing respiratory and cardiovascular disease; asthmatics and those with emphysema or bronchitis are the most sensitive to SO_2 exposure. SO_2 also contributes to acid rain, which can Pb to the acidification of lakes and streams and damage trees.

Airborne Lead. Pb can be inhaled directly or ingested indirectly by consuming Pb-contaminated food, water, or non-food materials such as dust or soil; fetuses, infants, and children are most sensitive to Pb exposure. Pb has been identified as a factor in high blood pressure and heart disease. Exposure to Pb measurements have declined dramatically in the last 10 years as a result of the reduction in Pb in gasoline, paint, and the elimination of Pb from soldered cans.

Ozone. The majority of ground-level (or *terrestrial*) O_3 is formed as a result of complex photochemical reactions in the atmosphere involving volatile organic compounds (VOCs), nitrogen oxides (NO_x), and oxygen. O_3 formulation is enhanced by warm temperatures and sunlight. O_3 is a highly reactive gas that damages lung tissue, reduces lung function, and sensitizes the lung to other irritants. Although *stratospheric* O_3 shields the earth from damaging ultraviolet radiation, terrestrial O_3 is a highly damaging air pollutant and is the primary component of smog.

Nitrogen Dioxide. NO_2 is a brownish, highly reactive gas that can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Continued and repeated exposure to high concentrations of NO_2 may cause acute respiratory disease in children. NO_2 is also an important precursor in the formation of terrestrial O_3 or smog; therefore, control of NO_2 emissions is an important component of overall pollution reduction strategies. NO_2 is also a precursor in the formation of nitric acid and other aerosols which may affect aquatic and terrestrial ecosystems. The two primary sources of NO_2 in the U.S. are fuel combustion and transportation.

3.9.1.2 Clean Air Act Amendments

The Clean Air Act Amendments (CAAA) of 1990 place most of the responsibility to achieve compliance with NAAQS on individual states. To this end, the USEPA requires each state to prepare a State Implementation Plan (SIP). A SIP is a compilation of goals, strategies, schedules, and enforcement actions that would lead the state into compliance with all NAAQS; changes to the compliance schedule or plan must be incorporated into the SIP. Areas found to be in non-compliance with a standard can be declared *nonattainment* areas by USEPA or the appropriate state or local agency. In order to reach *attainment*, NAAQS may not be exceeded more than once per year.

3.9.2 Existing Conditions

The ROI for air quality includes the Denver metropolitan area.

3.9.2.1 Air Basin

Buckley AFB and the Denver metropolitan area are located in the lowlands of the South Platte River Basin on the western portion of Colorado's central high plains, approximately 50 miles east of the Continental Divide where many peaks range from 10,000 to more than 14,000 feet above msl. The Front Range of the Rocky Mountains, with peaks ranging from 6,000 feet to 9,000 feet msl, is located about 25 miles west of the base. The entire South Platte River Basin is considered a

single airshed when evaluating the emission, accumulation, and transformation of air pollutants.

For monitoring purposes, the Colorado Air Quality Control Commission (AQCC) has separated the state into six regions to more clearly address each area's specific air quality conditions and activities. Buckley AFB is located in the AQCC's Central Front Range Region, which comprises Adams, Arapahoe, Boulder, Clear Creek, Denver, Douglas, Gilpin, and Jefferson Counties.

3.9.2.2 Climate

Buckley AFB has a dry continental climate, typified by low humidity, abundant sunshine, low precipitation, and large diurnal temperature fluctuations. The mean daily temperature is 29°F in January and 73°F in July. Average annual precipitation is about 16 inches, with most of it occurring from March through September. Mean wind speed in the region is 7 miles per hour, and predominant wind direction is southerly.

Winters are relatively temperate in the area, due in large part to the presence of the Rocky Mountains to the west and to warm c*hinook* winds that move down their eastern slopes. Spring is the cloudiest, windiest, and wettest season; much of the region's precipitation falls as snow in March and early April. In summer, precipitation falls primarily from scattered thunderstorms during afternoon and evening hours. During autumn, more sunshine and less severe weather occur than at any other time of year.

3.9.2.3 Local Air Quality

The Denver metropolitan area has received *attainment* status for all criteria pollutants from the AQCC and the USEPA (Colorado Department of Public Health and Environment [CDPHE] 2003). However, during summer months of 2003, ozone emissions exceeded the new 8-hour standard at several stations in the metropolitan area. The region has entered into an Ozone Early Action Compact with the USEPA, and has committed to an extensive modeling effort and early implementation of control measures as needed to maintain attainment of the ozone standard. The Compact outlines planning milestones that must be

met, culminating in attainment of the 8-hour standard by December 2007 (City of Aurora Planning Department 2003b; Denver Regional Air Quality Council [RAQC] 2003). Further, portions of Arapahoe County and the Denver metropolitan area are considered *maintenance* areas, or former *nonattainment* areas, for CO, O_3, and PM_{10} (USEPA 2003b). Maintenance area plans have been developed by the Colorado Air Pollution Control Division to ensure these areas maintain attainment status for each criteria pollutant. Major pollution sources in the region include power plants, oil refineries, gasoline storage terminals and transfer stations, mining activities, manufacturing facilities, and various agricultural operations (refer to Figure 3-9). Additionally, emissions occur as a result of motor vehicle use and wood-burning activities (CDPHE 1996).

3.9.2.4 Emissions at Buckley AFB

Buckley AFB is under the jurisdiction of the CDPHE's Air Pollution Control Division, the Colorado AQCC, and Denver's RAQC. The CDPHE develops air quality plans, policies, and programs, as well as regulates permitting processes for businesses and industries. The Colorado AQCC develops air pollution control policy, regulates pollution sources, and conducts hearings involving violations of the state's air pollution laws. The Denver RAQC is responsible for developing specific plans for implementation, maintenance and enforcement of state and national air quality standards within the Denver Metropolitan area. Buckley AFB is located within the City of Aurora and Arapahoe County and is included in the attainment area for all criteria pollutants.

Under the CAAA, the Title V Operating Permit Program imposes requirements for air quality permitting on air emission sources. Buckley would be categorized as a major source under the Title V program if it's potential emissions from stationary sources exceed 100 tons per year (tpy) of VOCs or NO_x; 100 tpy of CO, SO_2, or PM_{10}; or 10 or 25 tpy of any single or combination of hazardous air pollutants (HAPs), respectively. Also under the CAAA, the Aerospace National Emission Standards for Hazardous Air Pollutants (NESHAP) program specifies various provisions for regulated sources, including limits on HAP emissions, compliance demonstrations and performance testing, monitoring, record keeping, and reporting. Buckley AFB would trigger requirements under the NESHAP program if potential emissions of any HAP equals or exceeds 10 tpy or

any combination of HAPs equals or exceeds 25 tpy. Examples of HAPs include arsenic, asbestos, benzene, beryllium, mercury, and vinyl chloride.

Based on the previous emission inventory conducted for calendar year 2001, Buckley AFB is determined to be a major source. The base was initially issued a Title V Operating Permit by the CDPHE on 8 August 1997, and renewed the permit on 1 July 2002. Calculation of the potential-to-emit of the stationary sources for 2001 shows that Buckley AFB exceeds Title V major threshold for NO_x. Therefore, the installation remains a major source under the Title V program.

Primary on-site emission sources at Buckley AFB include stationary and mobile sources.

Stationary Sources include:

- combustion sources (jet engine tests, natural-gas-fired generators, water heaters, aircraft arresting barrier engines, and diesel-fired generators);
- fuel-storage/transfer operations (fuel-storage tanks); and
- operational sources (solvents, cleaners, antifreeze and other materials containing VOCs and HAPs).

The most recent air emissions inventory data available for Buckley AFB evaluates actual and potential stationary source emissions (Table 3-3) from the installation for calendar year 2001. The data present emissions for CO, NO_x, PM_{10}, SO_2, VOCs, and HAPs (including Pb) (Buckley AFB 2002i).

Table 3-3. Summary of Actual and Potential Stationary Source Air Emissions at Buckley AFB (2001)

Pollutant	Actual Emissions (tpy)	Potential Emissions (tpy)
Carbon Monoxide	24.2	94.0
Nitrogen Oxides	81.3	238.0
Particulate Matter (PM_{10})	11.6	29.1
Sulfur Dioxide	1.4	5.2
Volatile Organic Compounds	7.4	16.9
Hazardous Air Pollutants (including Pb)	1.8	2.6

Note: tpy - tons per year
Source: Buckley AFB 2002i

Mobile Sources at Buckley AFB include:

- vehicle and aircraft operation and maintenance (including aerospace ground equipment [AGE]).

Although mobile sources are a component of the total base emissions and in performing the conformity analysis, they are not considered under the CAAA Title V Operating Permit program. Actual mobile source emissions for Buckley AFB in Calendar Year 2001 are presented in Table 3-4.

Table 3-4. Summary of Actual Mobile Source Air Emissions at Buckley AFB (2001)

Pollutant	Actual Emissions (tpy)
Carbon Monoxide	287
Nitrogen Oxides	82
Particulate Matter (PM_{10})	2
Sulfur Dioxide	7
Volatile Organic Compounds	74
Hazardous Air Pollutants (including Pb)	N/A

Note: tpy - tons per year
N/A: Not Applicable
Source: Buckley AFB 2002i

3.10 HAZARDOUS MATERIALS AND WASTES

3.10.1 Definition of Resource

Hazardous wastes are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that pose a substantial present or potential hazard to human health or the environment. Hazardous materials are defined as any product, material, chemical or substance listed in 49 CFR 172.10, as revised October 1997, and 40 CFR 302-304, as revised July 1997. More specifically, a hazardous material is any substance or material, in any quantity or form, that has the potential to harm human health or the environment. Materials of concern include oils, lubricants, antifreeze, and lead acid batteries.

Issues associated with hazardous materials and wastes typically center around underground storage tanks (USTs); aboveground storage tanks (ASTs); and the storage, transport, and use of pesticides, fuel, and petroleum, oil, and lubricants (POL), and paint solvents. When such resources are improperly used in any way, they can threaten the health and well-being of wildlife species, botanical habitats, soil systems, water resources, and people.

To protect habitats and people from inadvertent and potentially harmful releases of hazardous substances, DoD has dictated that all facilities develop and implement Hazardous Waste Management Plans or Spill Prevention, Control, and Countermeasure Plans. Also, DoD has developed the Environmental Restoration Program (ERP), intended to facilitate thorough investigation and cleanup of contaminated sites located at military installations. These plans and programs, in addition to established legislation (e.g., the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] and Resource Conservation and Recovery Act [RCRA]) effectively form the "safety net" intended to protect the ecosystems on which most living organisms depend.

The base's Environmental Flight is responsible for environmental management action plans at Buckley AFB and acts as the U.S. Air Force (USAF) liaison on environmental compliance matters with regulatory agencies. The Environmental Flight supports the tenants of the base concerning environmental permits, hazardous material and waste storage, spill prevention and response, and participation on the Base Environmental Protection Committee (Buckley AFB 2002g).

3.10.2 Existing Conditions

The ROI for hazardous materials and wastes is limited to sources at Buckley AFB.

3.10.2.1 Hazardous Waste Generation and Storage

Hazardous materials and regulated waste management activities at Buckley AFB are governed by specific environmental regulations. In general these include substances that, because of their quantity, concentration, or physical, chemical, or

infectious characteristics, may present substantial danger to public health, welfare, or the environment upon the occurrence of a release.

Hazardous materials are used and hazardous wastes are generated at Buckley AFB in aircraft and ground vehicle maintenance, primarily the Vehicle Maintenance Shop (Building 340) and general base maintenance activities (Buckley AFB 2002g).

After hazardous wastes are initially generated, they are collected at an initial accumulation point (IAP) until the accumulated quantity reaches 55 gallons, at which moment the hazardous waste is immediately transferred to the Central Accumulation Site (CAS) (Buckley AFB 2003d). Buckley AFB is classified under RCRA as a small-quantity generator. A RCRA Part B permit is not required since Buckley AFB does not accumulate or store hazardous waste for more than 180 days, and does not treat or dispose of hazardous waste on-site. All wastes that are accumulated on-site are transported by Defense Reutilization and Marketing Office (DRMO) contractors and disposed of at permitted off-site facilities. Buckley AFB disposed of 7,335 pounds of hazardous waste and 9,132 pounds of universal waste in calendar year 2002 (Buckley AFB 2003d).

3.10.2.2 Storage Tanks and Oil/Water Separators

Fuels and other petroleum-based products that are stored and used at Buckley AFB include JP-8 jet fuel, diesel fuel, gasoline, and various oils. Areas where significant volumes of fuels are stored include the POL facility (near Building 200), the Buckley and Army Air Force Exchange Service (AAFES) Stations, the Fueling Area associated with the Army Aviation Support Facility (Building 1500), the Deicing Fluid Building (Building 604), and at various buildings where diesel tanks are required for auxiliary generators (Buckley AFB 2002g).

Buckley AFB has several oil/water separators on base for the accumulation of small discharges of waste oil at wash racks and maintenance areas (COANG 1996).

3.10.2.3 Pesticides and Herbicides

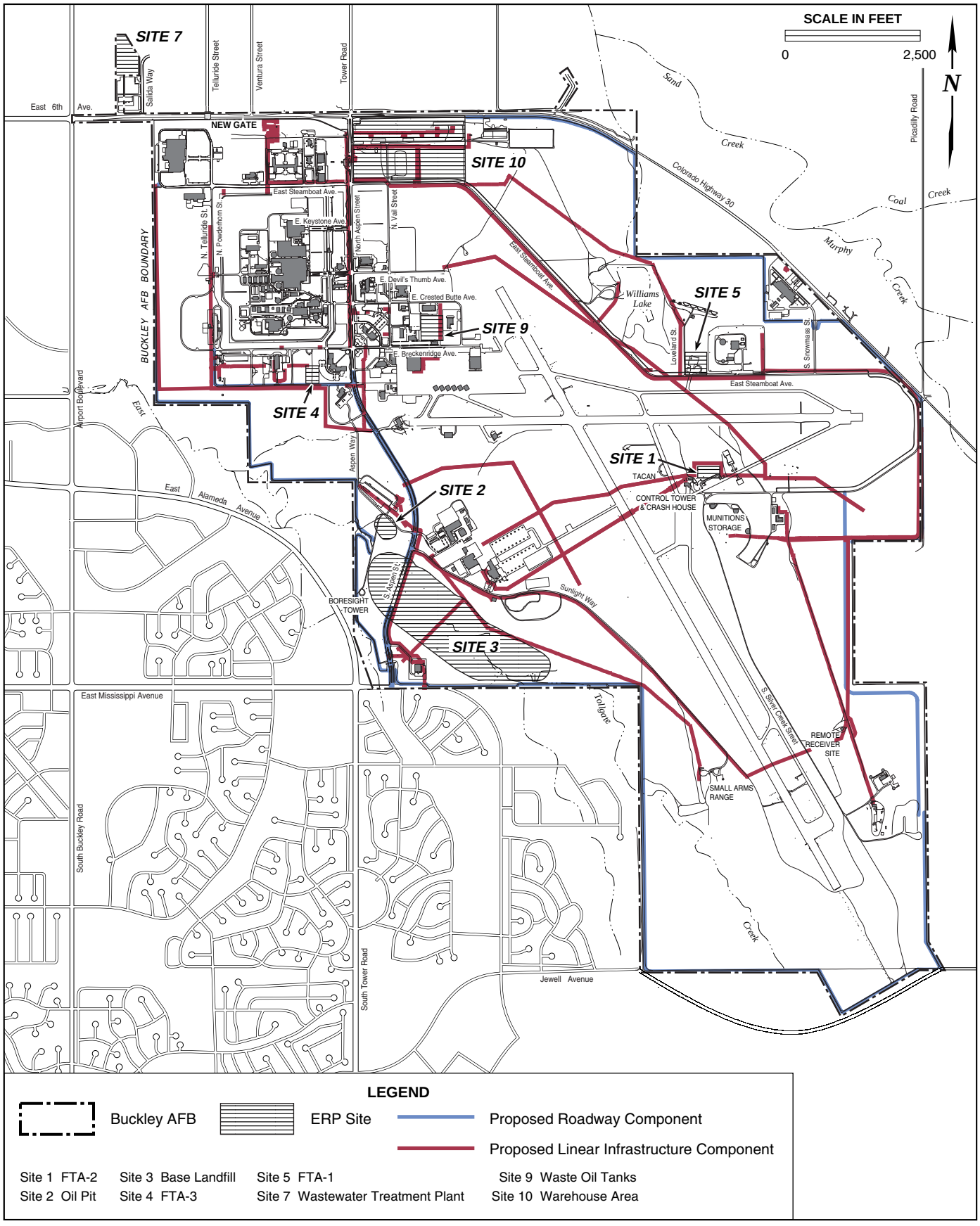
Herbicides are used at the base to control weed growth along base boundaries, on aircraft parking aprons, and along runways and taxiways. Pesticides are used to curb population growth among problem rodents and insects (e.g., rats, mice, and termites). Pesticides and herbicides are stored in the Civil Engineering Entomology facility (Building 306) which is locked; access is available only through Civil Engineering. Compounds used on base include Glyphosate, Propoxur, Pyraperm, Phostoxin, Mecoprop, Hydramethylnon, Boric Acid, and Cyfluthrin (Buckley AFB 2002g). These substances carry marginal warning levels and all applications are conducted in compliance with established guidelines to ensure their safe use.

3.10.2.4 Asbestos

Structures built on base during World War II may have included asbestos containing materials (ACM). Most of these buildings were demolished during the 1950s; however, infrastructure, including asbestos lined pipes was left in place in some areas. Further, recent activities within the former hospital complex in the northwest portion of the base revealed ACM in surface and subsurface soils (Buckley AFB 2003g). For these reasons, an asbestos survey was conducted at proposed construction sites throughout Buckley AFB, including proposed sites for infrastructure upgrades (the proposed action) in January 2003. Investigation sites included soil samples taken from trenches at proposed infrastructure upgrade areas. Thirty samples were drawn throughout the base and assessed in a laboratory. All samples were assigned a value of "non-detect" and no asbestos was found in any sample (Buckley AFB 2003g).

3.10.3 Environmental Restoration Program

Buckley AFB is currently in various phases of its ERP (Figure 3-10). Infrastructure upgrades and expansions, as well as roadway improvements, would abut some ERP sites and cross ERP Site 10, which is a former warehouse area located near the northern base boundary along East 6th Avenue. Investigations by the City of Aurora found contaminants in groundwater at this site. Trenching for proposed linear infrastructure is not proposed in areas of



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Proposed Roadway Components and Linear Infrastructure Components and Buckley AFB ERP Sites

3-10

known soil contamination and would be installed at significantly shallower depths than the contaminated water table. Although only a slight potential to occur, the contractor would be required to take precautions to prevent any contaminated soil gas from entering trenching areas in order to protect worker health and safety. The proposed action would neither affect nor be affected by ERP Site 10 (Buckley 2003b). Infrastructure components and roadway improvements shown within Site 3 are either existing overhead electrical lines to be removed, or roadway improvements and proposed electrical lines to be implemented on the South Aspen Street bridge; thereby not affecting ERP Site 3. No other ERP sites would affect or be affected by implementation of the proposed action; therefore, no further analysis with regard to potential impacts and ERP sites is covered in this EA.

3.11 BIOLOGICAL RESOURCES

3.11.1 Definition of Resource

Biological resources include native or naturalized plants and animals and the habitats in which they occur. Sensitive biological resources are defined as those plant and animal species listed as threatened or endangered, or proposed as such, by the U.S. Fish and Wildlife Service (USFWS), Colorado Division of Wildlife (CDOW) or Colorado Natural Heritage Program (CNHP). Federal *Species of Concern*, formerly known as *Category 2 candidate species*, are not protected by law; however, these species could become listed and, therefore, are given consideration in this document.

Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the Endangered Species Act and sensitive ecological areas as designated by state or federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer/winter habitats).

Jurisdictional wetlands are those subject to regulatory authority under Section 404 of the CWA and EO 11990. Wetlands are defined by the U.S. Army Corps of Engineers (USACOE) (Federal Register 1982) and USEPA (Federal Register 1980)

as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR § 328.3[b] 1984).

3.11.2 Existing Conditions

The ROI for biological resources is limited to Buckley AFB.

3.11.2.1 Vegetation

Two types of grassland communities occur at Buckley AFB. The crested wheatgrass (*Agropyron cristatum*) complex is the most common while a native mid-grass prairie occurs in the southern portions of the base and is dominated by western wheatgrass (*Agropyron smithii*). Other vegetation types include landscaped areas within the cantonment area as well as riparian bottomlands.

Existing grassland conditions at Buckley AFB can be described as a mosaic of grassland prairie, exotic weed infestations, riparian, and bottomland meadow. Typical vegetation at the installation include blue grama (*Bouteloua gracilis*), crested wheatgrass, western wheatgrass, yucca (*Yucca glauca*), prickly pear cactus (*Opuntia polyacantha*), needlegrass (*Stipa* spp.), buffalograss (*Buchloe dactyloides*), Russian thistle (*Salsola iberica*), kochia (*Kochia scoparia*), various mustards, white prickly poppy (*Argemone polyanthemos*), and sunflowers (*Helianthus* spp.). The shrubby component includes rubber rabbitbrush (*Chrysothamnus nauseosus*), and broom snakeweed (*Gutierezia sarothrae*).

3.11.2.2 Wildlife

The open grasslands and riparian corridors at Buckley AFB provide habitat for a variety of wildlife species. Numerous reptiles and amphibians have the potential to occur at the base including the western hognose snake (*Heterodon nasicus*), bull snake (*Pituophis melanoleucus*), prairie rattlesnake (*Crotalus viridis viridis*), many-lined skink (*Eumeces multivirgatus*), plains spadefoot (*Scaphiopus bombifrons*), and tiger salamander (*Ambystoma tigrinum*).

Common songbirds found at Buckley AFB include the horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), house finch (*Carpodacus mexicanus*), black-billed magpie (*Pica pica*), American robin (*Turdus migratorius*), and lark bunting (*Calamospiza melanocorys*). Birds of prey present at the base include the burrowing owl (*Athene cunicularia*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), American kestrel (*Falco sparverius*), and prairie falcon (*Falco mexicanus*). The mallard duck (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), northern shoveler (*Anas clypeata*), great blue heron (*Ardea herodias*), and killdeer (*Charadrius vociferus*) are bird species associated with the surface water resources of the base. All native North American birds, their eggs, and nests are protected by the Migratory Bird Treaty Act of 1912, as amended (USAF 2000).

The grassland complex at Buckley AFB supports a variety of small mammals. Rodents include the thirteen-lined ground squirrel (*Citellus tridecemlineatus*), black-tailed prairie dog (*Cynomys ludovicianus),* eastern fox squirrel (*Sciurus niger*), and western harvest mouse (*Reithrodontomys megalotis*). Black tailed jackrabbits (*Lepus californicus*) and desert cottontails (*Sylvilagus auduboni*) also utilize these grasslands. Large herbivores on base are generally absent due to conflicts with aircraft on the runways but an occasional mule deer (*Odocoileus hemionus*) or white-tailed deer (*Odocoileus virginianus*) may be found. Predators include the red fox (*Vulpes vulpes*), coyote (*Canis latrans*), badger (*Taxidea taxus*), and striped skunk (*Mephitis mephitis*).

3.11.2.3 Sensitive Species

According to information from the USFWS, CDOW, and CNHP, 10 special status species potentially occur on base (Table 3-5).

The northern leopard frog can be found along the riparian margins of ponds, marshes, streams, lakes, and reservoirs. It also occurs in wet meadows and along irrigation ditches. Surveys have not been conducted for this species at Buckley AFB, but suitable habitat may exist along the bottomlands and stream margins associated with Murphy Creek, East and West Tollgate Creeks, and unnamed tributaries of Sand Creek.

Ferruginous hawks were known to occur as a resident at the former Plains Conservation Center adjacent to Buckley AFB (USAF 2000). This species forages for small mammals including black-tailed prairie dogs in open vegetation areas. Due to the large numbers of prairie dogs on base and extensive habitat occupied

Table 3-5. Sensitive Species Potentially Occurring on Buckley AFB

Common Name	Scientific Name	Status
Amphibians		
Northern Leopard Frog	*Rana pipiens*	SSC
Birds		
Ferruginous Hawk	*Buteo regalis*	SSC
Bald Eagle	*Haliaeetus leucocephalus*	FT, ST
Mountain Plover	*Charadrius montanus*	PT, SSC
Burrowing Owl	*Athene cunicularia*	ST, FSC
Baird's Sparrow	*Ammodramus bairii*	FSC
Mammals		
Swift Fox	*Vulpes velox*	FE, SSC
Black-tailed Prairie Dog	*Cynomys ludovicianus*	FC
Plants		
Ute Ladies'-tresses Orchid	*Spiranthes diluvialis*	FT
Colorado Butterfly Plant	*Gaura neomexicana* ssp. *coloradensis*	FT

FC = Federal candidate species for listing
FE = Federally listed – endangered
FSC = Federal species of concern
FT = Federally listed – threatened
PT = Federally proposed – threatened
SSC = State special concern
ST = State threatened
Sources: CDOW 2001; USFWS 2002.

by these and other prey species, these hawks can be found on base as a transient or while foraging.

The state-threatened burrowing owl is a migratory resident on base and occurs there from March through October. They inhabit the grassland community and use abandoned prairie dog burrows or other excavated sites as nesting locations. During the summer of 2002 at least 18 to 20 nesting pairs were observed on the base (Buckley AFB 2003e).

The mountain plover is listed as a federally proposed-threatened species and state special concern species. This species prefers shortgrass prairies dominated by buffalograss and blue grama with areas of bare ground. They also inhabit prairie dog towns. The breeding range of the mountain plover does not include

the western portion of Arapahoe County. The mountain plover is only likely to be found on base as a rare migratory transient.

The federally threatened bald eagle is associated with large rivers, lakes, and reservoirs. They usually feed on fish but on the eastern plains of Colorado are known to feed on small mammals such as black-tailed prairie dogs, especially during the winter (USAF 2000). Bald eagles occur as winter transients at Buckley AFB, where they may occasionally forage in prairie dog towns.

The Baird's sparrow is another federal species of concern. In Colorado this species is known as a migrant on its way to nesting grounds in Montana and the Dakotas. It is a grassland bird species; therefore, it has the potential to be found in the undeveloped portions of the base.

The swift fox, a federally listed endangered species and state special concern species, is found across the eastern plains of Colorado. Typical habitat includes short and mid-grass prairies with relatively flat or gently rolling topography. This species preys largely on rabbits and hares but also takes smaller rodents such as black-tailed prairie dogs. This species has not been observed at Buckley AFB but due to its nocturnal behavior, it may go unnoticed.

A federal candidate species, the black-tailed prairie dog, is a common and numerous resident at Buckley AFB. It inhabits short and mid-grass prairies where it forms colonies known as towns. Prairie dogs provide a food source and/or valuable habitat for many species including some of the sensitive species mentioned in this section. The base follows the *Supplement to the Environmental Assessment of Proposed Prairie Dog Management Practices at Buckley AFB*, dated June 2001.

The Ute ladies'-tresses orchid is a federally threatened species. It occurs in wet meadows, along streams, lakes, and associated floodplains. At least two surveys have been attempted to locate the Ute ladies'-tresses orchid at Buckley AFB. To date, none have been discovered; however, suitable habitat has been identified, primarily in low-lying areas near Tollgate Creek and Williams Lake. Therefore, there is potential for this plant to occur at Buckley AFB, and it may be found when weather conditions become more favorable for the plant (Buckley AFB

2003e). A federally threatened species, the Colorado butterfly plant also occurs in similar habitat. Surveys have not been conducted on base for the Colorado butterfly plant, but potential habitat does occur along the bottomlands and stream margins associated with Murphy Creek, East and West Tollgate Creeks, and unnamed tributaries of Sand Creek.

3.11.2.4 Wetlands

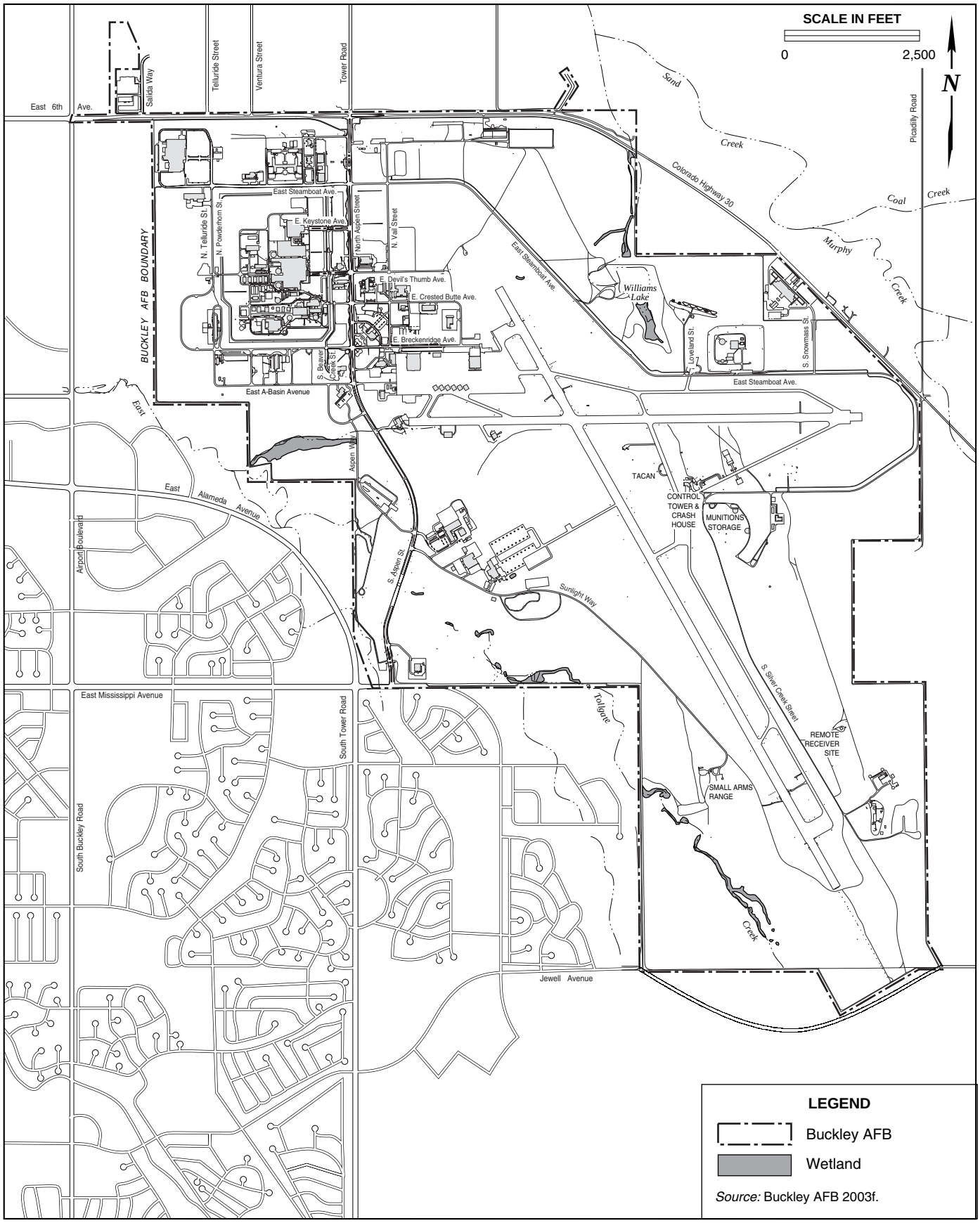
Buckley AFB's most current *Draft Integrated Natural Resources Management Plan* (2002) identified twenty-three wetland areas on Buckley AFB (Buckley AFB 2003e) (Figure 3-11). Most of the wetlands occur within or adjacent to the East Tollgate Creek floodplain in undeveloped southwestern portions of the base. A large wetland occurs along a fork of East Tollgate Creek, south of East A-Basin Ave and west of Aspen Way. Williams Lake and two other wetlands associated with a tributary of Sand Creek, comprise the three wetland sites in the northeast area of the base.

3.12 SAFETY

3.12.1 Definition of Resource

The primary concern with regard to military training flights is the potential for aircraft mishaps (i.e., crashes), which may be caused by mid-air collisions with other aircraft or objects, weather difficulties, or bird-aircraft strikes.

Siting requirements for explosive materials storage (e.g., munitions) and handling facilities are based on safety and security criteria. Air Force Manual (AFM) 91-201, *Explosives Safety Standards*, requires that defined distances be maintained between these and a variety of other types of facilities. These distances, called QD arcs, are determined by the type and quantity of explosive materials to be stored. Each explosive material storage or handling facility has QD arcs extending outward from its sides and corners for a prescribed distance. Within these QD arcs, development is either restricted or altogether prohibited in order to maintain safety of personnel and minimize the potential for damage to other facilities in the event of an accident. QD arcs for multiple facilities at a single site may overlap, leaving a series of arcs as edges of the safety zone.



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Wetlands on Buckley AFB

3-11

Explosive materials storage and build-up facilities must be located in areas where security can be assured.

3.12.2 Existing Conditions

3.12.2.1 Aircraft Mishaps

Five mishap classifications have been defined by the USAF. Class A mishaps result in a fatality or permanent total disability; total cost in excess of $1 million for injury, occupational illness, and property damage; or destruction or damage beyond repair to military aircraft. Class B mishaps result in a permanent partial disability; total cost in excess of $200,000 but less than $1 million for injury, occupational illness, and property damage; or hospitalization of five or more personnel. Class C mishaps result in total damages between $10,000 and $200,000, and Class D mishaps result in total damages between $1,000 and $10,000. The fifth mishap category, *high accident potential*, comprises incidents resulting in total damages of less than $1,000.

In 1993, the 140th Wing had one Class A mishap in a remote area of eastern Wyoming. Another Class A mishap occurred in 1994 when an F-16 aircraft (not assigned to Buckley ANGB at the time) crashed during takeoff at the southern end of the runway. Since these two events, Buckley AFB has reported no aircraft mishaps (COANG 1999a).

3.12.2.2 Accident Potential Zones

Accident Potential Zones (APZs)—rectangular zones extending outward from the ends of active runways at military bases—delineate those areas recognized as having the greatest risk of aircraft mishaps, most of which occur during takeoff or landing. Development restrictions within APZs are intended to preclude incompatible land use activities from being established in these areas. The Clear Zone (CZ) is the area closest to the end of the runway, which is considered the most hazardous area.

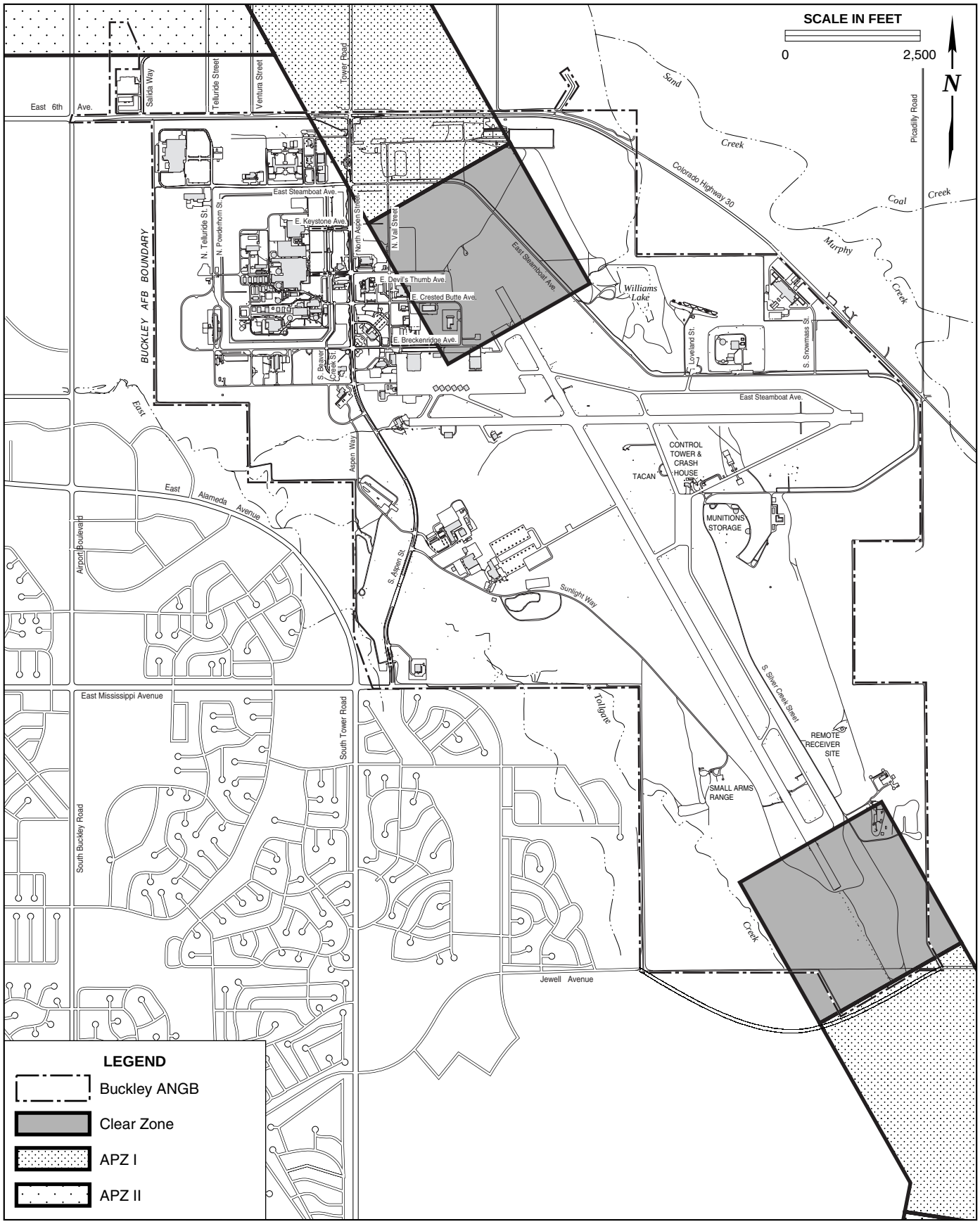
At Buckley AFB, the CZs and APZs extend 15,000 feet from both ends of the runway. Most of the CZs are contained within base boundaries but the majority

of APZs fall outside of the base's borders (COANG 1999a). To the north is mostly open space, some public land, and minimal light industrial development. Currently, four buildings designed for habitation are located wholly or partially in the northern CZ. According to the base's General Plan, one of the buildings (902) is scheduled for demolition; another would be vacated and demolished (950); and a third building (940) would be added to the demolition list when a replacement facility is built (Buckley AFB 2002a). To the south of the runway is the Plains Conservation Center, which is designated as Regional Park and Open Space in the *E-470 Corridor Land Use Study*. A small portion of the Center, abutting the southern boundary, is within the southern CZ (Buckley AFB 2002a) (Figure 3-12). A portion of the area to the southeast of the base boundary includes Buckley Research and Development land, and falls within the southern APZ (Buckley AFB 2002a).

3.12.2.3 Bird-Aircraft Strike Hazard

Bird-Aircraft Strike Hazard (BASH) is defined as the threat of aircraft collision with birds and other wildlife during aircraft operations and is a safety concern at all airfields due to the frequency of aircraft operations and the possibility of encountering wildlife on the ground and birds at virtually all altitudes. Most birds fly close to ground level; correspondingly, more than 95 percent of all reported bird-strikes occur below 3,000 feet above ground level (AGL). At most military base's, about half of reported bird strikes occur in the immediate vicinity of the airfield and another 25 percent occur during low-altitude local training exercises.

Bird-aircraft strikes present a potential threat to Buckley AFB aircraft and aircrew safety due to the base's proximity to resident and migratory bird species. The base developed a BASH plan in order to minimize the threat and occurrence of bird strike and wildlife hazards at Buckley AFB. According to Buckley AFB's 2001 BASH Plan, there were 21 reported bird strikes for the installation recorded between 1985 and July 2001. These strikes have occurred to assigned and transient aircraft at various times of year and include raptors, doves, and meadowlarks among other species. Additionally, two coyotes have been struck by F-16s at the base (Buckley AFB 2002j).



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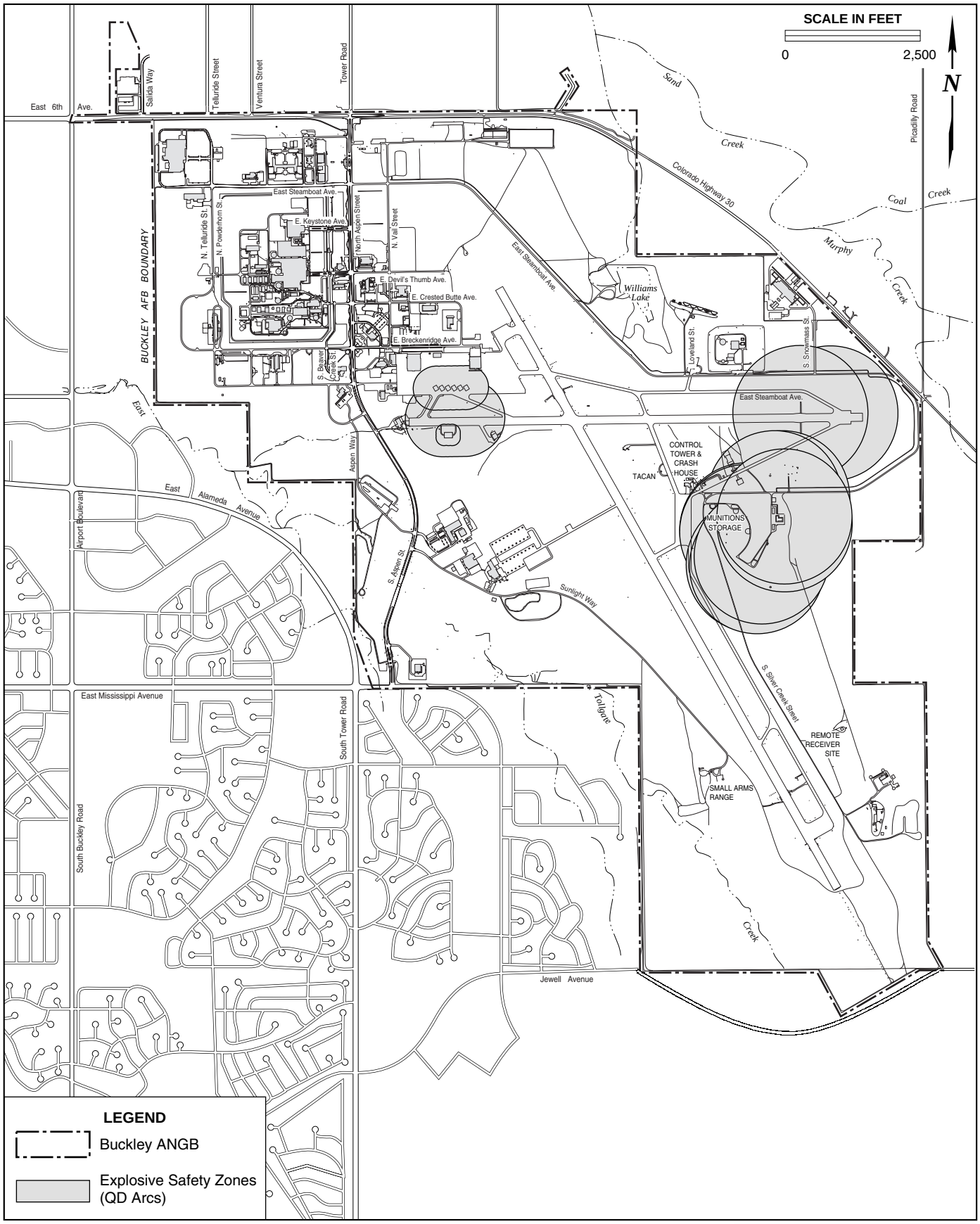
Clear Zones and Accident Potential Zones at Buckley AFB

3-12

Explosives Safety

As depicted in Figure 3-13, a series of quantity distance (QD) arcs exist in the eastern portion of the base. Arcs in the eastern portion of the base are associated with the munitions hold area on the south side of Taxiway L, and the hot cargo pad and the munitions storage area on the east side of the runway. No base facilities, other than those directly associated with munitions storage, are located within these QD arcs (COANG 1999a). There are also two QD arcs encompassing the two primary hangars (Buildings 801 and 909) and most of the Main Ramp in the western portion of the base (Buckley AFB 2002a). Within these QD arcs, administrative and maintenance personnel work in two habitable buildings. This is a land use incompatibility and safety issue because personnel working within QD arcs are supposed to perform duties directly related to the function requiring the arcs (Buckley AFB 2002a).



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Explosive Safety Zones and Defining QD Arcs at Buckley AFB

3-13

SECTION 4
ENVIRONMENTAL CONSEQUENCES

In this section, potential impacts of proposed actions and alternatives at Buckley Air Force Base (AFB) are examined for environmental and human resources. Where appropriate (e.g., in discussions of transportation and circulation, geological resources, and water resources), proposed action components have been grouped into two categories based on similarities of expansion and upgrade requirements: *linear infrastructure* (i.e., natural gas, electrical, sewerage, and potable water lines), and *roadways*. Examination of potential environmental impacts using these groupings is intended to reduce redundancy in impact analyses yet enable impact evaluation that may be unique to an individual proposed action component. In circumstances where potential environmental impacts would be common under implementation of both groupings, impacts are addressed together. Further, with regard to certain environmental issues (e.g., the Environment of Restoration Program [ERP] and cultural resources) analyses are not provided for reasons detailed in Section 3, *Affected Environment*).

4.1 UTILITIES

4.1.1 Approach to Analysis

Interruption or disruption of utility services could occur as a result of physical displacement and subsequent relocation of public utility infrastructure during project implementation. In addition, an impact to utilities would occur if an increase in demand for utility service is beyond the capacity of the utility provider. In general, impacts to utilities would be significant if the proposed action had the potential to exceed existing or forecasted capacities of natural gas, wastewater, water, solid waste disposal, or electricity.

4.1.2 Impacts

4.1.2.1 Proposed Action

Gas and Electricity

Existing natural gas distribution lines at the base are approaching the end of their design life span and some lines are leaking; further; demand for natural gas continues to increase. Similarly, the current electrical distribution system is undersized and needs to be upgraded. Because the proposed action would upgrade and extend natural gas and electrical distribution systems to satisfy existing and forecast demand, its implementation would have a beneficial impact on these utilities.

Wastewater

Sewerage service is mainly provided to the base by Metro Wastewater Reclamation District. During the first two phases of the infrastructure upgrade program at Buckley AFB, most of the base's original sanitary sewer system was replaced or upgraded. (The original system was constructed more than 50 years ago using vitrified clay pipe—a brittle material prone to cracking.) This third phase of the upgrade program would complete necessary improvements to the sanitary sewer system by installing a new sewer collection line in the northwestern portion of the base. Implementation of these proposed upgrades would result in beneficial impacts to wastewater collection, treatment, and disposal. The proposed project also calls for new potable water lines to be chlorinated and flushed to properly disinfect the pipes before they are put into service. Additional wastewater discharge from this process would not create significant impacts to the sanitary sewer system. This process is discussed further within the *Water* section below.

Water

Potable water supplied to Buckley AFB is currently provided by the City of Aurora. The base's potable water distribution system currently experiences pressure and flow problems during periods of heavy usage—the primary

affected area is the Munitions Storage Area (MSA) in the eastern portion of the base. To correct these problems, the base has proposed to install new lines and upgrade components of the existing distribution system. Implementation of these proposed upgrades would result in beneficial impacts to the potable water distribution system.

With regard to water allocation, no increases in personnel would occur as a result of the proposed action; therefore, water demand and use is not expected to increase. Buckley AFB used approximately 102 million gallons out of the approximate 111 million gallons of water allocated to the base by the City of Aurora in 2002. Further, the City plans to double water allocations to Buckley AFB starting in late 2003; therefore, the proposed potable water line upgrades would accommodate any potential future increases in water usage and would be beneficial to the potable water distribution system (City of Aurora Utilities 2003).

Coinciding with the implementation of proposed upgrades to the potable water distribution system, the City of Aurora would require all newly installed potable water lines to be chlorinated, then flushed to ensure the pipes are disinfected before usage. For the purpose of discharging the chlorinated water, the City's Utilities Department suggests land application of chlorinated wastewater (City of Aurora Utilities 2003). This process would involve discharging to the ground at a rate that allows the water to percolate into the soil where chlorine levels continue to naturally attenuate. The contractor would be required to dechlorinate water to specific levels (agreed to by the City's Utilities Department) before land-application, as well as coordinate with the Environmental Office at Buckley AFB regarding discharge procedures and locations (Buckley AFB 2003b). Further, the contractor would be required to prevent land-applied water from reaching stormwater conveyances (Buckley AFB 2003h). If the potable water lines were flushed a second time, the resulting wastewater could be used for irrigation purposes once water quality levels are measured as acceptable (City of Aurora Utilities 2003).

If the method chosen were to discharge to the sanitary sewer system, consultation with the Metro Wastewater Reclamation District would be required. Buckley AFB currently discharges an average of 150,000 gallons per day (gpd); an average of 327,000 gpd in the summer and 119,000 gpd in all other seasons.

Discharges to the sanitary sewer system of chlorinated water would be temporary, would not significantly increase the base's overall amount of wastewater discharge, and no significant impacts would occur.

4.1.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

Selection of this alternative would result in the elimination of certain components of the proposed action. Consequently, substandard electrical service in the eastern portion of the base would remain and the base would not obtain the long-term goal of having all utilities placed underground. Therefore, this alternative would result in adverse but insignificant impacts to utilities.

4.1.2.3 Alternative 2: No-Action Alternative

Impacts to utilities under the No-Action Alternative would be adverse yet insignificant since this alternative would leave system deficiencies uncorrected. While periodically inconvenient, implementation of this alternative would not impact the base's ability to accomplish its mission.

4.2 TRANSPORTATION AND CIRCULATION

4.2.1 Approach to Analysis

Potential impacts to transportation and circulation are assessed with respect to anticipated disruption or improvement of current transportation patterns and systems; deterioration or improvement of existing levels of service (LOS); and changes to existing levels of transportation safety. Impacts may arise from physical changes to circulation (e.g., closing, rerouting, or creating roads), construction activity, introduction of construction-related traffic on local roads, or changes in daily or peak-hour traffic volumes created by base workforce and population changes. Impacts on roadway capacities would be significant if roads with no history of exceeding capacity were forced to operate at or above their full design capacity or if already substandard conditions were worsened.

4.2.2 Impacts

4.2.2.1 Proposed Action

Implementation of any component of the proposed action would require delivery of materials to and removal of debris from construction sites. However, construction traffic would comprise only a small portion of total existing regional traffic. Further, an increase in traffic volumes associated with construction activity would be temporary; upon completion of construction, no long-term impacts to off-base transportation systems would result. Further, it is expected that equipment (e.g., heavy trucks and earthmoving machinery) would remain on site during construction activities; therefore, daily additions of construction-related vehicles onto regional roadways would not occur. No significant impacts to the regional transportation network are anticipated as a result of implementation of the proposed action.

Linear Infrastructure Components

Implementation of these projects would require site preparation (e.g., trench excavation and soil stockpiling), import of equipment (e.g., construction machinery and utility components), utilities burial, and site closure (e.g., resurfacing).

Construction-related impacts associated with linear infrastructure components (e.g., circulation detours and periodic obstructions presented by construction equipment) would result from implementation of the proposed action; however, such impacts would be short-term and temporary and would not be significant. Further, proposed linear upgrades and expansion would coincide with proposed road improvements in order to minimize the duration of potential traffic disruptions. Once complete, regular operation and use of the proposed linear infrastructure would not generate additional automobile traffic or encumber base circulation; therefore, no long-term impacts to transportation and circulation would occur under implementation of these project components.

Roadway Components

Existing circulation on base is constricted by narrow roads that cannot accommodate peak traffic volumes, and the existing transportation network does not provide adequate access to areas in the eastern portion of the base. Further, because existing roadway pavements are deteriorated, and much of the road network lacks stable shoulders, curbs, and proper drainage channels, implementation of roadway components of the proposed action would have long-term beneficial impacts to on-base circulation. Construction of a new road in the eastern portion of the base would improve traffic flow and safety conditions, while rerouting traffic away from the MSA and creating direct access to the U.S. Marines complex.

As with other components of the proposed action, implementation of proposed roadway improvements, as well as routine maintenance, would require the presence of on-site construction machinery and equipment; however, these impacts would be short-term and temporary and would not be significant. Once complete, upgraded roadways would enhance transportation and circulation at the base and would result in long-term beneficial impacts.

4.2.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

If this alternative were selected, certain aspects of the proposed action deemed "optional" would be excluded, and only the "priority" components of the upgrade program would be implemented. Under this alternative, potential short- and long-term impacts to transportation and circulation would be similar to those described under the proposed action. The proposed improvements to A-Basin Avenue and upgrades of the perimeter patrol road would not occur. Therefore, construction-related impacts associated with linear infrastructure components (e.g., circulation detours and periodic obstructions presented by construction equipment) under this alternative would be less than those under the proposed action because some of the components would not occur. Long-tem related impacts would be somewhat less beneficial than described under the proposed action. Problems associated with the conditions of A-Basin Avenue and the perimeter road would remain; however, these conditions, such as lack of curbs and gutters, would not have significant impacts to transportation and

circulation patterns. Therefore, impacts under this alternative would be insignificant to transportation and circulation.

4.2.2.3 Alternative 2: No-Action Alternative

Under the No-Action Alternative, transportation (i.e., roadway) conditions and circulation patterns would remain as they currently exist on base. Implementation of this alternative would not affect regional (i.e., off-base) transportation and circulation. However, selection of this alternative would leave deficiencies in existing roadway pavements and traffic circulation patterns on base uncorrected. Implementation of this alternative, although not altering an existing condition and not mission-prohibitive, would comprise an adverse impact to on-base transportation and circulation.

4.3 GEOLOGICAL RESOURCES

4.3.1 Approach to Analysis

Generally, impacts with regard to geological resources can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering designs are incorporated into project development. Analysis of potential impacts to geological resources typically includes: 1) identification and description of resources that could potentially be affected; 2) examination of the proposed action and the potential effects this action may have on the resource; 3) assessment of the significance of potential impacts; and 4) provision of mitigation measures in the event that potentially significant impacts are identified. Impacts would be significant if soils were altered or disturbed so as to create significant erosion problems, or if unique geological features were disturbed or removed.

4.3.2 Impacts

4.3.2.1 Proposed Action

Under implementation of any component of the proposed action, there would be no impacts on regional geology, and adverse but not significant impacts to soils.

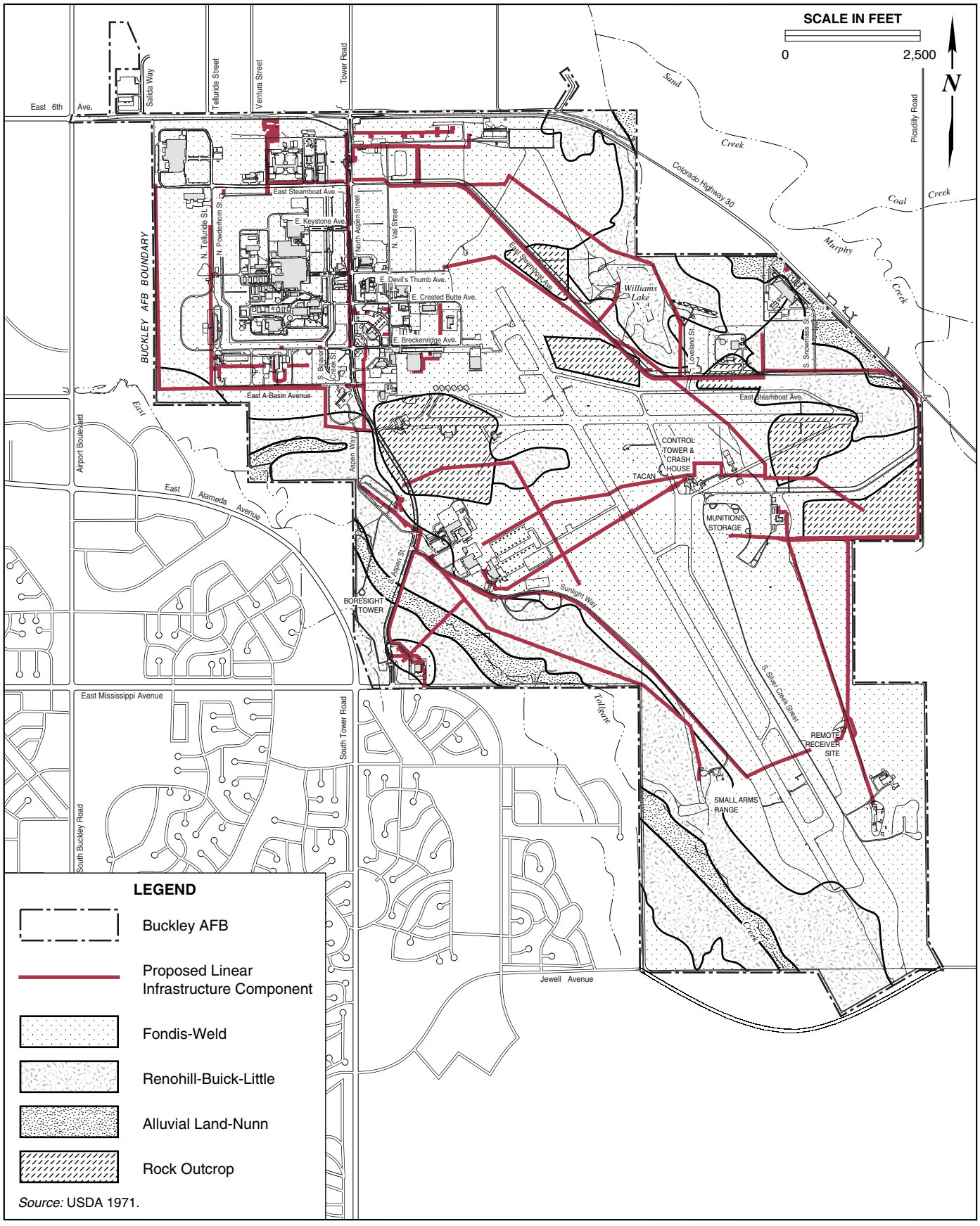
Soils in many areas of the base have been significantly altered through excavation, leveling, or replacement with fill to facilitate previous construction.

The predominant naturally occurring soil association at Buckley AFB and in areas proposed for infrastructure upgrade and expansion is the Fondis-Weld Association, which is rated as having *slight* to *moderate* limitations for the proposed actions (e.g., street construction) (Figure 4-1). A rating of *slight* indicates that a soil presents no important limitations to such development and a rating of *moderate* indicates that the soil presents some limitations to these selected uses, but these limitations are routinely overcome by employing standard construction practices (U.S. Department of Agriculture [USDA] 1971).

Due to the Fondis-Weld soil association's physical properties, this complex can become compacted quickly by heavy equipment during construction. Further, denuded or otherwise exposed soils may become vulnerable to increased wind and water erosion. However, through the use of best management practices (e.g., covering soils during rains, rapid replanting of vegetation, soil stockpiling, and minimization of soil disturbance) and limited use of heavy equipment, construction effects on the soils would be minimal and localized. Upgrades, repairs, and new construction of utilities and operating systems would be designed and constructed to mitigate potentially adverse soil conditions.

Linear Infrastructure Components

Implementation of linear infrastructure components would require site preparation (e.g., trench excavation and soil stockpiling), import of equipment (e.g., construction machinery and utility components), utilities burial, and site closure (e.g., resurfacing). In areas where infrastructure expansion is proposed that are currently dominated by rock outcrops (refer to Figure 4-1), standard rock excavation practices and, possibly, small-scale blasting may be required. (Affected rock outcrops comprise exposed bedrock; these are not unique geologic features and—if blasting were required—impacts would not be significant despite the permanent change in site-specific geology.) With respect to geological resources, the greater potential impacts would be those related to soils. To minimize potential impacts to soils after trenching operations are completed, disturbed surfaces would be replanted with native grasses, especially



Source: USDA 1971.

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Proposed Linear Infrastructure Components and Soils Associations at Buckley AFB

4-1

on steep slopes. In many circumstances, trenching and other activities related to infrastructure upgrade and installation would occur at locations that have previously been disturbed for infrastructure installation.

Once complete, regular operation and use of the proposed linear infrastructure would not require disturbance to soils, topographic alterations, or impacts to any other geological resources; therefore, no long-term impacts to geological resources would occur under implementation of these project components.

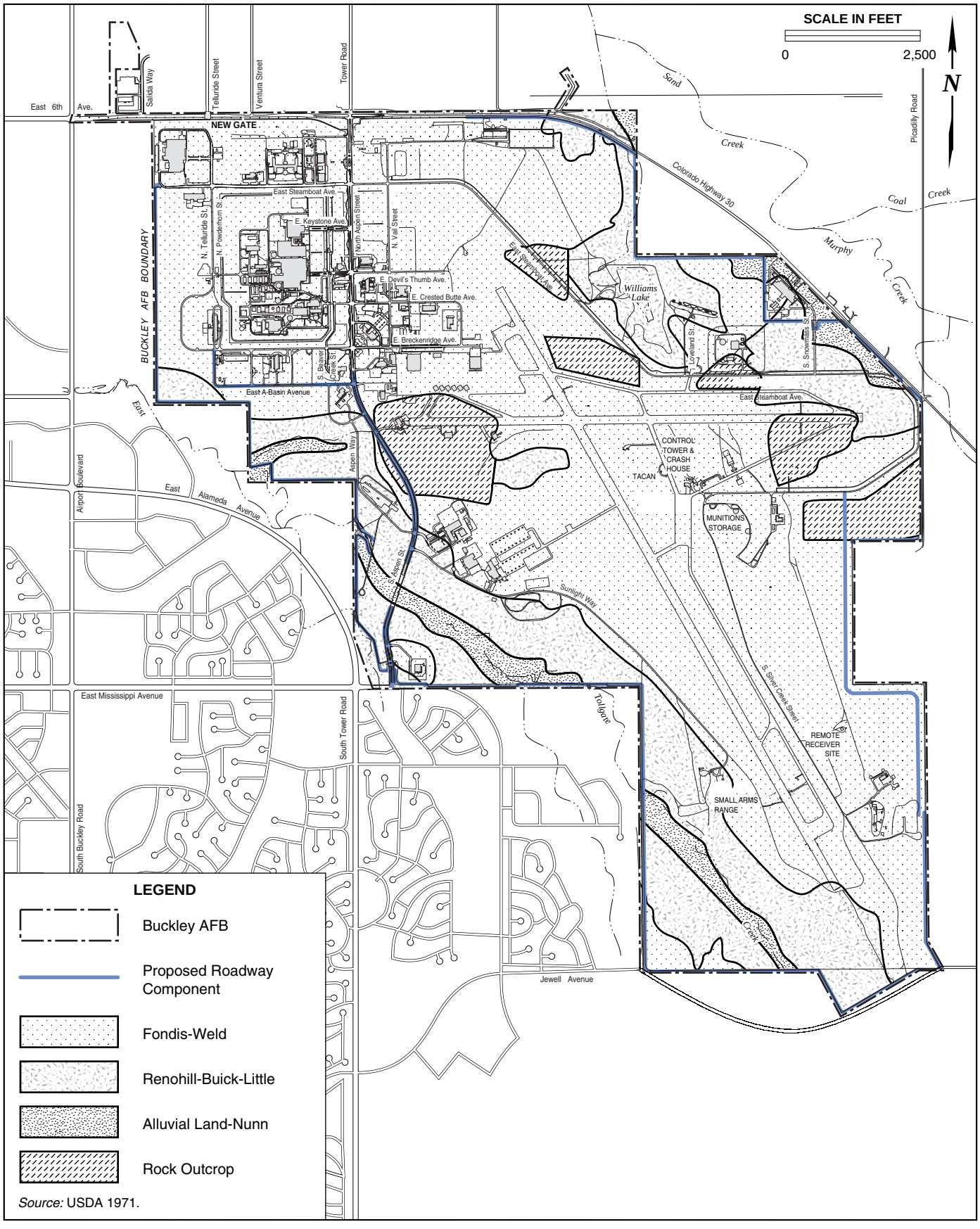
Roadway Components

As with other components of the proposed action, implementation of proposed roadway improvements would require the operation of on-site construction machinery and equipment; however, impacts associated with such activity would be short-term and temporary and would not be significant. In areas where new roadway construction is proposed that are currently dominated by rock outcrops (Figure 4-2), standard rock excavation practices and, possibly, small-scale blasting may be required. As mentioned previously, these outcrops do not represent unique geologic figures in the region. With regard to affected soils, implementation of best management practices would minimize potential impacts.

Once complete, upgraded and new roadways would not result in further disturbance to soils, topography, or geology; routine maintenance of the perimeter road would occur on existing roadways and would not disturb soils in previously undeveloped areas. Therefore, no long-term significant impacts to geological resources would result from implementation of the roadway components of the proposed action.

4.3.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

Under this alternative, potential short- and long-term impacts to geological resources would be similar to those described under the proposed action; however, the total area disturbed would be slightly less than under the proposed action. Therefore, because impacts to geological resources under implementation



Source: USDA 1971.

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Proposed Roadway Components and Soil Associations at Buckley AFB

4-2

of the proposed action would not be significant, impacts from this alternative would also not be significant.

4.3.2.3 Alternative 2: No-Action Alternative

Under the No-Action Alternative, the proposed upgrades and expansion of infrastructure at Buckley AFB would not occur; therefore, no impacts to geology, soils, or topography would occur. Existing conditions would remain unchanged from current conditions as described in Section 3.3, *Geological Resources*.

4.4 WATER RESOURCES

4.4.1 Approach to Analysis

Significance of potential impacts to water resources is based on water availability, quality, and use; existence of floodplains; and associated regulations. An impact to water resources would be significant if it would: 1) reduce water availability or interfere with the supply of existing users; 2) create or contribute to overdraft of groundwater basins or exceed safe annual yield of water supply sources; 3) adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions; 4) threaten or damage unique hydrologic characteristics; or 5) violate laws or regulations that have been established to protect or manage water resources of an area. Impacts of flood hazards on proposed actions would be significant if such actions are proposed to be established in areas with high probabilities of flooding. Further, any modification to the 100-year floodplain would result in significant impacts and would require coordination with the Urban Drainage and Flood Control District (City of Aurora Planning Department 2003b).

4.4.2 Impacts

4.4.2.1 Proposed Action

Regional water supply has sufficient capacity to meet current and anticipated demands at Buckley AFB. Implementation of the proposed upgrades to the base's distribution system would not significantly alter water resources on or off-

base, nor would any infrastructure component or facility be a substantial contributor to runoff.

With regard to groundwater and surface water, construction would have localized, temporary effects on hydrology; however, best management practices (e.g., channeling stormwater flow into existing drainages) would be incorporated during construction phases of the proposed action to minimize erosion, runoff, and sedimentation. Because the cumulative soil disturbance for this work is greater than one acre, the U.S. Army Corps of Engineers (USACOE) and the construction contractors must submit a Notice of Intent to the U.S. Environmental Protection Agency (USEPA) to be covered under the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from construction activities (Buckley AFB 2003h). The Stormwater Pollution Prevention Plan would be consulted and followed for all activities associated with managing runoff. Ground disturbance during construction would be temporary and would occur in previously developed areas—very few undeveloped areas would be converted to impermeable surfaces (i.e., primarily the proposed road segment intersecting Silver Creek Street east of the MSA and road widening projects). Further, although not part of the proposed action, a stormwater drainage study for the main industrial area is planned that would determine the adequacy of the existing system to accommodate current and anticipated demands. This separate study would assess the need for new detention ponds, as well as the potential to expand existing detention ponds.

Linear Infrastructure Components

Implementation of linear infrastructure components would require site preparation (e.g., trench excavation and soil stockpiling), import of equipment (e.g., construction machinery and utility components), utilities burial, and site closure (e.g., resurfacing).

With regard to potential impacts associated with increases in runoff, in many circumstances, trenching and other ground-disturbing activities would occur at locations that have previously been disturbed for infrastructure installation and have drainage systems in place. Nevertheless, potential impacts to water resources during construction would be further minimized through

implementation of best management practices to avoid total suspended particulates from entering waterways (e.g., controlling increased runoff generated through on-site retention).

With regard to potential impacts associated with floodplains, the proposed underground electrical line along South Aspen Street would be elevated and attached to the bridge over the floodplain (Buckley AFB 2003b) (see Appendix B, P-11). Therefore, the line would not go directly through the floodplain and no impacts would result (Figure 4-3). An overhead electrical line, which runs above the floodplain, would also be removed.

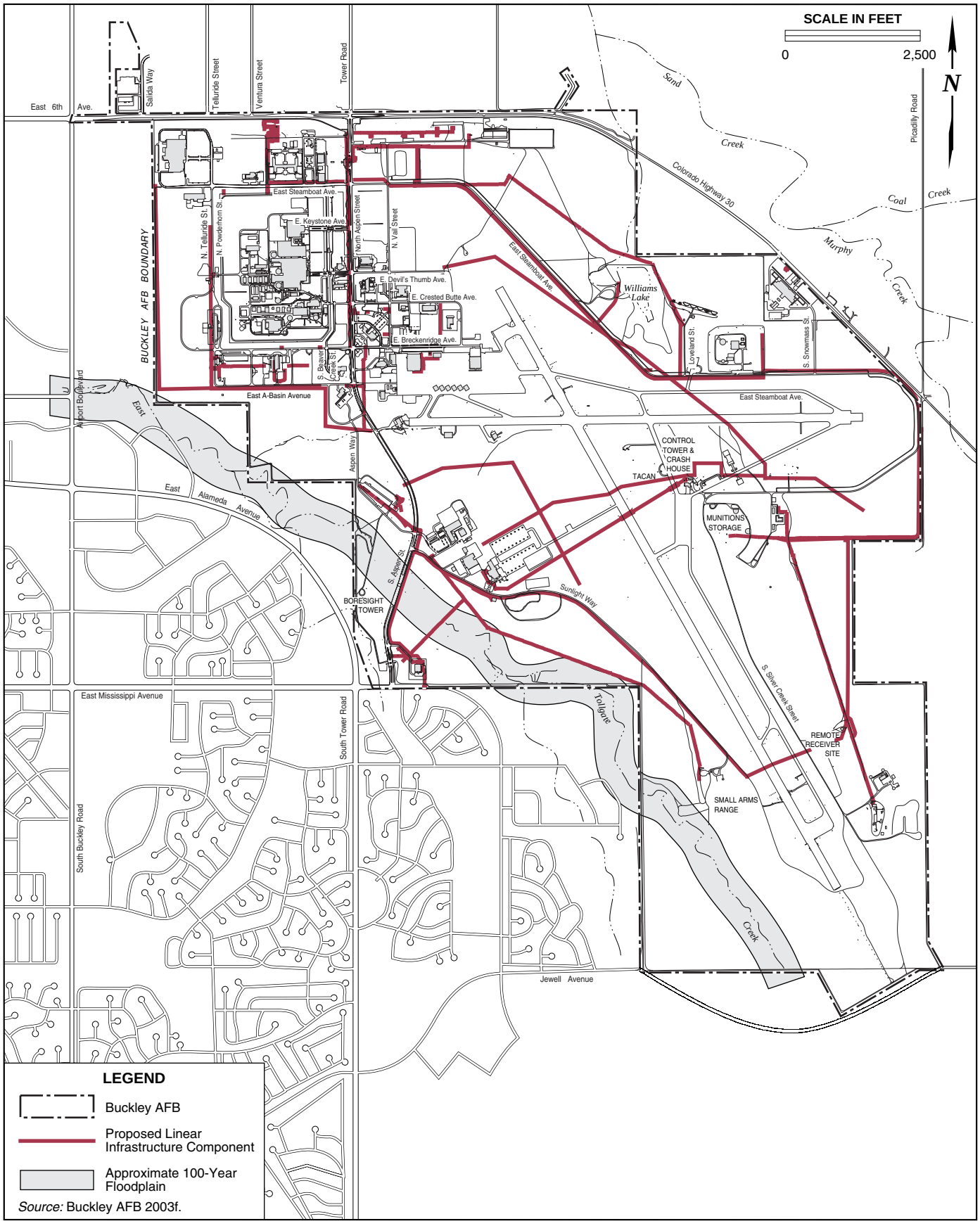
Once complete, burial and regular operation and use of the proposed linear infrastructure upgrades would not result in significantly increased runoff on base. Long-term impacts to floodplains are not anticipated to occur with implementation of new underground electrical lines.

Roadway Components

As with other components of the proposed action, implementation of proposed roadway improvements would require the presence of on-site construction machinery and equipment; however, potential impacts to water resources associated with the use of such equipment would be short-term and temporary, could be minimized through the use of best management practices, and would not be significant.

Segments of the perimeter road are within the 100-year floodplain of ephemeral East Tollgate Creek (Figure 4-4) (Appendix B, P-34). Routine grading proposed within these portions of the perimeter road would not change contours of the floodplain and would only include maintenance activities (i.e., filling potholes), thereby avoiding impacts which would alter the existing hydrologic regime. Further, no concrete would be used for routine grading and maintenance within the floodplain.

The proposed widening of base roadways would incorporate existing, base-wide surface drainage systems which would accommodate potential increases in stormwater flow associated with these minor increases in paved surfaces at the



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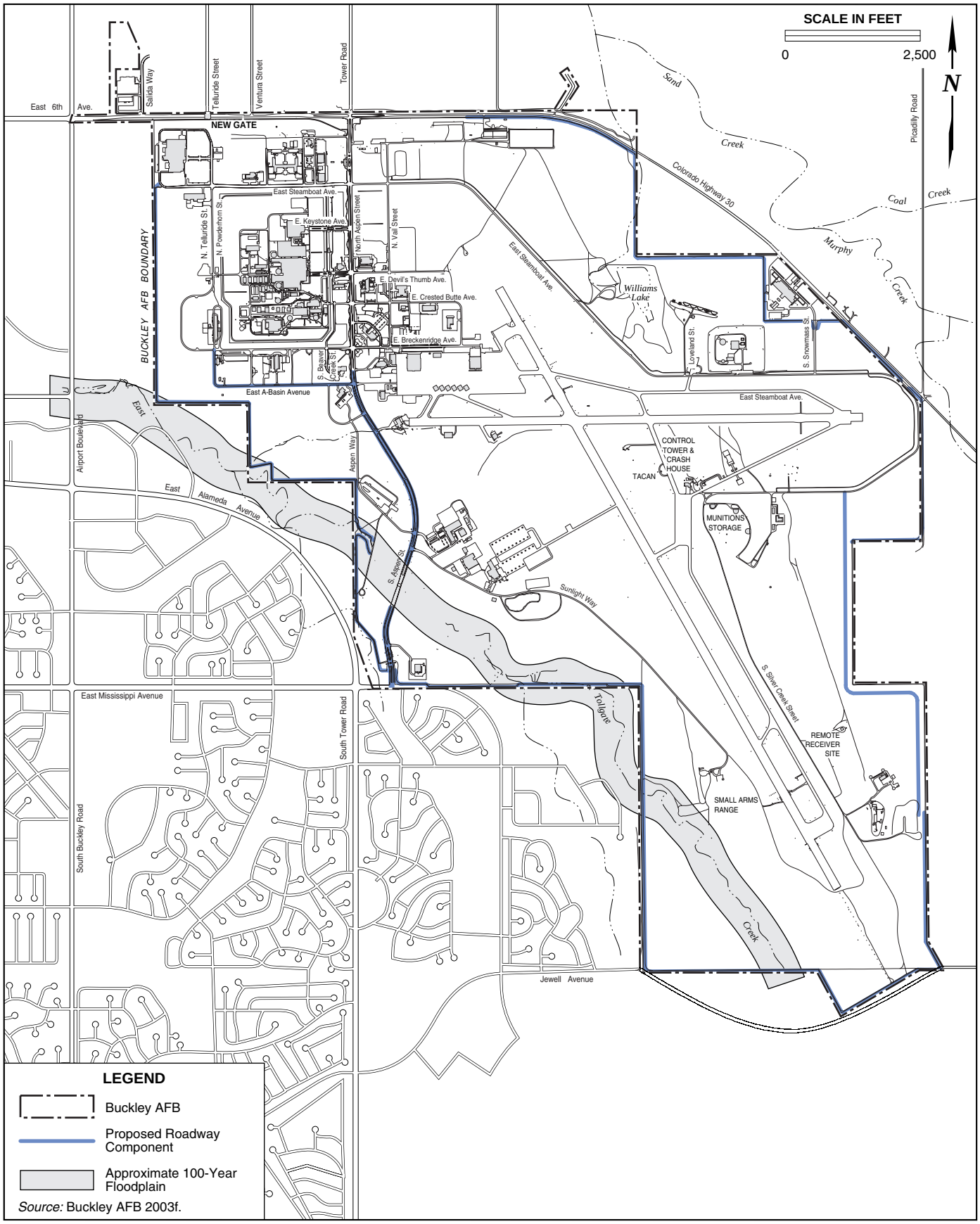
Proposed Linear Infrastructure Components and Floodplains in the Vicinity of Buckley AFB

4-3



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Proposed Roadway Components and Floodplains in the Vicinity of Buckley AFB

4-4

base. No upgrades to South Aspen Street would occur within the 100-year floodplain. Once complete, upgraded and new roadways would not result in further disturbance to water resources and increased runoff would be incorporated into existing base-wide drainage systems. Therefore, no long-term significant impacts to water resources would result from implementation of the roadway components of the proposed action.

4.4.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

Under this alternative, potential short- and long-term impacts to water resources would be similar as those described under the proposed action; therefore, no significant impacts to water resources would result from implementation of this alternative.

4.4.2.3 Alternative 2: No-Action Alternative

Under the No-Action Alternative, the proposed upgrades and expansion of infrastructure at Buckley AFB would not occur; therefore, no impacts to water resources would occur. Existing conditions would remain unchanged from current conditions as described in Section 3.4, *Water Resources*.

4.5 LAND USE

4.5.1 Approach to Analysis

Significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action. In general, land use impacts would be significant if they would: 1) be inconsistent or in noncompliance with applicable land use plans or policies; 2) preclude the viability of existing land use; 3) preclude continued use or occupation of an area; 4) be incompatible with adjacent or vicinity land use to the extent that public health or safety is threatened; or 5) conflict with airfield planning criteria established to ensure the safety and protection of human life and property.

4.5.2 Impacts

4.5.2.1 Proposed Action

No changes to existing land use patterns on or in the vicinity of the base would result from implementation of the proposed action; no changes in zoning would be required to implement the proposed action. All proposed action components would occur wholly within the boundary of the base and would not affect or be affected by off-base land use. Further, each component of the proposed action is consistent with goals set forth in the base *General Plan* and are designed to facilitate and improve operational efficiency on base.

Implementation of infrastructure upgrades would result in no change and no impact to existing base land use since these systems are already in place. New utility alignments would either be buried or would serve as extensions of existing infrastructure networks. Widening of existing roadways would not result in significant impacts to land use as these new pavements would be within existing rights-of-way. New components of the proposed action that are not extensions of or upgrades to existing infrastructure include the construction of a new gas house and underground storage vault, and two new roadway segments. These proposed action components are consistent with the base *General Plan* and would not result in significant impacts to land use.

The new roadway segments would be developed in areas currently classified as *Open Space*. This land use classification represents an existing conventional category rather than a zoning-like restriction to future land use. Nevertheless, development of a new roadway would not be inconsistent with *Open Space* since roadways currently cross many areas of *Open Space* at the base.

The construction of a new gas house and underground storage vault would replace Building 39, which is currently designated as an *Industrial* land use area and is surrounded by *Open Space*. Since these improvements are designed to improve natural gas distribution, they would have beneficial impacts to land use activities that rely on this utility. Further, the new gas house and associated underground storage vault would be consistent with the *Industrial* land use category.

4.5.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

Under this alternative, impacts to land use would be similar to those described under the proposed action. Consequently, significant impacts to land use would not occur.

4.5.2.3 Alternative 2: No-Action Alternative

Under the No-Action Alternative, proposed upgrades and expansion of infrastructure at Buckley AFB would not occur and no development of new roadways or utility alignments would occur. Therefore, land use would remain unchanged from current conditions as described in Section 3.5. Because existing conditions are adverse with respect to certain land use activities (e.g., transportation) selection of the No-Action Alternative would result in the continuation of problematic conditions, an adverse but insignificant impact.

4.6 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.6.1 Approach to Analysis

Significance of population and expenditure impacts are assessed in terms of their direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly depending on the location of a proposed action; for example, implementation of an action that creates 50 employment positions may be unnoticed in an urban area but may have significant impacts in a more rural region. If potential socioeconomic impacts would result in substantial shifts in population trends, or adversely affect regional spending and earning patterns, they would be significant.

In this socioeconomic analysis, impacts regarding environmental justice are evaluated by considering how potential impacts resulting from proposed action implementation may affect the nearby population. Further, characteristics of potentially affected populations are evaluated to determine whether minority or low-income communities would be disproportionately affected by adverse

socioeconomic impacts. Impacts regarding environmental justice are also evaluated by determining whether the proposed action poses any environmental health risks or safety risks to children. Correspondingly, the distribution of children and locations where their numbers may be proportionally high are evaluated to determine if children would be disproportionately affected by implementation of the proposed action.

4.6.2 Impacts

4.6.2.1 Proposed Action

Economic activity associated with proposed infrastructure upgrades and expansion, such as construction employment and materials purchases, would provide short-term economic benefits to the local economy; however, such beneficial impacts would be negligible on a regional scale. No long-term changes in economic activity associated with Buckley AFB would occur upon implementation of the proposed action (e.g., there would be no changes in base staffing levels). Therefore, implementation of the proposed action would not result in a significant impact to regional or local socioeconomic characteristics.

4.6.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

As under the proposed action, implementation of this alternative would generate short-term benefits in the local economy from construction payrolls and materials purchasing. No long-term impacts to socioeconomics would occur. Nevertheless, socioeconomic impacts associated with this alternative would remain negligible at a regional level. Therefore, this alternative would not result in significant impacts to socioeconomics.

4.6.2.3 Alternative 2: No-Action Alternative

Implementation of the No-Action Alternative would require no construction activity and no accompanying employment or materials purchasing. No change to current socioeconomic conditions, as described in Section 3.6, would occur.

4.6.3 Environmental Justice and Protection of Children

In order to comply with Executive Order 12898 (*Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*), ethnicity and poverty status in the vicinity of Buckley AFB have been examined and compared to city, regional, state, and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the proposed action or alternatives. Similarly, to comply with Executive Order 13045 (*Protection of Children From Environmental Health Risks and Safety Risks*), the distribution of children and locations where numbers of children may be proportionately high on and in the vicinity of Buckley AFB was determined to ensure that environmental risks and safety risks to children are addressed.

In general, residents in communities near the base are not considered low-income. The percentage of minority residents in the City of Aurora (31.1 percent) is higher than the percentage of Arapahoe County, Colorado, and the nation. However, since no significant, adverse environmental impacts associated with the proposed action or any identified alternative would affect on- or off-base communities, no populations (minority, low-income, or otherwise) would be disproportionately adversely impacted and no significant impact with regard to environmental justice would result.

Aurora has a slightly higher percent of total population of children under age 18 as compared to Arapahoe County, Colorado, and the nation. Several schools are located in the vicinity of Buckley AFB but no family housing or schools exist on the base proper; however, children are present at the base Day Care Center located in Building 725 in the central area of the base. No components of the proposed infrastructure or roadway upgrades would occur in the direct vicinity of the center. Implementation of the proposed action or any identified alternative would not result in increased environmental health risks or safety risks such as introduction of hazardous materials generation, use, or storage; therefore, not posing health or safety risks to children. Short-term environmental health risks or safety risks to children could occur if they are unattended at construction sites; however, standard construction site safety precautions (e.g., fencing and other security measures) would reduce potential

risks to a minimum. Thus, with implementation of standard safety measures, no adverse impacts to children would occur.

4.7 CULTURAL RESOURCES

For reasons provided in Section 3.7, *Cultural Resources*, further analysis of potential impacts to cultural resources were dismissed.

4.8 VISUAL RESOURCES

4.8.1 Approach to Analysis

Determination of the significance of impacts to visual resources is based on the level of visual sensitivity in the area. Visual sensitivity is defined as the degree of public interest in a visual resource and concern over adverse changes in the quality of that resource. In general, an impact to a visual resource is significant if implementation of the proposed action would result in substantial alteration to an existing sensitive visual setting.

4.8.2 Impacts

4.8.2.1 Proposed Action

The majority of the proposed infrastructure upgrade and expansion projects would occur along existing, developed utility alignments and roads; further, once operational, these improvements would be buried and not visible. Other visible development would be visually consistent with the military airfield characteristics of the base. Therefore, the proposed action would not result in significant changes to the area's visual resources; any noticeable change would be beneficial as utilities would be placed underground, eliminating foreground visual obstructions.

The new infrastructure alignments, roadways, and other infrastructure are proposed in areas mostly developed, adjacent to development, or linking development visually similar in nature to the proposed action components. For

example, the proposed gas house would be located where Building 39 currently exists and would be visually consistent with the surroundings.

As described previously, the proposed upgrade of electrical distribution lines would result in beneficial impacts to visual resources because existing aboveground electrical distribution lines would be replaced and buried, consequently removing visual clutter and improving the overall visual character of the base.

4.8.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

Under implementation of this alternative, placement of the existing electrical distribution system underground would not occur. Therefore, potential impacts to visual resources would be similar to, but less beneficial than those described under implementation of the proposed action.

4.8.2.3 Alternative 2: No-Action Alternative

No changes to existing visual resources, as described in Section 3.8, *Visual Resources*, would occur under implementation of the No-Action Alternative. Selection of this alternative would not beneficially impact the visual character of the base because existing overhead utility lines would not be placed underground.

4.9 AIR QUALITY

4.9.1 Approach to Analysis

The 1990 Amendments to the Clean Air Act (CAA) require that federal agency activities conform to the State Implementation Plan (SIP) with respect to achieving and maintaining attainment of National Ambient Air Quality Standards (NAAQS) and addressing air quality impacts. The USEPA General Conformity Rule requires that a conformity analysis be performed which demonstrates that a proposed action does not: 1) cause or contribute to any new violation of any NAAQS in the area; 2) interfere with provisions in the SIP for maintenance or attainment of any NAAQS; 3) increase the frequency or severity

of any existing violation of any NAAQS; or 4) delay timely attainment of any NAAQS, any interim emission reduction, goals, or other milestones included in the SIP for air quality. Provisions in the General Conformity Rule allow for exemptions from performing a conformity determination only if total emissions of individual nonattainment area pollutants resulting from the proposed action fall below the significant (*de minimis*) threshold values. The Denver Metropolitan Area and portions of Arapahoe County, including Buckley AFB, are considered *maintenance* areas, or former *non-attainment* areas for ozone, PM_{10}, and carbon monoxide (Colorado Department of Public Health and Environment [CDPHE] 2003).

4.9.2 Impacts

4.9.2.1 Proposed Action

Pollutant emissions associated with the proposed infrastructure upgrade and expansion at Buckley AFB would include fugitive dust emissions during ground disturbance and related site preparation activities, and combustion emissions from vehicles and heavy-duty equipment used during construction of new facilities, facility upgrades, and demolition. Emissions of hazardous air pollutants (HAPs) resulting from the proposed action would be minimal because construction activities that typically contribute to HAP emissions (e.g., use of paints and glues, heavy equipment operation) would also be minimal.

Dust Emissions

Under implementation of the proposed action, dust (i.e., particulate matter less than 10 micrometers in diameter [PM_{10}]) would be generated from construction activities including vegetation removal, grading, trenching, material handling, and demolition. Dust emissions can vary substantially daily depending on levels of activity, specific operations, and prevailing meteorological conditions. Using conservatively high estimates (based on moderate activity levels, moderate silt content in affected soils, and a dry climate), the standard dust emission factor for construction activity is 1.2 tons of dust generated per acre per month of activity. Based on this dust-generation factor and the maximum estimated acreage that

would be disturbed at any one time (1 acre), a projected total of approximately 1.2 tons of dust per month would be generated.

The perimeter dirt road, which is approximately 62,044 linear feet long and 10 feet wide, would require routine maintenance and grading under the proposed action. If 1 mile of the perimeter road were graded within 1 month, approximately 1.2 acres (52,800 square feet) would be disturbed; therefore, 1.4 tons of dust would be generated per month by grading alone. If routine grading were to occur simultaneously with all other components of the proposed action, a conservative estimated total of 2.6 tons of PM_{10} would be generated per month.

Buckley AFB prepares an annual emission estimate of PM_{10} emissions in accordance with its State of Colorado issued Title V Operating Permit. This estimate includes calculation of the construction activities for that calendar year in addition to on-going activities such as vehicle travel on unpaved roads. The potential to emit for construction projects during 2003 was approximately 28 tons per year (tpy) of PM_{10}. If 2.6 tons of PM_{10} were generated each month, an additional 27.6 tpy would be generated. This estimate is based on disturbing approximately 10 acres total for all utility upgrades and ongoing grading of 1 mile per month of the perimeter road. The combined amount is still far below the General Conformity *de minimis* threshold of 100 tpy for PM_{10} emissions.

Increased PM_{10} emissions resulting from proposed construction activities would comprise short-term adverse but negligible impacts that would be mitigated through standard dust minimization practices, such as regularly watering exposed soils, soil stockpiling, and soil stabilization. Although any substantial increase in PM_{10} emissions is inherently adverse, implementation of these dust minimization measures would limit the total quantity generated during project implementation and no significant impacts would occur.

Combustion Emissions

Combustion emissions associated with construction-related vehicles and equipment were calculated using broad assumptions of types of construction equipment and approximate duration to be used. (Specifics on construction

equipment to be used were unavailable and will be determined by the contractor.) An increase in the number of personal vehicle trips to and from Buckley AFB due to construction workers commuting was also considered in the quantification of emissions; however, any increase in combustion emissions due to workers' personal vehicles would be temporary and insignificant. Combustion emissions estimated would be far below the General Conformity *de minimis* threshold for all pollutants (see Table 4-1). Therefore, no significant impact to air quality would occur as a result of use and maintenance of construction-related vehicles.

Table 4-1. Combustion Emission Estimates Associated with the Proposed Action at Buckley AFB

	Estimated Emissions (tpy)				
Source	**ROG**	**NO_x**	**CO**	**PM_{10}**	**SO_2**
Construction Worker Trips	0.01	0.014	0.025	0.0025	--
Stationary Equipment	0.04	0.034	--	0.0025	0.00
Mobile Equipment-Gas	2.05	1.15	--	0.10	0.08
Mobile Equipment-Diesel	1.03	10.21	--	1.13	0.95
TOTALS (tpy)	3.13	11.41	0.025	1.24	1.03
de minimis threshold (tpy)	100	100	100	100	100

Note: CO – carbon monoxide
NO_x - nitrogen oxides
PM_{10} – particulate matter less than 10 micrometers in diameter
ROG – reactive organic gas
SO_2 – sulfur dioxide
tpy - tons per year
Source: URBEMIS 2001.

Paving Emissions

According to maps provided by Buckley AFB, approximately 8,775 linear feet of new roadway would be established. Using an approximate width of 20 feet for each road segment, this would equate to approximately 4 acres of roadway. The standard Reactive Organic Gas (ROG) emission for road paving is 2.62 pounds of ROGs per acre (URBEMIS 2001). If all proposed roadways were paved within 1 month, approximately 10.5 pounds of ROG would be emitted (0.35 pounds per day). This amount is significantly less than the Colorado State threshold of 5 tons of ROGs per year. Further, emissions from road and parking lot paving

operations at commercial and industrial facilities are exempted from permit and Air Pollution Emissions Notice (APEN) requirements per Colorado Regulation 3, Part A. Therefore, no impacts to air quality would occur due to road paving (City of Aurora Planning Department 2003b).

Operational Emissions

Implementation of the proposed action would not require or result in changes in operations or personnel levels at the Buckley AFB. The majority of the long-term operational emissions associated with the proposed action would comprise the combustion of natural gas for the generation of industrial and utility electric power. Operational emissions associated with the proposed facilities would fall substantially below the significant (*de minimis*) threshold values and would conform to the SIP. Therefore, impacts on local and regional air quality would be less than significant.

4.9.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

If Alternative 1 were selected, the overall, short-term, temporary impacts to air quality related to construction would be slightly less than impacts resulting from the proposed action (i.e., not significant). Long-term, operational impacts would be the same as those described under implementation of the proposed action (i.e., not significant).

4.9.2.3 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, short-term temporary air quality impacts anticipated to occur during implementation of the proposed action would not occur and air quality conditions and emissions associated with ongoing operations at Buckley AFB would remain as described in Section 3.9, *Air Quality*.

4.10 HAZARDOUS MATERIALS AND WASTES

4.10.1 Approach to Analysis

Numerous local, state, and federal laws regulate the storage, handling, disposal, and transportation of hazardous materials and wastes; the primary purpose of these laws is to protect public health and the environment. The significance of potential impacts associated with hazardous substances is based on their toxicity, ignitability, and corrosivity. Impacts associated with hazardous materials and wastes would be significant if the storage, use, transportation, or disposal of hazardous substances substantially increases the human health risk or environmental exposure.

4.10.2 Impacts

4.10.2.1 Proposed Action

Implementation of the proposed action would not result in any significant or long-term increase in the use, storage, or generation of hazardous materials or hazardous wastes. Use and storage of minor amounts of hazardous materials would increase temporarily during construction, upgrade, and installation phases of the proposed action. Any hazardous materials used or hazardous wastes generated as a result of proposed action implementation would be accumulated and removed in compliance with existing and approved Hazardous Waste Management Plans and related procedures. No use, generation, or storage of hazardous materials or hazardous wastes would result from long-term operation of the proposed infrastructure upgrades and expansions; therefore, no long-term impacts related to hazardous materials would occur.

With regard to asbestos containing material (ACM), impacts associated with the proposed action would be significant if the CDPHE and the Environmental and/or Occupational Safety and Health Act standards were exceeded by material present during and after construction activities. No asbestos contamination was detected at proposed infrastructure sites during the January 2003 survey, and future detections are not anticipated. However, if ACM were discovered during implementation of the proposed action, work would stop

immediately and measures would be taken to prevent the release of ACM. Further, Buckley AFB would consult with the CDPHE to determine appropriate measures to be taken, and regulations would be followed for proper remediation and disposal.

4.10.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

Under implementation of this alternative, potential impacts to hazardous materials and wastes would be similar to those described for the proposed action; therefore, no impacts would occur.

4.10.2.3 Alternative 2: No-Action Alternative

Under the No-Action Alternative, the proposed upgrades and expansion of infrastructure at Buckley AFB would not be implemented and no ground disturbance or additional use of hazardous materials required for construction would occur. Therefore, existing conditions with respect to hazardous materials and wastes would remain unchanged from the conditions described in Section 3.10, *Hazardous Materials and Wastes*.

4.11 BIOLOGICAL RESOURCES

4.11.1 Approach to Analysis

Determining the significance of potential impacts to biological resources is based on 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and 4) the duration of ecological ramifications. Impacts to biological resources are significant if species or habitats of concern are adversely affected over relatively large areas or disturbance causes reductions in population size or distribution.

When necessary, representatives of the U.S. Fish and Wildlife Service (USFWS), Colorado Division of Wildlife (CDOW), and Colorado Natural Heritage Program (CNHP) are contacted to determine the presence or potential occurrence of

sensitive species and habitats in the study area. Potential physical impacts such as habitat loss, noise, and impacts to surface water were evaluated to assess potential impacts to biological resources resulting from implementation of the proposed action and identified alternatives.

4.11.2 Impacts

4.11.2.1 Proposed Action

Vegetation

Many of the linear infrastructure and roadway upgrades would occur in or adjacent to existing roadways. Vegetation along these roadways usually shows signs of past disturbances and as a result consists largely of weedy species. The remainder of the infrastructure improvements would cross native mid-grass prairie and crested wheatgrass community types. Direct impacts to vegetation would come primarily from trenching activities associated with digging along natural gas, utility, sewage, and water lines.

Where activities occur adjacent to existing roadways, impacts to vegetation are expected to be non-significant due to the disturbed nature of the site. Trenching activities that occur away from these roadways would remove grassland vegetation. Impacts to these grassland communities would be limited to trenching lines. Once the infrastructure upgrades are completed and buried, revegetation of the disturbed site would be accomplished using appropriate and proven reseeding techniques. Impacts to the grassland community from the proposed action are expected to be localized and short-term due to revegetation efforts.

Due to their project locations in highly developed areas of the base, impacts to vegetation are not expected from the demolition of Building 39 or subsequent construction of a new gas house and underground storage vault. Additionally, vehicles associated with power line removal in the southwestern portion of the base would compress vegetation in that area. These impacts are expected to be temporary, since the vegetation is likely to rebound after completion of this phase of the proposed action.

Wildlife

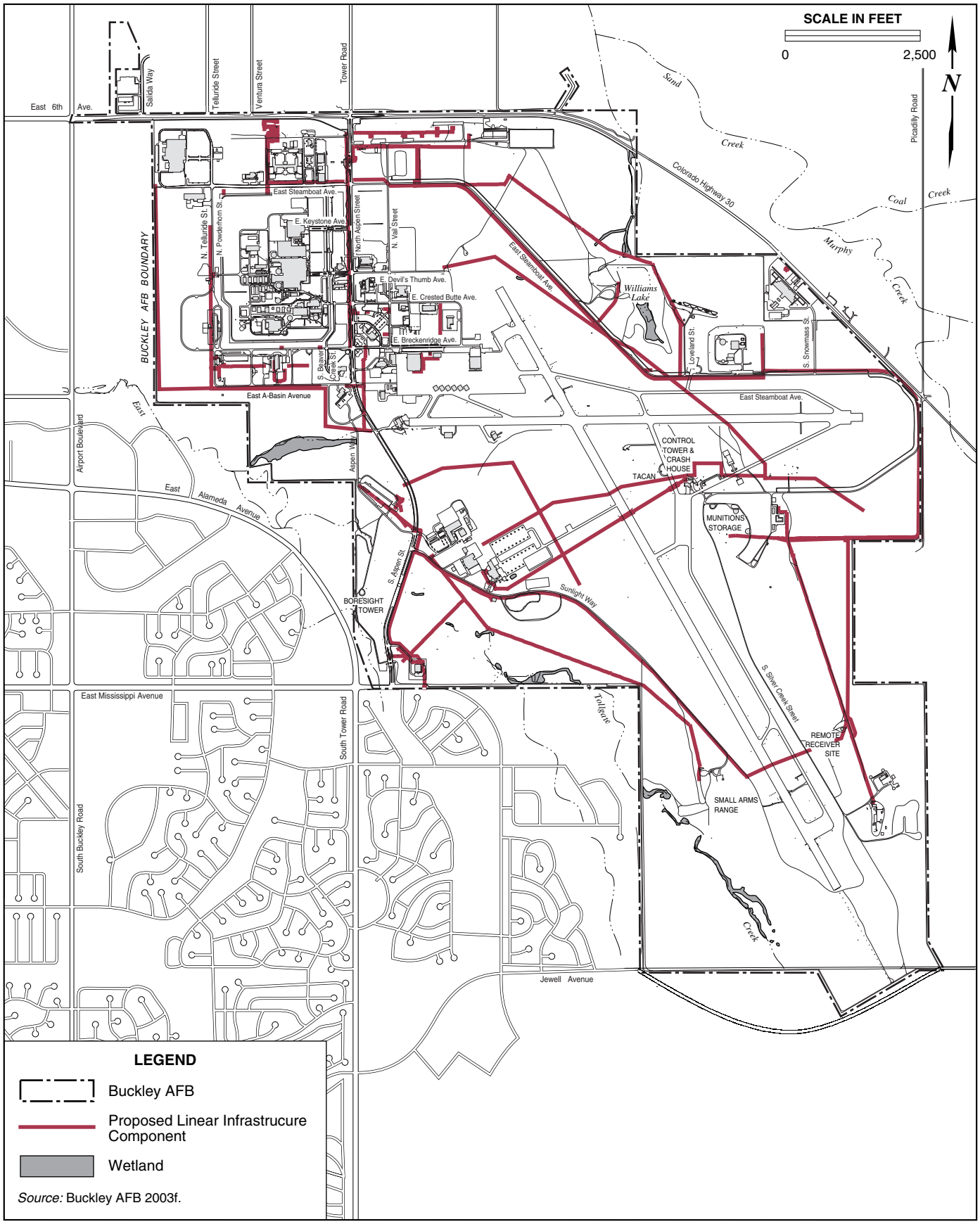
Impacts to wildlife are expected to be minimal since much of the trenching activities would occur adjacent to existing roadways, which provide limited wildlife habitat. However, in areas where sensitive species such as the burrowing owl exist or are nesting, trenching activities may need to be delayed during nesting season until surveys are conducted (see discussion below).

Wetlands

Several wetland communities are located near several of the proposed actions (Figures 4-5 and 4-6). Installation of proposed electrical lines and roadway improvements along South Aspen Street would occur on a bridge over the 100-year floodplain and would therefore not impact any wetland areas under the bridge. All utility lines, which appear to cross wetland areas in Figure 4-5, are overhead electrical lines proposed for removal, and therefore would not impact wetlands. To avoid sedimentation of wetlands from trenching activity runoff, erosion control measures outlined in the geological resource section (Section 4.2) would be used and no construction activities would occur within 50 feet of a wetland. Further, no construction equipment or supplies would be staged within a wetland, and the contractor would be required to develop a project and staging area map before construction activities would begin (Buckley AFB 2003b). Routine maintenance of portions of the perimeter road near wetland areas would only include filling potholes, thereby avoiding impacts which would alter existing wetland habitat adjacent to the road. Therefore, no impacts to wetlands would occur (see Figure 4-5).

Sensitive Species

Three sensitive bird species are known to occur at Buckley AFB. Both the bald eagle and ferruginous hawk forage at and around Buckley AFB. The proposed action is not expected to affect these species due to the temporary nature of the impacts and because ample foraging areas are available elsewhere throughout the base.



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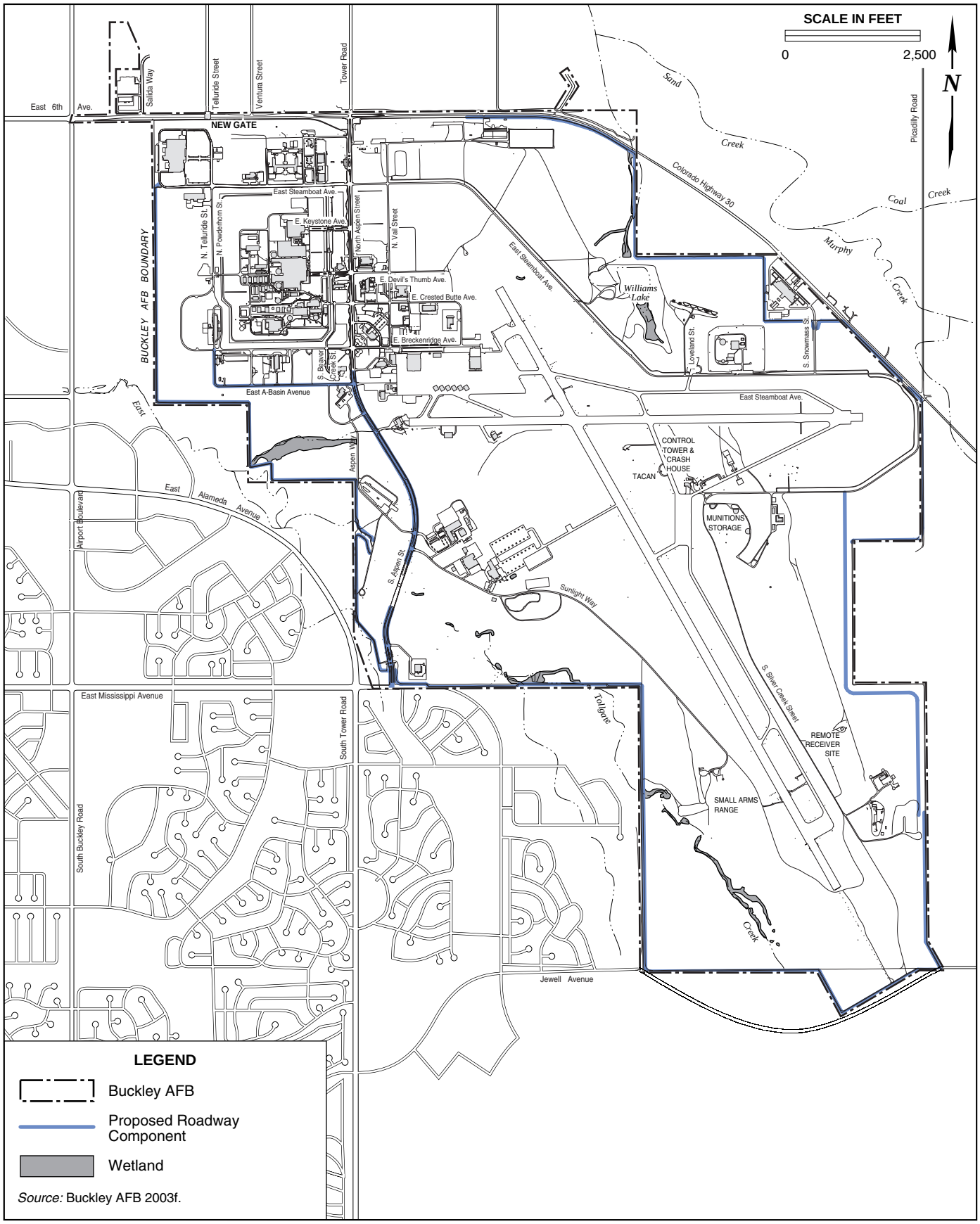
Proposed Linear Infrastructure Components and Wetlands on Buckley AFB

4-5



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Proposed Roadway Components and Wetlands on Buckley AFB

4-6

The burrowing owl is known to nest mainly in the northwestern portion of the base and along the airfield flightlines. All identified nesting burrows are currently located near busy roads or flightlines, which indicates that these owls are accustomed to human activity. The CDOW recommends a 150-foot buffer around burrowing owl sites during the nesting season (March 1 through October 31). If trenching activities must occur between March 1 and October 31, surveys would first be conducted for burrowing owls within 150 feet of the proposed action. If a burrowing owl is located within the buffer zone, construction activities in that area would be delayed until the owl migrated out of the area (November 1 through February 28). If construction could not be delayed, Buckley AFB personnel would consult with the CDOW and USFWS prior to conducting any earth-moving activities. According to the CDOW, another option is to encourage the owl out of the area, once fledged. Care should be taken to observe the owls to be sure they have relocated away from the proposed construction site (CDOW 2003).

Black-tailed prairie dogs inhabit many areas throughout the base, but are most common in the cantonment and flightline areas. Most of the infrastructure upgrades would either transect or occur adjacent to existing prairie dog towns. Some disturbance to these towns is unavoidable and limited mortality or displacement of prairie dogs is expected. However, since trenching activities are linear they would only impact a small portion of the many prairie dog towns on base. Prairie dogs are expected to recolonize disturbed areas soon after completion of the proposed action. Therefore, impacts to the current population of black-tailed prairie dogs at Buckley AFB are expected to be minor and short-term.

The mountain plover, Baird's sparrow, and swift fox have the potential for occurring on base as rare transients; however, impacts to these species are not expected, because more suitable habitat is located outside of the land affected by the proposed action.

4.11.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

Impacts to vegetation, wildlife, wetlands, and sensitive species from implementation of this alternative would be similar to those described for the

proposed action. Therefore, implementation of Alternative 1 would result in no significant impacts to biological resources.

4.11.2.3 Alternative 2: No-Action Alternative

Implementation of the No-Action Alternative would result in no changes to the existing vegetation, wildlife, wetlands, or sensitive species occurring at Buckley AFB. Conditions would remain as described in Section 3.11, *Biological Resources*.

4.12 SAFETY

4.12.1 Approach to Analysis

If implementation of the proposed action would substantially increase risks associated with aircraft mishap potential or flight safety relevant to the public or the environment, it would represent a significant impact. For example, if an action involved an increase in aircraft operations such that mishap potential would increase significantly, air safety would be compromised.

Further, if implementation of the proposed action would result in incompatible land use with regard to safety criteria such as accident potential zones (APZs) or quantity-distance (QD) arcs, impacts would be significant.

4.12.2 Impacts

4.12.2.1 Proposed Action

Mishap Potential and Bird-Aircraft Strike Hazard

Implementation of the proposed action would not result in changes to the frequency or type of aircraft operations performed at Buckley AFB. All proposed infrastructure upgrade and roadway improvement components are ground-based, would require only short-term construction activity for development, and would result in no long-term operational requirements (other than standard maintenance). Therefore, with regard to aircraft mishaps and Bird-Aircraft Strike

Hazard (BASH), no impact would result from implementation of the proposed action.

Accident Potential Zones

The proposed action would not result in a change in shape or shift in location of established APZs and no habitable structures are proposed for development in the Clear Zones (CZs) or APZs associated with the airfield. Proposed electrical and gas lines, as well as roadway improvements would occur within the northern APZ and a new potable water line would be installed within limits of the southern APZ. Personnel involved with airfield activities would be notified of these activities, and construction equipment would not be stored within restricted areas. Construction activity would be short-term and the presence of construction equipment and personnel would not impede flight operations. Therefore, with regard to airfield safety, the proposed action would result in no significant impacts.

Explosives Safety

Implementation of the proposed action would result in establishment of gas, electric, and water lines within QD associated with the MSA. A portion of the new road would also be within a QD arc. The utility alignments would require short-term construction within the arcs and would not have any impacts to safety conditions. Further, no habitable structures are proposed within QD arcs. Construction of the new road near the MSA would improve traffic flow and safety conditions in the eastern portion of the base, and provide direct access to the U.S. Marines complex. No other structures or facilities are proposed for development within QD arcs. Consequently, no significant impacts with regard to explosives safety would occur under the proposed action.; any long-term impact would be beneficial as access to and egress from the MSA would be improved.

4.12.2.2 Alternative 1: Exclude "Optional" Components of the Proposed Action

Under this alternative, certain components of the proposed action would be eliminated. Therefore, fewer utility alignments and roadway improvements

would occur within APZs and QD arcs. Because no impacts with regard to mishap potential, BASH, airfield safety, or explosives safety would occur under the proposed action; likewise, no significant impacts to safety would occur under implementation of Alternative 1.

4.12.2.3 Alternative 2: No-Action Alternative

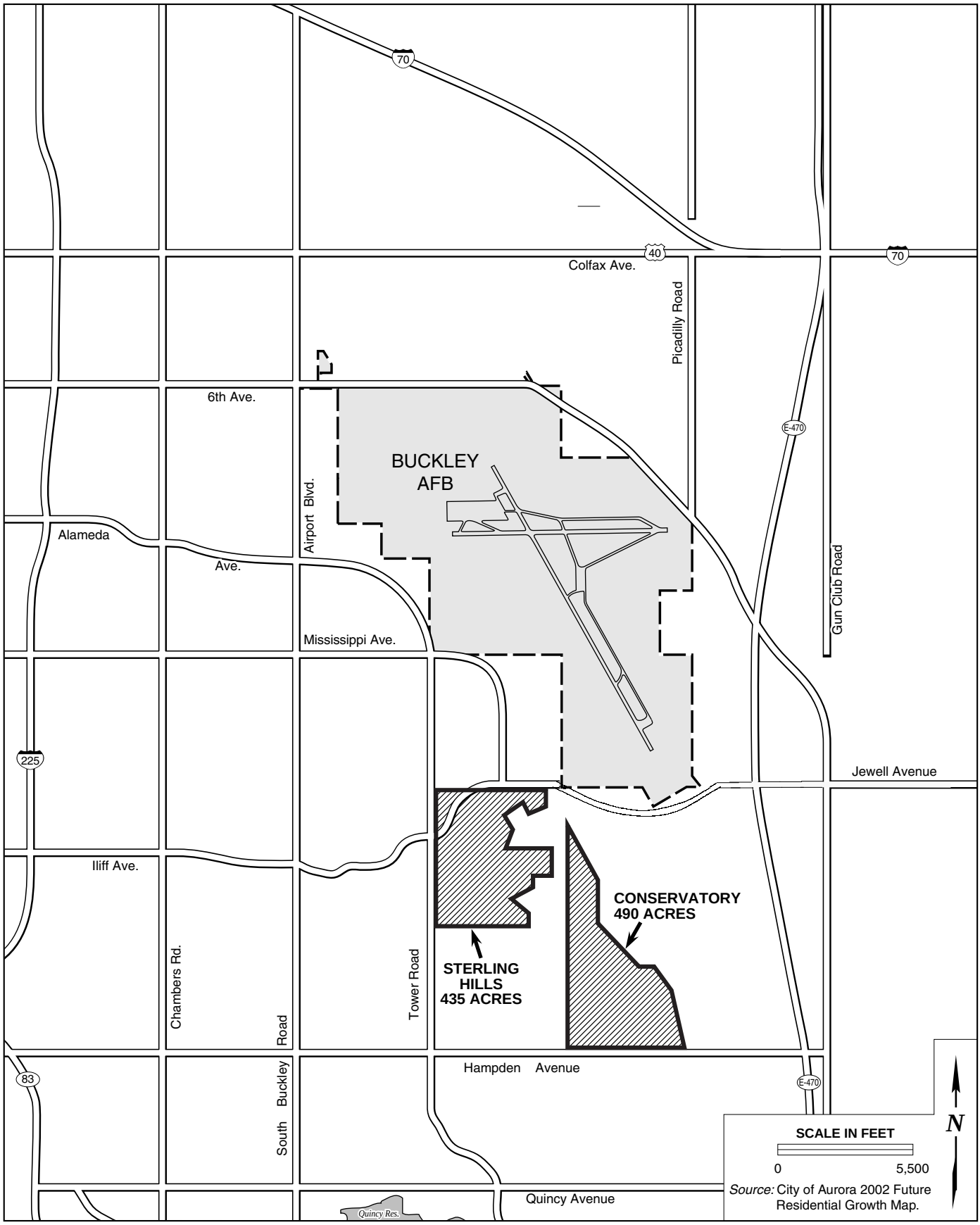
If the No-Action Alternative were selected, Buckley AFB would not implement infrastructure upgrades or roadway improvement projects. Current safety conditions, as described in Section 3.12, would remain unchanged.

SECTION 5
CUMULATIVE IMPACTS

Cumulative impacts on environmental resources result from incremental impacts of proposed actions when combined with other past, present, and reasonably foreseeable future projects in an affected area. Cumulative impacts can result from minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, or local) or persons. In accordance with the National Environmental Policy Act (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.

The infrastructure upgrade and expansion program is planned at Buckley Air Force Base (AFB) to support the recent establishment of the 460th Air Base Wing (460 ABW). Proposed activities would take place within the current Buckley AFB boundary. Ultimately, these planned infrastructure upgrades would contribute to a further modernized AFB facility, and support the needs of the 460 ABW by bringing the base up to sufficient system standards and improving the local transportation circulation system. Further, this type of development would be consistent with surrounding land use and would not result in cumulatively significant environmental impacts. At present, no other substantial facility improvement or construction projects are known to be proposed at Buckley AFB.

Regionally, a residential development comprising 435 acres is currently under construction within 0.5 mile of the southern limits Buckley AFB. Just east of this development, a 490-acre residential development is also under construction (Figure 5-1). Finally, a much smaller single family housing development comprising 36.5 acres is under construction approximately 0.5 mile west of Buckley AFB (City of Aurora Planning Department 2003a). (A figure of this project was unavailable upon completion of the Environmental Assessment [EA] and is not shown in Figure 5-1.) All projects are consistent with the City of Aurora's Comprehensive Plan. In comparison to these developments, the proposed infrastructure upgrades at Buckley AFB would result in minimal overall land disturbance; consequently, associated increased erosion and runoff would be insignificant on- and off-base. Therefore, the proposed action at Buckley AFB, combined with these adjacent, ongoing projects would not be



EA

Ongoing Projects in the Vicinity of Buckley AFB

5-1

collectively significant. Buckley AFB personnel should continue to coordinate and consult with the City of Aurora's Planning Department to ensure proposed projects are implemented with best management practices, which minimize any potential cumulative impacts.

SECTION 6
SUMMARY OF FINDINGS

A summary of environmental impacts anticipated to result from implementation of proposed infrastructure upgrade and expansion projects to support the 460th Air Base Wing (460 ABW) at Buckley Air Force Base (AFB) are evaluated in this section.

Utilities. Implementation of the proposed action would result in upgrades to and expansions of existing utility alignments, resulting in beneficial impacts to natural gas, electrical, sewerage, and potable water distribution systems.

Transportation. Implementation of the proposed action would require delivery of materials to and removal of related debris from construction sites. However, construction traffic would make up only a small portion of the total existing traffic at the facility, and many of the vehicles would be driven to and kept on site for the duration of construction, resulting in very few actual increased trips. Further, upgraded roadways would enhance transportation and on-base circulation and would result in long-term beneficial impacts. Therefore, implementation of the proposed action would result in beneficial impacts to vehicular circulation at Buckley AFB.

Geological Resources. Potential impacts associated with the proposed action at Buckley AFB would be limited to ground-disturbing activities. Most construction activities associated with the proposed action would occur on previously disturbed land, which is capable of supporting such development. Some soils found within areas where proposed roadway upgrades would occur have limitations for street construction. However, through the use of best management practices (e.g., covering soils during rains, rapid replanting of vegetation, soil stockpiling, etc.) construction effects of the soils would be minimal and localized. All construction activities would be designed and constructed implementing measures to mitigate potentially adverse soil conditions. Therefore implementation of the proposed action would have no significant impacts on geological resources.

Water Resources. With regard to surface water, implementation of the proposed action would have a localized and temporary effect on hydrology; however, best management practices would be incorporated during the construction phase of the proposed action to minimize erosion, runoff, and sedimentation. Impacts to groundwater recharge created by introduction of impermeable surfaces would be negligible. Project activities would not occur through floodplains, and undergrounding of utilities would not significantly increase runoff or flooding conditions at Buckley AFB. No impacts to water resources would occur under the proposed action.

Land Use. No changes to existing land use patterns on or in the vicinity of the base would result from implementation of the proposed action; no changes in zoning would be required to implement the proposed action. All proposed action components would occur wholly within the boundary of Buckley AFB and would not affect or be affected by off-base land use. No impacts to land use would occur under the proposed action.

Socioeconomics. Economic activity associated with proposed infrastructure upgrades and expansion, such as construction employment and material purchases, would provide short-term economic benefits to the local economy; however, such beneficial impacts would be negligible on a regional scale. No long-term changes in economic activity associated with Buckley AFB would occur upon implementation of the proposed action; therefore, no significant impacts would occur.

Environmental Justice and Protection of Children. Residents in communities near the base are not considered low income. The percentage of minority residents in Aurora is higher than in the state, but lower than in the nation. However, since no significant, adverse environmental impacts associated with the proposed action or any identified alternative would occur, no populations (minority, low-income, or otherwise) would be disproportionately adversely impacted and no significant impact with regard to environmental justice would result.

No family housing or schools exist on base, however children are present at the base Day Care Center located in Building 725 in the central area of Buckley AFB.

Implementation of the proposed action or any identified alternative would not result in increased environmental health risks or in safety risks such as introduction of hazardous materials generation, use, or storage; therefore health or safety risks would not be increased with respect to children. In addition, standard construction site safety precautions (e.g., fencing and other security measures) would reduce potential risks to a minimum.

Cultural Resources. No known archaeological resource sites occur within any infrastructure upgrades or expansion proposed at the base. No modification to existing structures (other than replacement of Building 39 with a new gas house) would be required. Building 39 is not considered a historically significant structure and is not eligible for the NRHP. No impacts would occur to cultural resources.

Visual Resources. Facility construction associated with the proposed action would be limited to the new gas house and would be visually consistent with existing structures at Buckley AFB. Further, the proposed upgrade of communication and electrical distribution lines would result in beneficial impacts to visual resources because existing aboveground electrical and communication distribution lines would be replaced and buried, consequently removing visual clutter and improving the overall visual character of the base.

Air Quality. Under implementation of the proposed action, particulate matter less than 10 micrometers in diameter (PM_{10}) would be generated from construction activities including grading of the perimeter dirt road. A projected total of 2.6 tons of dust per month would be generated. Increased PM_{10} emissions would be short-term adverse impacts that would be mitigated through standard dust minimization practices, such as regularly watering exposed soils, soil stockpiling, and soil stabilization. Once operational, long-term emissions associated with the proposed infrastructure upgrades and expansion would not increase and air quality would not be significantly impacted. Combustion emissions associated with the proposed action were estimated using assumptions for construction equipment usage. Based on these estimates, all emissions would remain significantly lower than the General Conformity *de minimis* threshold, and, therefore, no impacts would occur.

Hazardous Materials and Wastes. Upon implementation of the proposed action, there would be no change to existing hazardous materials plans, policies, or procedures associated with Buckley AFB. Any hazardous materials used or hazardous wastes generated as a result of the proposed action would be accumulated and removed in compliance with existing and approved Hazardous Waste Management Plans and related procedures. Linear Infrastructure upgrades are proposed within Environmental Restoration Program (ERP) Site 10. Proposed infrastructure upgrades crossing Site 10 would be installed at much shallower depths than the groundwater table; therefore, no impacts would occur. Further, precautions would be implemented to prevent any contaminated soil gas from entering trenching areas.

Biological Resources. Potential impacts to biological resources arising from implementation of the proposed action would result primarily from site preparation activities (e.g., vegetation clearing, grading, and trenching). Given that most construction activity would occur in developed areas where vegetation and natural habitat has been removed or has been previously disturbed, potential impacts would not be significant. Three sensitive bird species are known to occur at Buckley AFB, however, the proposed action is not expected to affect these species due to the temporary nature of the impacts and because ample foraging areas are available elsewhere throughout the base. Erosion control measures would be used to avoid sedimentation of wetlands from trenching activity runoff, no construction would occur within 50 feet of a wetland, and the contractor would develop project and staging area maps. No impacts to biological resources would occur.

Safety. Implementation of the proposed action would not result in changes to the frequency or type of aircraft operations performed at Buckley AFB; therefore with regard to aircraft mishaps and bird-aircraft strikes, no impact would result from implementation of the proposed action. The proposed action would not result in new structures within established APZs and the proposed action would not result in changes of established APZs. Therefore, no land use conflict with regard to airfield safety would occur. Further, no incompatible structures are proposed within a QD arc, and no impacts with regard to explosives safety would occur. Finally, construction of a new road near the MSA would improve

traffic flow and safety conditions in the eastern portion of the base. No impacts with regard to safety would occur under the proposed action.

SECTION 7
SPECIAL PROCEDURES

Impact evaluations contained in this Environmental Assessment (EA) have determined that no significant environmental impacts would result for implementation of the proposed action. This determination is based on thorough review and analysis of existing resource information, the application of accepted modeling methodologies, and coordination with knowledgeable, responsible personnel from Buckley Air Force Base (AFB) and relevant local, state, and federal agencies.

Since implementation of the proposed action for the U.S. Air Force (USAF) at Buckley AFB would not require changes or modifications to operations and identified adverse environmental impacts associated with the proposed action would be short-term and temporary (i.e., upon completion, no further impacts would occur), recommendations for special procedures are unnecessary.

SECTION 8
REFERENCES

Aurora Public Schools 1997 — Aurora Public Schools. 1997. *School Enrollment Data and Map*. Aurora, CO.

Aurora Public Schools 2002 — Aurora Public Schools. 2002. *District Profile and Demographics*. Transmitted to AMEC via the Internet on 8 May 2002 (http://www.aps.k12.co.us/ district-info/index.html).

Buckley AFB 2002a — Buckley Air Force Base (AFB). 2002a. *Buckley AFB General Plan*. Aurora, CO.

Buckley AFB 2002b — Buckley AFB. 2002b. Personal communication with Candrea Thomas, 460 ABW/PA (Public Affairs), Buckley AFB. May, September.

Buckley AFB 2002c — Buckley AFB. 2002c. Personal communication with Dennis Korycinski, 460 CES/CEVR (Environmental Flight), Installation Restoration Program Manager, Buckley AFB. May, September.

Buckley AFB 2002d — Buckley AFB. 2002d. Personal communication with Elise Sherva, 460 CES/CEVP Environmental Manager, Buckley AFB. May, September.

Buckley AFB 2002e — Buckley AFB. 2002e. Personal communication with Floyd Hatch, 460 CES/CEVP (Environmental Flight), Natural and Cultural Resources Manager, Buckley AFB. May.

Buckley AFB 2002f — Buckley AFB. 2002f. Personal communication with Kelly Hranac, Buckley AFB Water Program Manager. September.

Buckley AFB 2002g — Buckley AFB. 2002g. Personal communication with Ron Lancaster, 460 CES/CEVC (Environmental Flight), Hazardous Waste/Materials/Water program Manager, Buckley AFB. May.

Buckley AFB 2002h — Buckley AFB. 2002h. Personal communication with Steven P. Yost, Buckley, 460 CS/SCX (Communications Squadron), Plans and Implementation, Buckley AFB. May.

Buckley AFB 2002i — Buckley AFB. 2002i. *Buckley AFB Air Emissions Inventory (2001)*. Aurora, CO.

Buckley AFB 2002j — Buckley AFB. 2002j. *Bird Aircraft Strike Hazard (BASH) Plan*. Aurora, CO.

Buckley AFB 2003a — Buckley AFB. 2003a. *Gate Design and Traffic Engineering Guidance*. Prepared by Military Traffic Management Command Transportation Engineering Agency. Newport News, VA.

Buckley AFB 2003b — Buckley AFB. 2003b. Personal communication with Elise Sherva, 460 CES/CEVP Environmental Manager, Buckley AFB. April, August, September.

Buckley AFB 2003c — Buckley AFB. 2003c. Stormwater Drainage Map Showing Drainage Areas, Outfalls, Industrial Areas, Spills, and Material Storage Areas. March.

Buckley AFB 2003d — Buckley AFB. 2003d. Written directive by Dale Carlson, 460 CES/CEVP, forwarded by Elise Sherva, 460 CES/CEVP, Buckley AFB. February.

Buckley AFB 2003e — Buckley AFB. 2003e. Written directive by Floyd W. Hatch, Civ 460 CES/CEV, Buckley AFB. February.

Buckley AFB 2003f — Buckley AFB. 2003f. Maps for Infrastructure Upgrades Phase III. Buckley AFB.

Buckley AFB 2003g — Buckley AFB. 2003g. *Asbestos Survey at Certain Construction Sites*. Aurora, CO.

Buckley AFB 2003h — Buckley AFB. 2003h. Written directive by Eric Farrington, 460 CES/CEVP, forwarded by Elise Sherva, 460 CES/CEVP, Buckley AFB. September.

Carlson, L.W. 1997 — Carlson, L.W. 1997. Colorado Field Supervisor, U.S. Fish and Wildlife Service. Letter to W. Moore, Ogden Environmental and Energy Services, dated 5 September 1997.

City of Aurora 2002 — City of Aurora. 2002. ADT Traffic Volumes Map for 1998, 1999, 2000. Aurora, CO.

City of Aurora Planning Department 2000	City of Aurora Planning Department. 2000. Profile of General Demographic Characteristics, City of Aurora, Colorado and Selected Geographies. Transmitted to AMEC via the Internet on 16 July 2002 (http://www.ci.aurora.co.us/documents/CTY_PL_General_Demographic_Characteristics.pdf).
City of Aurora Planning Department 2002	City of Aurora Planning Department. 2002. Personal communication with Jay Pierce, Planning Department. April, September.
City of Aurora Planning Department 2003a	City of Aurora Planning Department. 2003a. Personal communication with Jay Pierce, Planning Department. September, November.
City of Aurora Planning Department 2003b	City of Aurora Planning Department. 2003b. Written directive for Draft EA and FONSI from Denise Balkas, Director of Planning. November.
City of Aurora Public Works Department 2002	City of Aurora Public Works Department. 2002. Personal communication with John Lampey, Public Works Department. April.
City of Aurora Utilities Department 2003	City of Aurora Utilities Department. 2003. Personal communication with Natalie Brower-Kirton, Water Conservation Specialist. September.
COANG 1989	Colorado Air National Guard (COANG). 1989. *Integrated Land Use Management Plan: Buckley Air National Guard Base, Aurora, Colorado*. Prepared by Hunter/ESE, Denver, CO.
COANG 1991	COANG. 1991. *Environmental Assessment of an Aircraft Conversion, 140th Tactical Fighter Wing, Buckley Air National Guard Base, Aurora, Colorado.* Prepared for the National Guard Bureau/DEV, Andrews AFB, Washington, DC.
COANG 1995a	COANG. 1995a. *Installation Restoration Program: Management Action Plan*. Air National Guard Readiness Center. Andrews AFB, MD.
COANG 1995b	COANG. 1995b. *Buckley Air National Guard Base Stormwater Pollution Prevention Plan*. Aurora, CO.

COANG 1996	COANG. 1996. *Hazardous Waste Management Plan*. Draft, June 1996. Aurora, CO.
COANG 1997a	COANG. 1997a. Traffic Study: Buckley Air National Guard Base. Aurora, CO.
COANG 1997b	COANG. 1997b. Master Plan: Buckley Air National Guard Base. Aurora, CO.
COANG 1998	COANG. 1998. Air Installation Compatible Use Zone Study at Buckley Air National Guard Base. Environmental Management. Aurora, CO.
COANG 1999a	COANG. 1999a. *Environmental Assessment for Proposed Infrastructure Upgrade and Expansion at the 140th Wing*. Buckley Air National Guard Base, CO. March.
COANG 1999b	COANG. 1999b. *Oil and Hazardous Materials Spill Prevention and Response Plan*. Aurora, CO.
Colorado Department of Labor and Employment 2000	Colorado Department of Labor and Employment. 2000. Labor Market Information. Transmitted to AMEC via the Internet on 10 May 2002 (http://www.coworkforce.com).
CDPHE 1996	Colorado Department of Public Health and Environment (CDPHE). 1996. *Colorado Air Quality Commission: Report to the Public*. Prepared by the Colorado Air Pollution Control Division. Denver, CO.
CDPHE 2002	CDPHE. 2002. Personal communication with Gordon Pierce. April.
CDPHE 2003	CDPHE. 2003. Personal communication with Christopher Dann, Air Pollution Control Division. June.
Colorado Department of Transportation 1997	Colorado Department of Transportation. 1997. *Traffic Analysis Unit: 1996 Traffic Data*. Denver, CO.

Colorado Department of Transportation 2001	Colorado Department of Transportation. 2001. Traffic Data. Transmitted to AMEC via the Internet on 6 September 2002 (www.dot.state.co.us/App_DTD_DataAccess/Traffic/index).
CDOW 2001	Colorado Division of Wildlife (CDOW). 2001. *Colorado Listing of Endangered, Threatened and Wildlife Species of Special Concern.* Transmitted to AMEC via the Internet on 28 May 2002 (http://wildlife.state.co.uc/T&E/list.asp).
CDOW 2002	CDOW. 2002. Personal communication with Gary Skiba, Ecosystems Management. May.
CDOW 2003	CDOW. 2003. Personal communication with Jerry Craig regarding Burrowing Owl mitigation. April.
Colorado SHPO 2003	Colorado State Historic Preservation Officer (SHPO). 2003. Letter of concurrence regarding the status of Building 39 (5AH.1502). 30 April.
Denver RAQC 2003	Denver Regional Air Quality Council (RAQC). 2003. Ozone Early Action Compact Denver Metro Area, June 20, 2003 Progress Report. Transmitted to AMEC via the Internet on 4 November (http://www.raqc.org/ozone/EAC).
Denver Regional Council of Governments 2002	Denver Regional Council of Governments. 2002. Personal communication with Lawrence Tilong. April.
FEMA 1995	Federal Emergency Management Agency (FEMA). 1995. *National Flood Insurance Program Rate Map: City of Aurora, Colorado, Adams, Arapahoe and Douglas counties.* Washington, DC.
Federal Register 1980	Federal Register. 1980. *"40 CFR Part 230: Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material."* Vol. 45, No. 249, pp. 85352-85353. US Government Printing Office. Washington, D.C.

Federal Register 1982	Federal Register. 1982. *"Title 33: Navigation and Navigable Waters; Chapter II, Regulatory Programs of the Corps of Engineers."* Vol. 47, No. 138, p. 31810. US Government Printing Office. Washington, D.C.
NRHP 2003	National Register of Historic Places (NRHP). 2003. State Listings, Arapahoe County. Transmitted to AMEC via the Internet on 15 September 2003 (www.nationalregisterofhistoricplaces.com/state.html).
Powers Elevation Company, Inc 1990	Powers Elevation Company, Inc. 1990. *Cultural Resource Management Report, Final Report: A Cultural Resources Inventory of the Buckley Air National Guard Base, Arapahoe County, Colorado*. Prepared for Pahl, Pahl, Pahl, Architects/Planners. Denver, CO.
URBEMIS 2001	URBEMIS. 2001. Air Quality-Emission Factors for Paving Construction Projects and Combustion Emissions Associated with Construction Equipment. Created by the South Coast Air Quality Management District.
USAF 1992	U.S. Air Force (USAF). 1992. *Environmental Assessment: Additions to and Operations of Aerospace Data Facility*.
USAF 2000	USAF. 2000. *Environmental Assessment for Buckley Air National Guard Base Realignment*. Buckley Air National Guard, Colorado. September.
U.S. Bureau of the Census 2000	U.S. Bureau of the Census. 2000. *Profile of General Demographic Characteristics for Arapahoe County, Colorado: 2000*. Transmitted to AMEC via the Internet on 16 July 2002 (http://censtats.census.gov/data/CO/05008005.pdf).
U.S. Bureau of Economic Analysis 1999	U.S. Bureau of Economic Analysis. 1999. *Regional Accounts Data, Local Area Personal Income for Arapahoe County*. Transmitted to AMEC via the Internet on 16 July, 2002 (http://www.bea.doc.gov/bea/regional/reis/action.cfm).

U.S. Bureau of Labor Statistics 2000	U.S. Bureau of Labor Statistics. 2000. *Local Area Unemployment Statistics*. Transmitted to AMEC via the Internet on 16 July 2002 (http://www.bls.gov/lau/home.htm#overview).
USDA 1971	U.S. Department of Agriculture (USDA). 1971. *Soil Survey of Arapahoe County, Colorado.* Washington, DC.
USEPA 1995	U.S. Environmental Protection Agency (USEPA). 1995. *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, and Volume 2: Mobile Sources (AP-42)*. 5th Edition. Ann Arbor, MI.
USEPA 2003a	USEPA. 2003a. Emission Data for Criteria Air Pollutants in Arapahoe County: 2002. Transmitted to AMEC via the Internet on 3 November 2003 (www.epa.gov/air/data).
USEPA 2003b	USEPA. 2003b. Green Book Nonattainment Areas for Criteria Pollutants. Transmitted to AMEC via the Internet on 9 June 2003 (http://www.epa.gov/air/oaqps/greenbk/index.html).
USFWS 1992	U.S. Fish and Wildlife Service (USFWS). 1992. Wetlands Map in the vicinity of Buckley AFB. Transmitted to AMEC via the Internet on 10 September 2002 (http://ecos.fws.gov/).
USFWS 2002	USFWS. 2002. *Threatened and Endangered Species System* (TESS). Transmitted to AMEC via the Internet on 28 May 2000 (http://ecos.fws.gov/webpage/webpage_usa_lists.html? state=CO).
Wright Water Engineers, Inc 1988	Wright Water Engineers, Inc. 1988. *New Denver Airport Environmental Assessment*. Prepared for the City and County of Denver, Department of Public Works. Denver, CO.

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