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FINAL

ENVIRONMENTAL ASSESSMENT

OF THE

RELOCATION AND CONSTRUCTION OF A MILITARY WORKING DOG (MWD) KENNEL BUCKLEY AIR FORCE BASE, COLORADO

Prepared for

460 CES/CEV
660 S. Aspen Street, Stop 86
Buckley AFB, CO 80011-9551

DECEMBER 2006

Final
FINDING OF NO SIGNIFICANT IMPACT (FONSI)
ENVIRONMENTAL ASSESSMENT OF THE RELOCATION AND CONSTRUCTION OF A MILITARY WORKING DOG (MWD) KENNEL

INTRODUCTION

The United States Air Force (USAF) 460th Space Wing (460 SW) proposes to relocate and construct a Military Working Dog (MWD) kennel facility on Buckley Air Force Base (AFB) in response to changing land use surrounding the existing kennel and to accommodate additional MWDs. The Proposed Action, two Action Alternatives, and the No Action Alternative were assessed in an Environmental Assessment (EA) which is incorporated herein by reference.

The USAF's MWD Program is prescribed by Air Force Instruction (AFI) 31-202, *Military Working Dog Program*, 1 August 1999. Because the U.S. Army provides veterinary service for MWDs as prescribed by support agreements and Air Force Joint Instruction (AFJI) 48-131/Army Regulation (AR) 40-905, *Veterinary Health Services* (formerly AFR 163-5/AR 40-905), the USAF's MWD program is also subject to AR 190-12, *Military Working Dog Program*, 30 September 1993. Changes in missions at Buckley AFB and concurrent growth in base population and activity requires additional MWDs to support Antiterrorism/Force Protection (AT/FP) and law enforcement efforts (AFI 31-202). Two additional canines have been authorized for the base for this purpose. However, the current kennel is at capacity and the two additional canines cannot be obtained until adequate space is available (AFI 31-202, AR 190-12). The current MWD kennel is adjacent to Telluride Avenue in an area that is being developed for military family housing, youth athletic (ball and soccer) fields, and other family support activities. Telluride Avenue will be widened to four lanes with sidewalks as it will become the main travel corridor between military family housing and the Base Exchange/Commissary, Army and Air Force Exchange Service (AAFES) gas station, the fitness center, and the Telluride Entry Gate. The inherent increased pedestrian and vehicular traffic and youth-oriented activities planned for the current MWD kennel location pose a number of hazards. There is a possibility children would attempt to play with or harass the MWDs, risking injury to the children and to the canines. If an MWD were to escape from the current kennel, it could pose a substantial threat to the surrounding public. Finally, although the increase in such activities may not elevate noise levels above the acceptable decibel (dB) limit of 75 adjusted dB (dBA) as established in AFI 31-202 and AR 190-12, it is reasonable to anticipate that it would interfere with outdoor training, thereby compromising MWD training and performance.

DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with AR 190-12. Construction is currently planned for 2007.

SUMMARY OF ALTERNATIVES TO THE PROPOSED ACTION

Action Alternative A: Under Action Alternative A the new MWD Kennel would be constructed adjacent to the future small arms firing range, south and west of Chuchara Street on the southeastern portion of the installation. The design and footprint would be identical to that described for the Proposed Action.

Action Alternative B: Under Action Alternative B the new MWD kennel would be built in the vicinity of the fire training area, east of Chuchara Street on the southeastern portion of the installation. The design and footprint would be identical to that described for the Proposed Action.

No Action Alternative: Under the No Action Alternative, the new MWD kennel would not be constructed. All MWD housing and training functions would continue at the current MWD kennel site.

SUMMARY OF ANTICIPATED ENVIRONMENTAL IMPACTS

Analyses performed in the EA addressed potential effects of the Proposed Action and Alternatives on land use, utilities, air quality, noise, hazardous materials and wastes (including the Environmental Restoration Program [ERP]), safety, geology, water resources, biological resources, and socioeconomics and environmental justice. The analyses indicate that implementing the Proposed Action would have no significant direct, indirect, or cumulative effects on the quality of the natural or human environment.

PUBLIC REVIEW AND INTERAGENCY COORDINATION

Based on the provisions set forth in the Proposed Action, all activities were found to comply with criteria or standards of environmental quality and coordinated with Federal, state, and local agencies. The Draft EA and Draft FONSI were made available to Federal, state, and local agencies; and to the public for a 15-day review period beginning 9 November 2006 and ending 24 November 2006. Comments were received from the City of Aurora, Colorado Department of Public Health and Environment, and Colorado Historical Society. Responses to comments were made by letter to originators or incorporated into the EA and FONSI as appropriate.

FINDING OF NO SIGNIFICANT IMPACT

Reasonable alternatives to the Proposed Action were considered. The Proposed Action was found to be the preferred alternative to meet Buckley AFB's purposes and needs. After review of the EA prepared in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations, and the Environmental Impact Analysis Process (32 Code of Federal Regulations 989, as amended), I have determined that the Proposed Action would not have a significant impact on the quality of the human or natural environment. An Environmental Impact Statement (EIS) will not be prepared. This decision has been made after taking into account all submitted information and considering a full range of practical alternatives that would meet project requirements and are within the legal authority of the USAF.

David W. Ziegler

DAVID W. ZIEGLER, Colonel, USAF
Commander

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Date

Cover Sheet
Final Environmental Assessment of the
Relocation and Construction of a Military Working Dog (MWD) Kennel
Buckley Air Force Base, Colorado

Responsible Agency: 460th Space Wing (460 SW), Buckley Air Force Base (AFB), Colorado

Affected Location: Buckley AFB, Colorado

Document Designation: Final Environmental Assessment

Proposed Action: Under the Proposed Action, a new Military Working Dog (MWD) kennel would be constructed on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with AR 190-12. Construction is currently planned for 2007.

Action Alternative A: Under Action Alternative A the new MWD Kennel would be constructed adjacent to the future small arms firing range, south and west of Chuchara Street on the southeastern portion of the installation. The design and footprint would be identical to that described for the Proposed Action.

Action Alternative B: Under Action Alternative B the new MWD kennel would be built in the vicinity of the fire training area, east of Chuchara Street on the southeastern portion of the installation. The design and footprint would be identical to that described for the Proposed Action.

Other Action Alternatives Considered: Construction of the new MWD kennel east of the Office of Special Investigations (OSI) building was also considered. Due to the proximity of this location to off-installation residences, and the location's position on the landscape, this alternative was not analyzed in detail.

No Action Alternative: Under the No Action Alternative, the new MWD kennel would not be constructed. All MWD training and housing functions would continue at the current MWD kennel site.

Written comments and inquiries regarding this document should be directed to Ms. Elizabeth Meyer, NEPA Compliance Program Manager, 460th CES/CEV; Tel. 720-847-7159; email Elizabeth.meyer@buckley.af.mil.

Privacy Advisory

Your comments on this Final EA are requested. Letters or other written comments provided may be published in the EA. Comments will normally be addressed in the EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and phone numbers will not be published in the EA.

FINAL
ENVIRONMENTAL ASSESSMENT
OF THE
RELOCATION AND CONSTRUCTION OF A MILITARY WORKING DOG (MWD) KENNEL
BUCKLEY AIR FORCE BASE, COLORADO

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ABBREVIATIONS AND ACRONYMS

µg/m^3	Micrograms Per Cubic Meter
140 WG	140th Wing
460 SFS	460th Security Forces Squadron
460 SW	460th Space Wing
AAFES	Army and Air Force Exchange Service
ACM	Asbestos-Containing Material
AEI	Annual Emissions Inventory
AFB	Air Force Base
AFI	Air Force Instruction
AFJI	Air Force Joint Instruction
AFPD	Air Force Policy Directive
ANGB	Air National Guard Base
AQCR	Air Quality Control Region
AR	Army Regulation
AST	Aboveground Storage Tank
AT/FP	Antiterrorism/Force Protection
BMP	Best Management Practice
CAA	Clean Air Act
CAP	Centralized Accumulation Point
CAPCD	Colorado Air Pollution Control Division
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
CES/CEV	Civil Engineering Squadron/Environmental Flight
CFR	Code of Federal Regulations
CGP	Construction General Permit
CO	Carbon Monoxide
COANG	Colorado Air National Guard
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted Sound Level Measurements
DIA	Denver International Airport
DNL	Day-Night Average A-weighted Sound Level
DOD	Department of Defense
EA	Environmental Assessment
EAC	Early Action Compact
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ETL	Engineering Technical Letter
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
HAZMART	Hazardous Materials Pharmacy
HAZMAT	Hazardous Materials
HUD	U.S. Department of Housing and Urban Development
HWMP	Hazardous Waste Management Plan
IAP	Initial Accumulation Point
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
LBP	Lead-Based Paint
LBPPO	Lead-Based Paint Program Officer
mg/m^3	Milligrams per Cubic Meter
MS4	Municipal Separate Storm Sewer Systems

MSA	Metropolitan Statistical Area
MSDS	Material Safety Data Sheet
MSGP	Multi-Sector General Permit
MSW	Municipal Solid Waste
MWD	Military Working Dog
NAAQS	National Ambient Air Quality Standards
NBC	Nuclear, Biological, Chemical
NEPA	National Environmental Policy Act
NO_2	Nitrogen Dioxide
NOI	Notice of Intent
NO_x	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	Ozone
OSHA	Occupational Safety and Health Administration
OSI	Office of Special Investigations
Pb	Lead
pCi/L	Picocuries per Liter
PM_{10}	Particulate matter less than 10 microns in diameter
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
POL	Petroleum, Oil, and Lubricants
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
QD	Quantity Distance
RAMP	Radon Management Plan
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SAP	Satellite accumulation points
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Sulphur Oxide
sq.ft.	Square Feet or Square Foot
SWMP	Stormwater Management Plan
SWPPP	Storm Water Pollution Prevention Plan
tpy	Tons per Year
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
USDOT	U.S. Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VOC	Volatile Organic Compound

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1. INTRODUCTION

This section describes the purpose of and need for the Proposed Action at Buckley Air Force Base (AFB), provides summaries of the scope of the environmental review and the applicable regulatory requirements, and presents an overview of the organization of the document.

Federal agencies are required to consider the environmental consequences of proposed actions in the decisionmaking process under the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] Sections 4321 to 4370d) and the Council on Environmental Quality's (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508). This Environmental Assessment (EA) for construction of a new Military Working Dog (MWD) kennel at Buckley AFB was prepared in accordance with NEPA.

1.1 BACKGROUND

Buckley AFB occupies approximately 3,283 acres (1,328 hectares) adjacent to the city of Aurora, Arapahoe County, Colorado, within the Denver metropolitan area (Figure 1-1). Buckley Field was first used by the military for training during World War II, and then the Colorado Air National Guard (COANG) acquired use of Buckley Field in 1946. After ownership by the Department of the Navy from 1947 to 1959, COANG resumed use of the installation in 1959. In October 2000, Buckley Air National Guard Base (ANGB) was realigned and became an AFB under the 821st Space Group. The 460th Space Wing (460 SW) is the current host of Buckley AFB (BAFB 2004a).

The mission of the 460 SW is to provide combatant commanders with superior global surveillance, worldwide missile warning, expeditionary forces, and support to homeland defense missions. A wide range of missions are performed at Buckley AFB including flight training, support for transient military aircraft, and space-related initiatives by a variety of tenants including active-duty, National Guard, and Reserve personnel from the United States Air Force (USAF), Army, Navy, and Marine Corps. The 140th Wing (140 WG) of the COANG operates and manages the only active military airfield in the Denver metropolitan area as a tenant at Buckley AFB. The installation currently supports 2,712 active-duty personnel, 1,716 Air Force Reserves, 2,497 Air/Army/Navy/Marine Reserves, and 2,811 contract and private citizens (Spann 2006). In addition, the installation serves approximately 16,363 military dependents, 22,000 USAF retirees, and approximately 55,000 additional retirees (Spann 2006).

The 460th Security Forces Squadron (460 SFS) is responsible for all aspects of security at Buckley AFB, including Antiterrorism/Force Protection (AT/FP) and law enforcement duties. MWDs are assigned to the squadron to support performance of this mission.

1.2 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The USAF has prepared this EA to assess the environmental and social impacts resulting from the Proposed Action and Alternatives.

The purpose of the Proposed Action is to construct a new MWD kennel facility on Buckley AFB. The USAF's MWD Program is prescribed by Air Force Instruction (AFI) 31-202, *Military Working Dog Program*, 1 August 1999 (USAF 1999). Because the U.S. Army provides veterinary service for MWDs as prescribed by support agreements and Air Force Joint Instruction (AFJI) 48-131/Army Regulation (AR) 40-905, *Veterinary Health Services* (formerly AFR 163-5/AR 40-905), the USAF's MWD program is also subject to AR 190-12, *Military Working Dog Program*, 30 September 1993 (U.S. Army 1993).

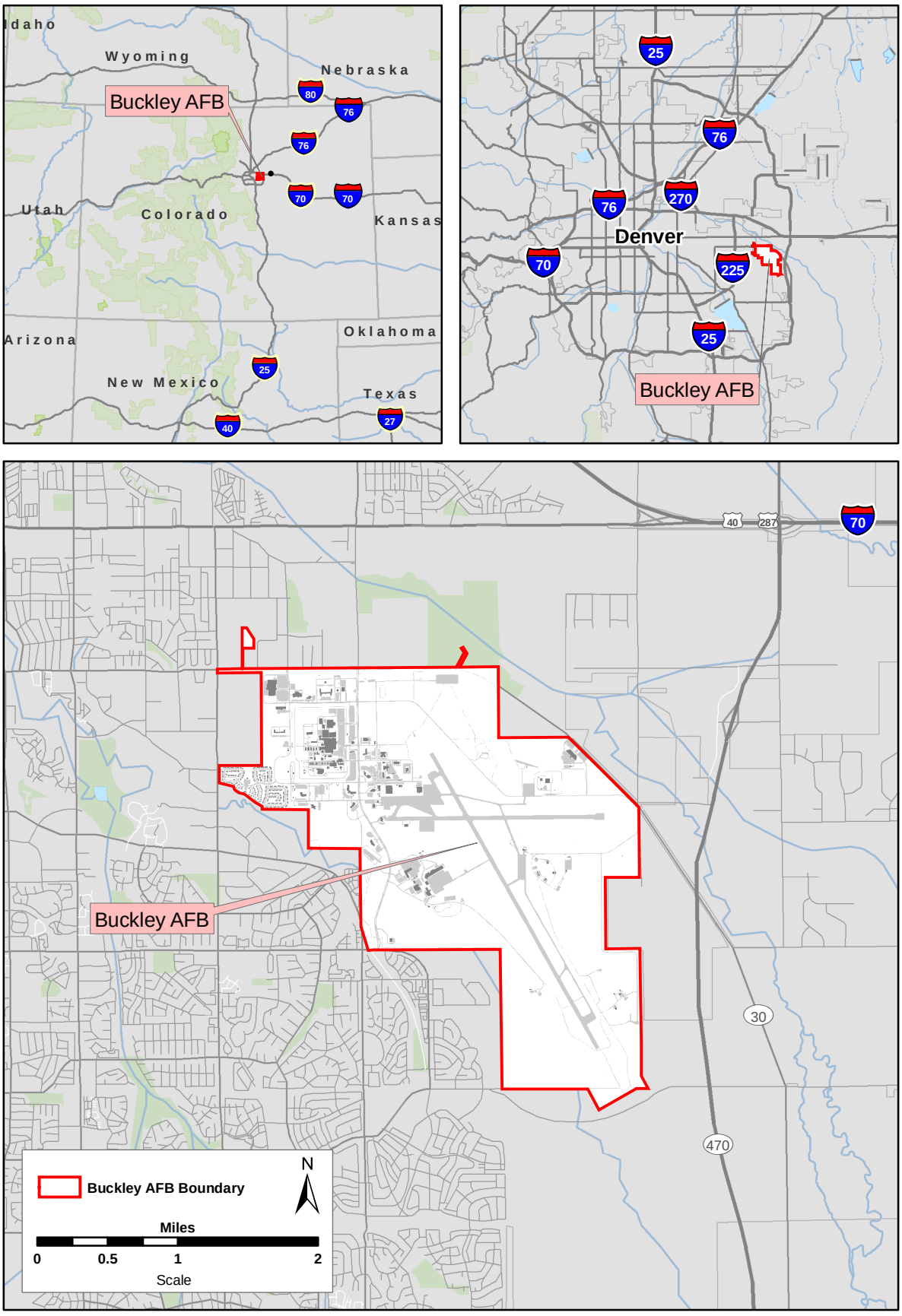

Figure 1-1. Buckley AFB Vicinity Map

Due to the change in missions at Buckley AFB, concurrent growth in installation population, and increased security activities there is a need for additional MWDs to support AT/FP and law enforcement efforts. Two additional canines have been authorized for the installation for this purpose. However, the current kennel is at capacity and the two additional canines cannot be obtained until adequate space is available (USAF 1999, U.S. Army 1993). Furthermore, the current kennel cannot accommodate MWDs that are at the installation on temporary duty. The current MWD kennel is adjacent to Telluride Avenue in an area that is being developed for military family housing, youth athletic (ball and soccer) fields, and other family support activities (Figure 1-2). Telluride Avenue is going to be widened to four lanes with sidewalks as it will become the main travel corridor between military family housing and the Base Exchange/Commissary, Army and Air Force Exchange Service (AAFES) gas station, the fitness center, and the Telluride Entry Gate. The inherent increased pedestrian and vehicular traffic, and youth-oriented activities planned for the current MWD kennel location pose a number of hazards. There is a possibility children would attempt to play with or harass the MWDs, risking injury to the children and to the canines. If an MWD were to escape from the current kennel, it could pose a substantial threat to the surrounding public. Finally, although the increase in such activities might not elevate noise levels above the acceptable decibel (dB) limit of 75 adjusted dB (dBA) as established in AFI 31-202 and AR 190-12, it is reasonable to anticipate that it would interfere with outdoor training, thereby compromising MWD training and performance.

1.3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The Draft EA will be made available for public and agency review and comment. If the analyses presented in the EA indicate that the Proposed Action and Alternatives would result in no significant environmental or socioeconomic impacts, a Finding of No Significant Impact (FONSI) would be prepared. If the analyses reveal the potential for significant environmental impacts that cannot be reduced to insignificance, an Environmental Impact Statement (EIS) would be prepared or no action would be taken.

In compliance with NEPA, CEQ, and USAF regulations and guidelines, this document focuses on those conditions and resource areas that are potentially subject to impacts. These resources include land use, utilities, air quality, noise, hazardous materials and wastes (including the Environmental Restoration Program [ERP]), safety, geology, water resources, biological resources, and socioeconomics and environmental justice. Some environmental resources and conditions that are often analyzed in an EA have been eliminated from analysis or review. The following paragraphs identify these resource areas and the basis for such exclusions:

- **Cultural Resources** - Buckley AFB has undergone four separate cultural resources surveys since 1983 which cumulatively evaluated all areas of the installation with the exception of portions of the 152 acres within the fenced high security area (BAFB 2002a, BAFB 2004b). Cultural resources identified in these combined surveys included a number of lithic scatters, foundations of historic properties, trash dumps, and a railroad spur line, none of which were considered eligible for the National Register of Historic Places (NRHP); and six buildings that are eligible for the NRHP. None of these buildings are in the location of the Proposed Action or Alternatives. The Colorado State Historic Preservation Officer (SHPO) has previously concurred that no significant archaeological resources have been identified at Buckley AFB and that various proposed actions are, therefore, unlikely to impact such resources. The implementation of the Proposed Action does not lead to any actions that have the potential to significantly affect cultural resources, tribal resources, tribal rights, or Indian lands. Should any cultural resources be uncovered during implementation of the Proposed Action, work would stop and the site would be

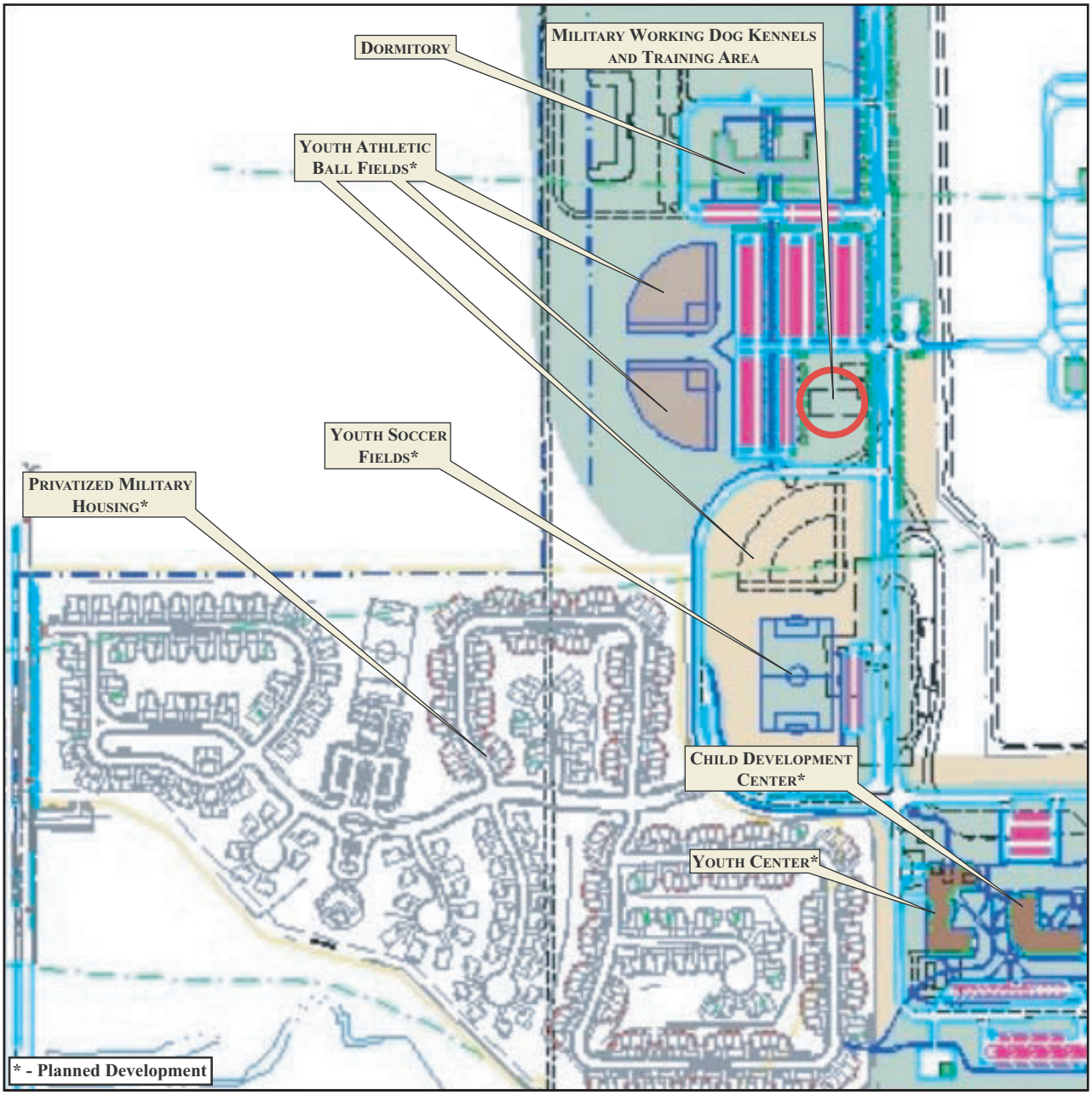

Figure 1-2. New and Incompatible Land Use in Area in Vicinity of Current MWD Kennel

evaluated prior to the continuation of the project. Accordingly, the USAF has eliminated detailed examination of cultural resources, including historic structures and buildings, archaeological resources, and tribal resources.

- **Airspace Management** - Because the Proposed Action would not involve any flying or flying missions, there would be no new impacts on airspace. Accordingly, the USAF has eliminated detailed examination of airspace management.

1.4 SUMMARY OF KEY ENVIRONMENTAL COMPLIANCE REQUIREMENTS

This EA is documentation of the Environmental Impact Analysis Process (EIAP) (32 CFR Part 989), and complies with NEPA, CEQ regulations, and Department of Defense (DOD) Instruction 4715.9. The EA addresses all applicable Federal, state, and local laws and regulations, including the Clean Air Act (CAA); Endangered Species Act (ESA); AFI 32-7040, *Air Quality Compliance*; Executive Order (EO) 11990, *Protection of Wetlands*; EO 12898, *Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations*; EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*; Resource Conservation and Recovery Act; and Comprehensive Environmental, Response, Compensation, and Liability Act. The EA does not constitute approval for the Proposed Action.

In accordance with the National Pollutant Discharge Elimination System (NPDES) requirements, a site-specific Storm Water Pollution Prevention Plan (SWPPP), including sediment- and erosion-control measures, would be developed and implemented for construction activities. A Notice of Intent would be filed to obtain coverage under the United States Environmental Protection Agency (USEPA) Storm Water Construction General Permit. A fugitive dust permit would not be required for the Proposed Action as the impact area for the new construction is below the 25-acre limit, beyond which a fugitive dust permit would be needed.

1.5 ORGANIZATION OF THE ENVIRONMENTAL ASSESSMENT

This EA is organized as follows:

Acronyms and Abbreviations: provides a list of acronyms and abbreviations used throughout the document.

Section 1 – Introduction: Purpose and Need for the Proposed Action: provides background information about the installation, the purpose and need for the Proposed Action, the scope of the environmental review, applicable regulatory requirements, and a brief description of how the document is organized.

Section 2 – Description of the Proposed Action and Alternatives: provides the selection criteria; a detailed description of the Proposed Action, Action Alternatives, and the No Action Alternative; other alternatives that were considered but not carried forward in the evaluation process; and an alternatives comparison table.

Section 3 – Affected Environment and Environmental Consequences: provides a description of the existing conditions of the areas potentially affected by the Proposed Action, Action Alternatives, and the No Action Alternative; and an analysis of the direct and indirect project impacts on resources from the Proposed Action, Action Alternatives, and the No Action Alternative.

Section 4 – Cumulative Impacts: provides an analysis of present and reasonably foreseeable projects, and the potential incremental impacts of the Proposed Action, Action Alternatives, and the No Action Alternative when considered along with these other planned or reasonably foreseeable projects.

Section 5 – List of Preparers: provides a list of the document preparers and contributors.

Section 6 – Distribution List and Agencies and Individuals Contacted: provides lists of agencies and individuals to whom this EA will be distributed and the agencies and individuals who were contacted for information in the preparation of this document.

Section 7 – References: provides a listing of the references used in preparing this EA.

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section identifies selection criteria, and provides a detailed description of the Proposed Action, Action Alternatives, and the No Action Alternative for the proposed relocation and construction of an MWD kennel. In addition, a comparison of how the alternatives meet the selection criteria is provided at the end of this section.

2.1 IDENTIFICATION OF SELECTION CRITERIA

In an effort to satisfy the purpose and need for the Proposed Action, several criteria were developed to compare and contrast alternative ways of fulfilling the objectives of the Proposed Action in accordance with 32 CFR 989.8(c).

Selection criteria for the MWD kennel include

- Kennel location is in a compatible land use area in accordance with the General Plan for Buckley AFB and per AFI 31-202 and AR 190-12.
- Kennel location provides enough space for construction of the larger kennel and associated support facilities (e.g., training and exercise areas, storage, parking) needed to accommodate four additional MWDs per AR 190-12.
- Kennel location is supplied by necessary infrastructure (i.e., electricity, water, sewer, roads) per AR 190-12.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The current MWD kennel is adjacent to Telluride Avenue in an area that is being developed to provide military family housing, youth athletic (ball and soccer) fields, and other family-oriented facilities and activities (see Figure 1-2). Because of the activity and noise associated with this kind of development (both in the construction and operation phases), the new land use for this area is incompatible with performance of the 460 SFS mission components related to MWDs. AFI 31-202 and AR 190-12 establish guidance for design and siting of MWD kennels. Based on these regulations, the current MWD kennel does not have adequate space for the number of MWDs allocated to 460 SFS or stationed at Buckley AFB on temporary duty; nor does it provide adequate training and break facilities for the canines currently occupying the kennel. Both AFI 31-202 and AR 190-12 establish that the time-weighted overall average sound pressure level for any 24-hour period should not exceed 75 dB. If noise at a kennel location exceeds this threshold, the training and performance of MWDs is anticipated to be negatively impacted. Under the authority of AFI 31-202, Section 9.1.2 and AR 190-12, Section 7-2.f, the attending veterinarian can close the kennel if noise at the kennel location exceeds this threshold (Coenen 2006). While it is not anticipated that increased activity and noise in the area of the current kennel location would exceed this threshold, it is anticipated, particularly during the construction phase for surrounding developments, to impact the effectiveness of outdoor training. Thus, the current kennel does not meet anticipated space or location requirements.

Under the Proposed Action, a new MWD kennel would be constructed on the south side of Sunlight Way in the area of the former Army obstacle training course. Figure 2-1 presents the current, proposed, and alternative MWD locations. The new MWD kennel would include kennels for a minimum of ten dogs, four administrative offices for handlers, a veterinary examination room, a break area and shower/restroom for handlers, and adequate storage and facility support (e.g., mechanical) space, and would total

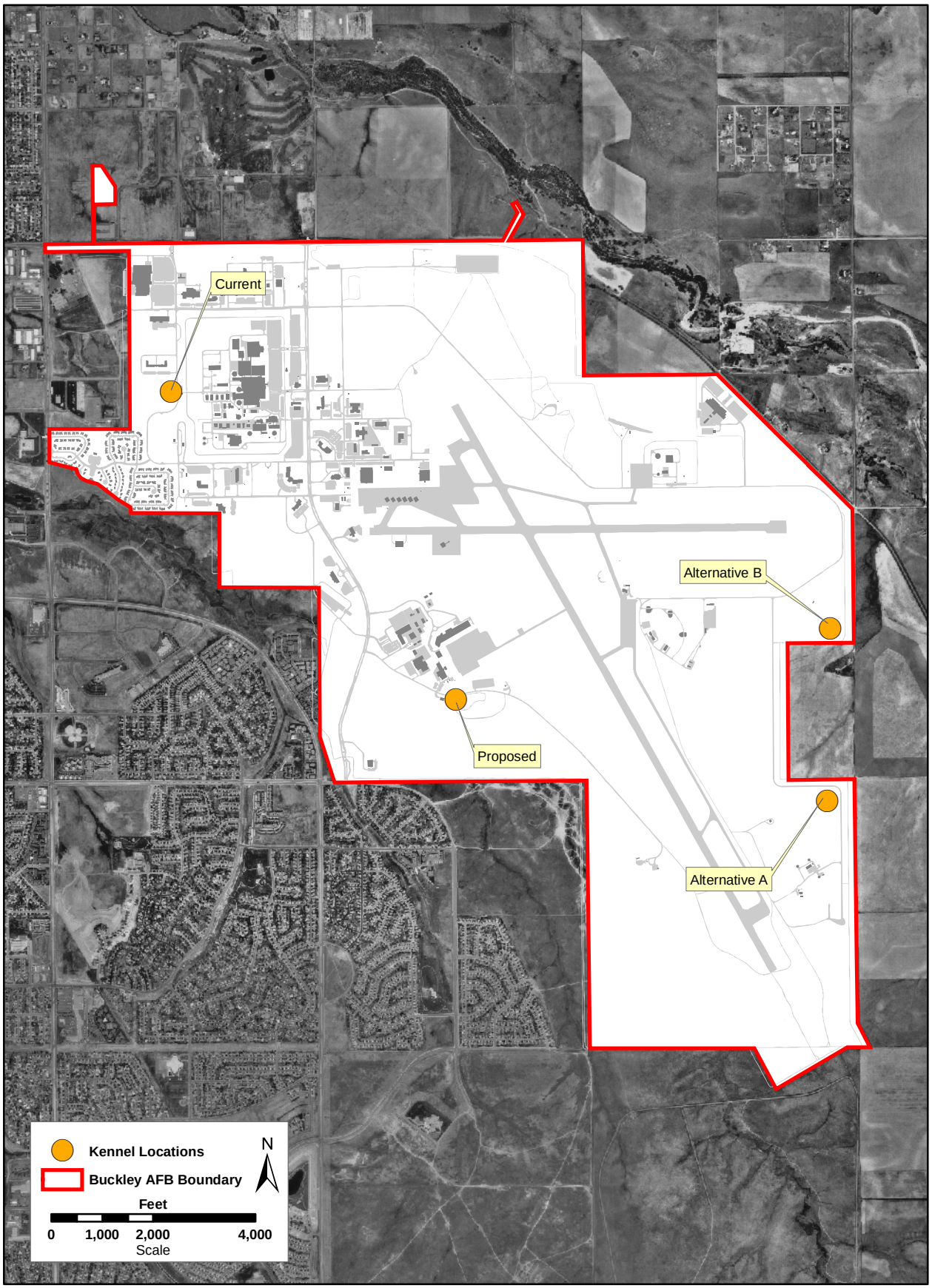

Figure 2-1. Current, Proposed, and Alternative MWD Kennel Locations

approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a training/obedience yard and canine break area (approximately 26,156 sq.ft.), driveway and parking lot for 10 vehicles (approximately 4,385 sq.ft.), a vehicle garage (approximately 900 sq.ft.), and a separate storage building for MWD training gear (approximately 323 sq.ft.). Design of the kennel and support facilities would comply with AR 190-12, including use of noise-dampening materials in construction of the kennel and the fence surrounding the training and exercise areas as needed to ensure effective training and care of the MWDs. Per Section 1-12 of AR 190-12, the design of the kennel and support facilities would be approved by the MWD veterinarian prior to construction, which is anticipated in 2007. The footprint of the new facility would be approximately 1.5 acres.

2.3 DESCRIPTION OF ACTION ALTERNATIVES

2.3.1 Action Alternative A

Under Action Alternative A, the new MWD kennel would be constructed adjacent to the future small arms range in the southeastern portion of the installation (Figure 2-1). The design and footprint of the kennel and associated support structures would be identical to that described for the Proposed Action.

2.3.2 Action Alternative B

Under Action Alternative B, the new MWD kennel would be constructed in the vicinity of the fire training area in the southeastern portion of the installation (Figure 2-1). The design and footprint of the kennel and associated support structures would be identical to that described for the Proposed Action.

2.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, the MWD kennel would remain in its current location with no new construction or renovation. This document refers to the continuation of existing (i.e., baseline) conditions of the affected environment, without implementation of the Proposed Action, as the No Action Alternative. The No Action Alternative serves as a benchmark against which Federal actions can be evaluated. Inclusion of a No Action Alternative is prescribed by CEQ regulations and, therefore, will be carried forward for further analysis in this EA. The No Action Alternative would result in continuing juxtaposition of incompatible land uses, possibly result in safety concerns for children in the area, and not support the installation security mission. The No Action Alternative cannot meet the space, facility, and siting requirements set forth in AFI 31-202 and AR 190-12.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER REVIEW

Locating the new MWD kennel near the Office of Special Investigations (OSI) was considered. However, the proximity of this location to civilian neighborhoods close to the installation, and its position on the terrain, made this alternative impractical.

2.6 COMPARISION OF ALTERNATIVES

Table 2-1 illustrates the Proposed Action, Action Alternatives, and the No Action Alternative as they relate to the selection criteria presented in Section 2.1. Only the Proposed Action meets all three of the selection criteria.

Table 2-1. Comparison of Alternatives with Selection Criteria

Selection Criterion	Proposed Action	Alternative A	Alternative B	No Action Alternative
Kennel is located in a compatible land use area.	Yes	Yes	Yes	No
Kennel location provides enough space for construction of the larger kennel and associated support facilities needed to accommodate additional MWDs.	Yes	Yes	Yes	No
Kennel location is supplied by necessary infrastructure (i.e., electricity, water, sewer, roads).	Yes	No	No	Yes

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the current conditions for and anticipated impacts on those resources which might be impacted by the Proposed Action including land use, utilities, air quality, noise, hazardous materials and wastes (including the ERP), safety, geology, water resources, biological resources, and socioeconomics and environmental justice. The definitions for impact intensity thresholds used in this document are

- Negligible. Impacts on the resource, although anticipated, could be difficult to observe and are not measurable
- Minor. Impacts on the resource would be detectable upon close scrutiny or would result in small but measurable changes to the resource
- Moderate. Impacts on the resource would be easily observed and measurable, but would be localized or short-term
- Major. Impacts on the resource would be easily observed and measurable, widespread, and long-term.

The definitions for duration of impacts used in this document are

- Short-term. Impacts are not anticipated to last for more than 1 to 2 years
- Long-term. Impacts are anticipated to last for more than 2 years

3.1 LAND USE

3.1.1 Affected Environment

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence."

Buckley AFB occupies approximately 3,283 acres (1,328 hectares) adjacent to the city of Aurora, Arapahoe County, Colorado, within the Denver metropolitan area. Developed areas, including residential, commercial, and light industrial, border the installation to the west and northwest (Figure 3-1). Along the northern boundary of the installation are light industrial and open space (e.g., grassland conservation) areas. Land uses bordering the installation to the east are primarily recreation and agriculture at present. Land use for this eastern border is anticipated to shift to industrial/commercial to the northeast and residential to the southwest. Regional Park and Open Space designations are proposed for areas immediately south of the installation. The East Toll Gate Creek 100-year floodplain borders the installation to the southwest and provides a buffer between the developed areas and the installation boundary (BAFB 2005).

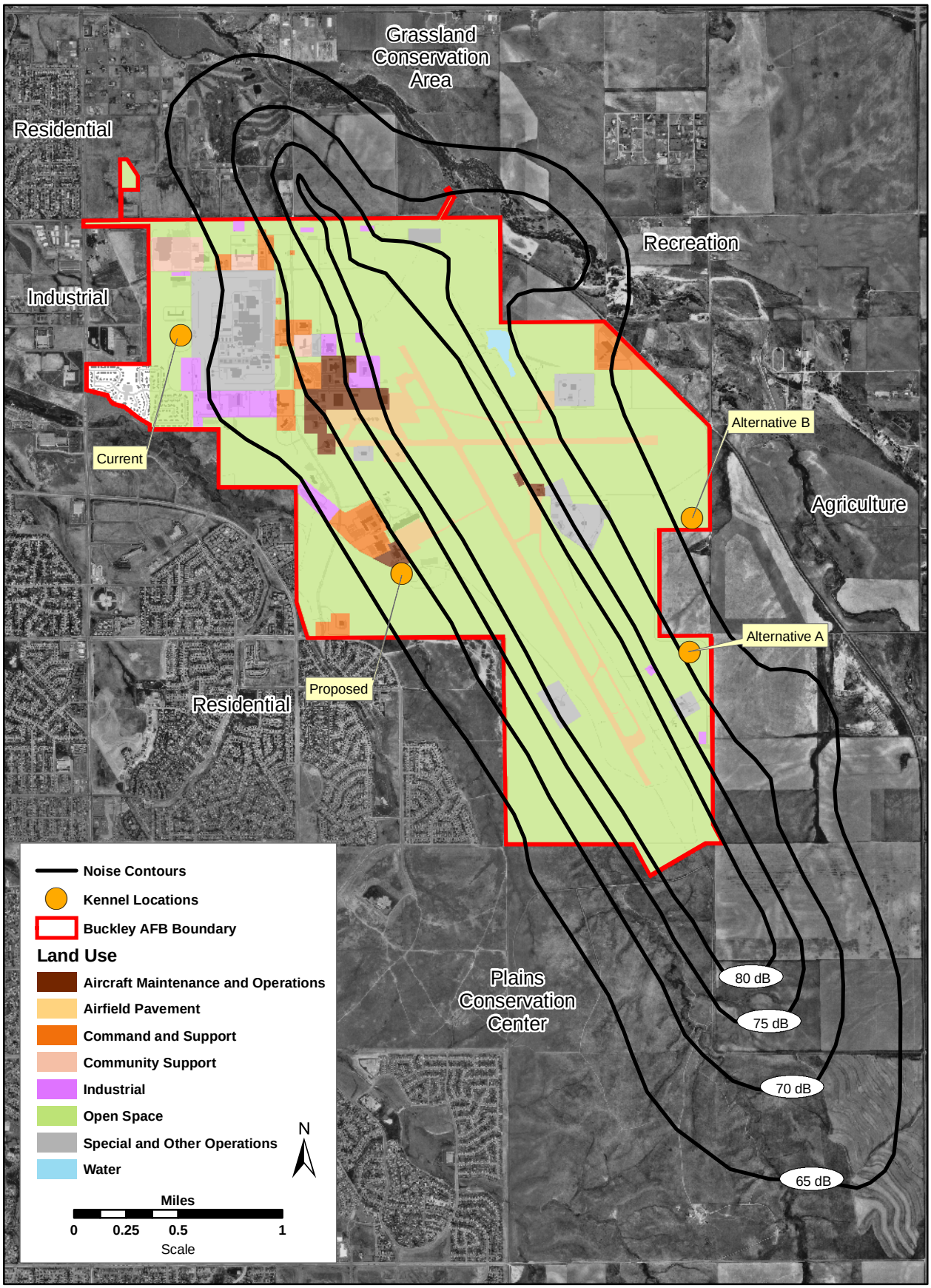

Figure 3-1. Land Use and Noise Contours at Alternative Locations

Land uses within Buckley AFB are primarily divided into 14 categories (administrative, aircraft operations and maintenance, airfield, airfield pavements, community commercial, community service, housing-accompanied, housing-unaccompanied, industrial, medical, mission operations and maintenance, open space, outdoor recreation, and water). The land use categories were developed to prevent incompatible siting of facilities and operations.

Proposed Action

The Proposed Action would construct the new MWD kennel in the southwestern portion of the installation, on the south side of Sunlight Way. The approximately 1.5-acre footprint of this facility would occupy the former Army obstacle training course, the current land use designation of which is outdoor recreation. On-installation land use north of the proposed site is currently industrial and airfield-related; however, actions are underway to convert the area along the north side of Sunlight Way to aircraft operations and maintenance (Figure 3-1). To the east, west, and south of the Proposed Action site, land use is currently open space (BAFB 2005) and is planned for outdoor recreation in the future (Figure 3-1). Off-installation, the closest land uses to the Proposed Action site are residential and open space.

Action Alternative A

Action Alternative A would place the new MWD kennel adjacent to the future small arms range in the southeastern portion of the installation. Within installation boundaries, this site is currently bordered to the south and west by open space. The nearest non-open space land uses are administrative and airfield. Future land use of the area near this site is planned for designation as industrial (Figure 3-1). Off-installation land use (to the north and east) is currently agriculture but could shift to industrial/commercial to the north and residential to the east.

Action Alternative B

Action Alternative B would construct the new MWD kennel in the vicinity of the fire training area in the southeastern portion of the installation. Within installation boundaries, this site is currently bordered to the north and west by open space, but future plans have indicated this open space to be designated industrial. This site is close to the installation boundary to the east and south, outside of which the current land use is agriculture. Future land use for these off-installation areas is anticipated to convert to industrial/commercial (Figure 3-1).

No Action Alternative

Under the No Action Alternative, a new MWD kennel would not be constructed, leaving kennel functions at the current location adjacent to Telluride Avenue. The new on-installation land use designations for this area are Community Service and Housing; providing family housing and related support services (e.g., youth athletic fields and a Child Development Center). Off-installation land use in the vicinity of this site is light industrial.

3.1.2 Impacts

The primary issues and concerns related to land use include the ability of Buckley AFB to continue to perform its mission while maintaining the viability of the land uses at and adjacent to the installation. Also of concern are the health, safety, and welfare of persons using land adjacent to Buckley AFB. The region of influence (ROI) considered for land use is limited to the areas inside of and immediately outside of Buckley AFB boundaries.

Impacts on land use from the Proposed Action or Action Alternatives would include

- Land use changes on installation that would conflict with community land use plans or zoning
- Land use conflicts on installation that are considered incompatible with the Buckley AFB General Plan
- Land use changes on installation that would impact communities (i.e., residential, business) that are located off installation, adjacent to Buckley AFB.

The Proposed Action and Action Alternatives are designed to alleviate the conflict between incompatible land uses (i.e., the MWD kennel functions and housing/community services) at the current kennel location.

Proposed Action

The Proposed Action is farther (approximately 1,500 feet) from the installation boundary than either of the Action Alternatives. At this distance, sounds from the kennel would be lost in background noise resulting from surrounding activities. Therefore impacts on residential land use areas outside the installation are anticipated to be negligible.

Within installation boundaries, the Proposed Action is compatible with both current (open space) and planned (unspecified outdoor recreation) land use to the west, south, and east of the proposed MWD kennel. Future outdoor recreational activities planned in the vicinity of the Proposed Action should consider potential impacts on MWD activities and vice versa. It is anticipated that, given the drainage and associated wetlands traversing the area south of the Proposed Action site, these activities would be low-impact, and therefore would not affect MWD training. Land use to the north might be considered incompatible. AR 190-12, *Military Working Dog Program*, and AFI 31-202, *Military Working Dog Program*, specifically prohibit location of kennels near runways, taxiways, small arms ranges, or other areas where the time-weighted overall average sound pressure level for any 24-hour period exceeds 75 dBA. As discussed in Section 3.4, the proximity of aircraft operations and maintenance activities to the Proposed Action site could have the potential to increase the 24-hour weighted average noise level above 75 dBA. Should this occur, there is the potential that the kennel could be closed down by the supervising veterinarian under authority provided in AR 190-12 and AFI 31-202. However, the recently revalidated noise contours are not anticipated to change substantially in the area of the Proposed Action (Harris 2006). Based on this prediction, and incorporation of appropriate kennel design and noise-attenuating materials, adjacent land use has the potential to have long-term minor adverse impacts on the land use designated for the new kennel location.

Action Alternative A

Action Alternative A would be within approximately 500 feet of the installation boundary. No impacts are anticipated from this alternative on current off-installation land use (agriculture). However, off-installation land to the east of Action Alternative A has been proposed for rezoning to residential (BAFB 2003). Noise from the MWD kennel could negatively impact such a spatially close residential area. Given that the off-installation area immediately north of both Action Alternative A and the future residential area is anticipated to be industrial/commercial, sounds produced by MWDs and their training activities are not expected to rise noticeably above industry/commerce-associated background levels. Therefore, potential impacts on off-installation land uses, although long-term, would be considered negligible.

Within installation boundaries, current immediately adjacent land use (open space) is compatible with the MWD kennel. While future proximity to the small arms range could appear to present a conflict per AR 190-12 and AFI-31-202, relative to noise associated with the firing range, the planned firing range would be completely enclosed and soundproofed to the point that this conflict would not exist. The proximity of

Action Alternative A to the flightline does present the potential for incompatibilities in land use relative to noise. However, this potential is less than that for the Proposed Action. This potential conflict is analyzed under Noise (Section 3.5). Beyond the noise issue, there is no incompatibility between the adjacent land uses under Action Alternative A. Impacts of Action Alternative A on land use would be expected to be long-term and negligible within the installation boundaries.

Action Alternative B

Action Alternative B would also construct the kennel within approximately 500 feet of the installation boundary. Adjacent, off-installation land use is currently agriculture and anticipated to convert to industrial/commercial in the future. No impacts on off-installation land use are anticipated from implementation of Action Alternative B.

Airfield activities are distant enough from Action Alternative B that the site is currently outside the 65-dB weighted noise contour. Therefore airfield-related land use is not anticipated to impact the Action Alternative B site. Other on-installation land uses close to Action Alternative B include open space and the fire training facility. AR 190-12 advises against location of a MWD kennel "in the vicinity of [Nuclear, Biological, Chemical] NBC training sites, or other areas that may present an environmental or health hazard to the dogs or the handlers." Due to this potential conflict, implementation of Action Alternative B could result in long-term, minor to moderate, adverse impacts on land use.

No Action Alternative

The Proposed Action and Action Alternatives are designed to alleviate the conflict between incompatible land uses (i.e., the MWD kennel functions and housing/community services) at the current kennel location. Retention of the kennel in its current location represents the No Action Alternative. No impacts on off-installation land use near the kennel's current location are anticipated as a result of the No Action Alternative. However, this alternative does not resolve the current conflict and is, therefore, anticipated to have moderate adverse impacts on land uses adjacent to this site.

3.2 UTILITIES

3.2.1 Affected Environment

Infrastructure typically refers to the systems and physical structures that enable a population in a specified area to function. Components include transportation and circulation (i.e., movement of vehicles), utilities, solid waste handling, and wastewater treatment. Transportation and circulation are not differentially affected by the Proposed Action or Action Alternatives, nor is solid waste handling. Therefore, this EA focuses on utilities and wastewater treatment. Utilities include electricity, natural gas, potable water, and communications lines. Wastewater treatment includes the sanitary sewer system and any ancillary structures such as leach fields.

Public providers supply water, gas, and electrical power to Buckley AFB. Since 2001 Buckley AFB has been proactive in increasing the capacity of its infrastructure systems.

Electrical System and Natural Gas. Buckley AFB receives electrical power and natural gas from Xcel Energy (BAFB 2003).

Water System. Potable water is provided by the city of Aurora directly to Buckley AFB facilities without supplementary treatment. There are two connections to the city pipelines: (1) along 6th Avenue, a water main connects to a line that provides the primary source of potable water to the installation; and (2) along

Mississippi Avenue, a water main provides emergency backup should the water main on 6th Avenue fail. There are no contractual limits on the amount of water the installation may use (BAFB 2003).

Sanitary Sewer. Wastewater flow from Buckley AFB is conveyed through an on-installation sanitary sewer system to the city of Aurora's wastewater collection system, and then to one of two wastewater treatment facilities. The majority of the installation's sanitary sewer system is composed of vitrified clay pipe, which was installed in the 1940s and 1950s. The more recently installed sections of sewer main are polyvinyl chloride pipe, which is now used for all sewer upgrades on the installation (BAFB 2003). The wastewater is primarily directed to and treated at the city of Denver's Metro Wastewater Reclamation District at 64th Avenue and York Street. The city of Aurora's total flow contribution to this treatment facility ranges between 18 and 20 million gallons per day. The other treatment facility, the Sand Creek Treatment Facility, is owned and operated by the city of Aurora and processes approximately 10 percent of Aurora's total discharge (BAFB 2005).

3.2.2 Impacts

Issues and concerns regarding infrastructure are related to (1) availability of necessary infrastructure to support the facility; and (2) creation of stress on existing infrastructure systems, such that they must be updated or changed. Assessing impacts on infrastructure entails a determination of infrastructure that would be used as a result of the Proposed Action or Action Alternatives.

Proposed Action

Utilities are currently available at the Proposed Action site. No burden on the provider of utility support would be anticipated because there would be no anticipated increase in installation personnel. However, the installation would need to upgrade the potable water, electric, natural gas, and sanitary networks. Therefore, no adverse impacts are anticipated on utilities as a result of implementing the Proposed Action.

Action Alternative A

Site utilities are not currently available at the Action Alternative A site and are not scheduled within the next 5 years. The cost of earlier installation in conjunction with the MWD kennel relocation would be prohibitve. Water would need to come from either an existing well in the area or from a new well. Because sanitary sewer service is not available at the Action Alternative A location, it is assumed, based on distance from available sewer lines, that leach fields would be used for sewage disposal. Electrical service has been extended to the project area through a fiscal year 2004 project. Natural gas is remote from the complex and would require an extension of the main to reach the site. Communications would need to be served from adjacent buildings or new trunk lines would need to be installed (BAFB 2005). No burden on the provider of utility support would be anticipated because there is no anticipated increase in installation personnel. However, the installation would need to upgrade the potable water, electric, natural gas, and sanitary networks. Therefore, no adverse impacts are anticipated on utilities as a result of implementing Action Alternative A.

The leach field associated with the Action Alternative A site would utilize state-of-the-art technology to prevent impacts on ground or surface water. Based on the assumption that the leach field will be in compliance with all applicable regulations and would be monitored frequently, impacts from the leach field would not be expected.

Action Alternative B

Site utilities are not currently available at the Action Alternative B site. Utility availability at this site is similar to that described for Action Alternative A. Provision of required utilities in conjunction with the

MWD kennel relocation would be cost-prohibitive. No burden on the provider of utility support is anticipated because there is no anticipated increase in installation personnel. However, the installation would need to upgrade the potable water, electric, natural gas, and sanitary networks. Therefore, no adverse impacts are anticipated on utilities as a result of Action Alternative B.

No Action Alternative

The No Action Alternative would have no impact on utilities.

3.3 AIR QUALITY

3.3.1 Affected Environment

In accordance with Federal CAA requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

The CAA directs USEPA to develop, implement, and enforce strong environmental regulations to ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM_{10}]) and particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$)], and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. Table 3-1 presents the primary and secondary NAAQS.

Although O_3 is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because O_3 is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "O_3 precursors." These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O_3 concentrations by controlling VOC pollutants (sometimes identified as reactive organic gases) and NO_2.

The CAA authorized USEPA to delegate responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in state implementation plans (SIPs) that must be developed by each state or local regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

Table 3-1. National Ambient Air Quality Standards

Pollutant	Standard Value [b]		Standard Type
CO			
8-hour Average	9 ppm	(10 mg/m^3)	Primary
1-hour Average	35 ppm	(35 mg/m^3)	Primary
NO_2			
Annual Arithmetic Mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
O_3			
1-hour Average [a]	0.12 ppm	(235 µg/m^3)	Primary and Secondary
8-hour Average [a]	0.08 ppm	(157 µg/m^3)	Primary and Secondary
Pb			
Quarterly Average		1.5 µg/m^3	Primary and Secondary
PM_{10}			
Annual Arithmetic Mean		50 µg/m^3	Primary and Secondary
24-hour Average		150 µg/m^3	Primary and Secondary
$PM_{2.5}$			
Annual Arithmetic Mean		15 µg/m^3	Primary and Secondary
24-hour Average		65 µg/m^3	Primary and Secondary
SO_2			
Annual Arithmetic Mean	0.03 ppm	(80 µg/m^3)	Primary
24-hour Average	0.14 ppm	(365 µg/m^3)	Primary
3-hour Average	0.5 ppm	(1,300 µg/m^3)	Secondary

Notes:

[a] In July 1997, the 8-hour O_3 standard was promulgated and the 1-hour O_3 standard was remanded for all areas, except those designated nonattainment with the 1-hour standard when the O_3 8-hour standard was adopted. In July 2000, the O_3 1-hour standard was reinstated as a result of federal lawsuits that were preventing the implementation of the new 8-hour O_3 standard.

[b] Parenthetical value is an approximately equivalent concentration.

ppm – parts per million

mg/m^3 – milligrams per cubic meter

µg/m^3 – micrograms per cubic meter

Under USEPA guidance and Federal CAA regulations, provisions of the CAA that are relevant to construction of the Proposed Action include the following:

New Source Review. To prevent new sources of emissions from deteriorating existing air quality beyond acceptable levels, a Federal review process was established. There are separate procedures for Federal preconstruction review of certain large proposed projects in areas with measured concentrations of pollutants below the NAAQS or attainment areas versus areas with measured concentrations of pollutants that exceed the NAAQS or nonattainment areas.

Federal Prevention of Significant Deterioration. Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to

be "significant" if (1) a proposed project is within 10 kilometers of any Class I area; and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)]. Because Buckley AFB is not within 10 kilometers of a Class I area, PSD regulations do not apply and are not discussed further in this EA.

New Source Performance Standards. New Source Performance Standards (40 CFR Part 60) are implemented by USEPA and are applicable to owners and operators of an affected facility which has an applied standard (i.e., emissions limits imposed on a particular type of equipment or activity). The owner of the administrative facilities proposed for leasing would not be subject to New Source Performance Standards.

National Emission Standards for Hazardous Air Pollutants. 40 CFR Part 61 regulates the emissions of hazardous air pollutants from existing and new sources. However, facilities construction and vehicle operations are not expected to include any processes that are regulated by Part 61.

Title V. Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (e.g., plant, base, or activity) that can emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants. However, lower pollutant-specific major source permitting thresholds apply in nonattainment areas. For example, the Title V permitting threshold for a moderate O_3 nonattainment area is 50 tpy of VOC and 100 tpy of NO_x emissions. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their effect on air quality.

General Conformity. The CAA requires that USEPA promulgate general conformity regulations. These regulations are designed to ensure that Federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS. The General Conformity Rule and the promulgated regulations, found in 40 CFR Part 93, exempt certain Federal actions from conformity determinations (e.g., contaminated site cleanup and natural emergency response activities). Other Federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR 93.153. The threshold levels (in tons of pollutant per year) depend on the nonattainment status that USEPA has assigned to a nonattainment area. Once the net change in nonattainment pollutants is calculated, the Federal agency must compare them to the *de minimis* thresholds.

Regional Air Quality. The Colorado Air Pollution Control Division (CAPCD) under the Colorado Public Health and Environment Department is responsible for implementation of the CAA and has adopted the Federal primary and secondary NAAQS. Buckley AFB is in Arapahoe County, Colorado, within the Metropolitan Denver Intrastate Air Quality Control Region (MDIAQCR). The ROI affected by activities at Buckley AFB is considered to be the entire MDIAQCR.

In December 2003, the USEPA proposed to defer the effective date of air quality designations for certain areas of the country that did not meet the 8-hour O_3 NAAQS. The areas with these deferments, known as Early Action Compacts (EAC), agreed to reduce ground-level O_3 pollution earlier than the CAA requires. The MDIAQCR is designated as a nonattainment EAC Subpart 1 area for 8-hour O_3. In addition, the MDIAQCR has been designated as a *serious* maintenance area for CO and a *moderate* maintenance area for PM_{10}. The MDIAQCR is in attainment for all other criteria pollutants (USEPA 2004b).

Buckley AFB is a major source of criteria pollutants under the Title V program as it has the potential to emit more than 100 tons of sulphur oxide (SO_x) and 100 tons of NO_x. Buckley AFB is a minor source of VOCs, carbon monoxide (CO), and particulate matter 10 microns in diameter (PM_{10}) under the PSD with a potential to emit less than 250 tons of these pollutants. Buckley AFB is a PSD synthetic minor source of NO_x because the installation has accepted permit limits that establish the potential to emit less than 250 tons for these two pollutants per year. Buckley AFB has a Title V Operating Permit (No. 950PAR118) that was issued on 28 August 1997, renewed on 1 July 2002, modified (revised) on 1 November 2005, and will expire on 30 June 2007.

Stationary source emitting criteria pollutants consist of natural gas-fired boilers, furnaces and heaters, diesel-fired generators, fuel storage tanks, and degreasers. Buckley AFB is required to submit an Annual Emissions Inventory (AEI) each year. Buckley AFB Emissions Inventory is presented in Table 3-2.

Table 3-2. Buckley AFB Air Emissions Inventory [a]

Pollutant Emission Sources	CO (tpy) [b]	VOC (tpy) [c,e]	SO_x (tpy)	NO_x (tpy) [d,e]	PM_{10} (tpy)
Buckley AFB 2003 Mobile Emissions [f]	204.5	56.9	2.1	40.6	5.0
Buckley AFB 2005 Point and Fugitive Stationary Source Emissions [g]	21.8	26.4	1.5	52.04	6.08
Total 2003 Mobile and 2005 Stationary Buckley AFB Emissions	226.3	83.3	3.6	92.6	11.1
AQCR 36 Emission Inventory [h]	678,170	167,900	69,350	112,785	32,156
Conformity Rule De Minimus Threshold [i]	100	100	100	100	100
10 percent of AQCR 36 Emission Inventory (Significant Threshold Values)	67,817	16,790	6,935	11,279	2,316

Notes: [a] The Buckley AFB 2005 AEI did not assess lead or $PM_{2.5}$ emissions.

[b] tpy - tons per year.

[c] VOC - volatile organic compounds.

[d] NO_x - nitrogen oxides.

[e] VOCs and NO_x contribute to the formation of ground-level ozone.

[f] Source: URS Group 2004. Mobile emission inventories are not conducted annually.

[g] Source: Golder Associates 2006. Calendar year 2005 AEI, Buckley AFB.

[h] CAQCC 2003 (CO-2006 Interim Year Inventory), 2001a, (VOC and NO_x 2006 Inventory), and 2001b (PM_{10} and SO_x 2005 Maintenance Inventory).

[i] 40 CFR 93.153(b) - These limits are applicable to nonattainment and maintenance areas, and therefore, apply to Buckley AFB.

3.3.2 Impacts

Proposed Action

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS "attainment" areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory
- Exceed any Evaluation Criteria established by a SIP

Effects on air quality in NAAQS "nonattainment" areas are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP

With respect to the General Conformity Rule, effects on air quality would be considered significant if the proposed Federal action would result in an increase of a nonattainment or maintenance area's emissions inventory by 10 percent or more for one or more nonattainment pollutants, or if such emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been redesignated as a maintenance area.

In addition to the *de minimis* emissions thresholds, Federal PSD regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Class I area, and emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more (40 CFR 52.21(b)(23)(iii)).

The proposed project would result in short-term, minor impacts to regional air quality during construction activities, primarily from site disturbing activities and operation of construction equipment. In addition, the proposed project would result in long-term, minor impacts from the operation of a natural gas furnace to heat the facilities.

The construction projects would generate total suspended particulate and PM_{10} emissions as fugitive dust from ground-disturbing activities (e.g., grading, trenching, soil piles) and from combustion of fuels in construction equipment. Fugitive dust emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity.

Construction operations would also result in emissions of criteria pollutants as combustion products from construction equipment, as well as evaporative emissions from architectural coatings and asphalt paving operations. These emissions would be of a temporary nature. The emissions factors and estimates were generated based on guidance provided in USEPA AP-42, Volume II, *Mobile Sources*. Fugitive dust emissions for various construction activities were calculated using emissions factors and assumptions published in USEPA's AP-42 Section 11.9.

For purposes of this analysis, the project duration and affected project site area that would be disturbed (presented in Section 2) was used to estimate fugitive dust and all other criteria pollutant emissions. The construction emissions presented in Table 3-3 include the estimated annual construction PM_{10} emissions associated with the Proposed Action. These emissions would produce slightly elevated short-term PM_{10} ambient air concentrations. However, the effects would be temporary, and would fall off rapidly with distance from the proposed construction site.

Specific information describing the types of construction equipment required for a specific task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established methodologies for construction and experience with similar types of construction projects. Combustion by-product emissions from construction equipment exhausts were estimated using USEPA's AP-42 emissions factors for heavy-duty, diesel-powered construction equipment.

The construction emissions presented in Table 3-3 include the estimated annual emissions from construction equipment exhaust associated with the Proposed Action. As with fugitive dust emissions, combustion emissions would produce slightly elevated air pollutant concentrations. Early phases of construction projects involve heavier diesel equipment and earthmoving, resulting in higher NO_x and PM_{10} emissions. Later phases of construction projects involve more light gasoline equipment and surface coating, resulting in more CO and VOC emissions. However, the effects would be temporary, fall off rapidly with distance from the proposed construction site, and would not result in any long-term effects.

Since the Proposed Action is within a nonattainment area for the 8-hour O_3 and a maintenance are for CO and PM_{10} standards, General Conformity Rule requirements are applicable. However, as shown in Table 3-3, the Proposed Action would generate emissions well below conformity *de minimis* limits as specified in 40 CFR 93.153. Therefore, the Proposed Action would not trigger the requirement to prepare a conformity determination report to demonstrate conformity with the General Conformity Rule. Since the emissions generated would be below *de minimis* levels, it is reasonable to assume that the temporary construction emissions and the long-term operational emissions caused by the Proposed Action would not cause a violation of the NAAQS. In summary, no significant impact on regional or local air quality would result from implementation of the Proposed Action. Appendix D details the emissions factors, calculations, and estimates of construction-related and operational emissions for the Proposed Action.

Alternatives

The environmental consequences resulting from construction of the MWD Kennel is the same for all alternatives.

Table 3-3. Total Proposed Emissions Estimates from the Proposed Action

Description	NOx (tpy)	VOC (tpy)	CO (tpy)	SOx (tpy)	PM10 (tpy)
Construction Emissions	0.104	0.076	0.120	0.003	1.845
Operational Emissions	0.094	0.006	0.040	0.001	0.008
Total Emissions	0.198	0.081	0.160	0.004	1.852
Regional Emissions (MDIAQCR)	113,946	101,293	816,914	39,750	72,846
Percent of Regional Emissions Inventory	0.0002	0.00008	0.00002	0.00001	0.0025

Note: MDIAQCR = Metropolitan Denver Intrastate Air Quality Control Region

3.4 NOISE

3.4.1 Affected Environment

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on the roof. Sound is measured with instruments that record instantaneous sound levels in dB. A-

weighted sound level measurements (dBA) are used to characterize sound levels that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency content of a sound-producing event to represent the way in which the average human ear responds to the audible event. All sound levels analyzed in this section are A-weighted.

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Affected receptors are specific areas (i.e., schools, churches, or hospitals) or broad areas (i.e., nature preserves or designated districts) in which occasional or persistent sensitivity to noise above ambient levels exists.

Noise levels resulting from multiple single-events are used to characterize community noise effects from aircraft or sustaining road and building construction activity, and are measured in day-night averaged A-weighted sound level (DNL). This noise metric incorporates a "penalty" for evening and nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by averaging sound exposure level values for a given 24-hour period. DNL is the preferred noise metric of U.S. Department of Housing and Urban Development (HUD), Federal Aviation Administration (FAA), USEPA, and DOD for modeling airport environs.

Most people are exposed to sound levels of 50 to 55 DNL or higher on a daily basis. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below 65 DNL (USDOT 1984). Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments and that there is a consistent relationship between DNL and the level of annoyance. AR 190-12 and AFI 31-202 require that kennels not be placed in areas where the average daily weighted noise environment is more than 75 dB.

Although the communities surrounding Buckley AFB are typical of an urban residential atmosphere, the noise environment in the vicinity of Buckley AFB is dominated by aircraft operations and vehicular traffic. Commercial facilities are also prevalent in the area. Figure 3-1 portrays the noise contours for Buckley AFB.

3.4.2 Impacts

Proposed Action

Kennel Noise. Noise from the new kennel facility could impact residential housing nearby. Barking dogs and noise associated with training of the MWDs could potentially be an annoyance to some people. However, the closest residence to the facilities as sited in the Proposed Action is more than 2,000 feet away. A large dog barking at 50 feet is around 70 dBA (SDSC 2006). According to the studies done for this EA, the noise contours should not be changed by the Proposed Action. Because of the distance between the new kennel location and residences, noise impacts from the Proposed Action would be long-term, negligible to minor, and adverse.

Construction Noise. The Proposed Action at Buckley AFB would construct a new kennel facility in the area around Sunlight Way. Building construction work can cause an increase in sound that is well above the ambient level. A variety of sounds come from graders, pavers, trucks, welders, and other work processes. Table 3-4 lists noise levels associated with common types of construction equipment that are

Table 3-4. Predicted Noise Levels for Construction Equipment

Construction Category and Equipment	Predicted Noise Level at 50 feet (dBA)
Grading	
Bulldozer	87
Grader	85
Water Truck	88
Paving	
Paver	89
Roller	74
Demolition	
Loader	85
Haul Truck	88
Building Construction	
Generator Saw	81
Industrial Saw	83
Welder	74
Truck	80
Forklift	67
Crane	83

Source: COL 2001

likely to be used under the Proposed Action. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area. The construction of the kennel and support facilities would likely cause noise impacts on the populations on the southwestern side of the installation. Populations 2,165 feet away from construction would experience noise levels of approximately 60 dBA.

Implementation of the Proposed Action would have temporary effects on the noise environment from the use of heavy equipment during construction activities. However, noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Therefore, it is anticipated that implementation of the Proposed Action would have negligible short-term adverse impacts as a result of the construction activities.

Noise impacts from increased traffic due to construction vehicles using the major access roads would also be temporary in nature. These impacts would also be confined to normal working hours, and would last only as long as the installation was undergoing construction activities. However, major access routes into Buckley AFB pass by several residential areas. It is anticipated that the Proposed Action would have short-term moderately adverse noise impacts as a result of the increase in traffic, most notably in the areas around East Alameda Parkway.

Noise Impacts on Kennel Function. USAF and U.S. Army regulations require that MWD kennels not be placed in areas where the average daily weighted noise environment is more than 75 dB. The siting for the Proposed Action would construct the kennel within the current DNL 65–69 dB contour, with some

sections of the building possibly entering the DNL 70–74 dB contour. Therefore, the siting of the facility would be in compliance with regulations under current noise conditions.

As part of the 2020 Vision for Buckley AFB, a new Army Aircraft Maintenance Facility is under construction approximately 500 feet north of the Proposed Action. The 2020 Vision also proposes a high-speed taxiway parallel to Runway 14/32 and approximately 1,500 feet away from the Proposed Action's siting of the kennel. These additional activities are not anticipated to increase noise levels in the vicinity of the Proposed Action above the MWD threshold of 75 dB (Harris 2006). Kennel design and incorporation of noise-attenuating materials per AR 190-12 would reduce potential impacts of increased noise levels.

Under the Proposed Action, noise impacts on the MWD kennel function are anticipated to be short- and long-term, minor and adverse, due to the Proposed Action's location in an area close to the current DNL 70–74 dB noise contour.

Action Alternative A

Kennel Noise. Noise from the new kennel facilities could impact residential housing nearby. Barking dogs and noise associated with training of the MWDs is likely to be seen as an annoyance to some people. However, the closest residence to the facilities as sited in Alternative A is more than 6,000 feet away. As mentioned under the Proposed Action, a dog barking at 50 feet produces sound of around 70 dB. Due to the distance between the kennel and residences, noise impacts from Alternative A would be minimal due to kennel noise.

Construction Noise. Alternative A at Buckley AFB would construct a new kennel facility in the area adjacent to the new small arms range. The construction of the kennel and support facilities would likely cause noise impacts on the populations east of the installation. Populations 6,019 feet away from construction would experience noise levels of approximately 51 dBA.

Implementation of Alternative A would have temporary effects on the noise environment from the use of heavy equipment during construction activities. However, noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Due to these factors, and the fact that residential populations are away from where construction would occur, it is anticipated that implementation of Alternative A would have negligible impacts as a result of the construction activities.

Noise impacts from increased traffic due to construction vehicles using the major access roads would also be temporary in nature. These impacts would also be confined to normal working hours, and would last only as long as the installation was undergoing construction activities. However, major access routes into Buckley AFB pass by several residential areas. It is anticipated that Alternative A would have moderate noise impacts as a result of the increase in traffic, most notably in the areas around East Alameda Parkway.

Noise Impacts on Kennel Function. USAF and U.S. Army regulations require that MWD kennels not be placed in areas where the average daily weighted noise environment is more than 75 dBA. The siting for Action Alternative A would construct the kennel within the current DNL 70–74 dBA contour, with some sections of the facility possibly intersecting the 75-dBA contour, depending on the exact positioning of the facility in this area. Therefore, it is possible that the siting of this facility would not be in compliance with regulations. However, kennel design and incorporation of noise-attenuating materials per AR 190-12 would reduce potential impacts of increased noise levels.

Under Action Alternative A, noise impacts on the MWD kennel function are anticipated to be short- and long-term, minor to moderate, and adverse. These anticipated impacts are based on the proximity of the site to the DNL 75–79 dBA contour and assume that the facility would be situated to avoid entry into the that contour.

Action Alternative B

Kennel Noise. Noise from the new kennel facilities could impact residential housing nearby. Barking dogs and noise associated with training of the MWDs is likely to be seen as an annoyance to some people. However, the closest residence to the facilities as sited in Alternative B is more than 6,000 feet away. As mentioned under the Proposed Action, a dog barking at 50 feet produces sound of around 70 dB. Due to the distance between the kennel and residences, noise impacts from Alternative B would be minimal due to kennel noise.

Construction Noise. The Proposed Action at Buckley AFB would construct a new kennel facility in the area adjacent to the new small arms range. The construction of the kennel and support facilities would likely cause noise impacts on the populations east of the installation. Populations 6,019 feet away from construction would experience noise levels of approximately 51 dBA.

Implementation of Alternative B would have temporary effects on the noise environment from the use of heavy equipment during construction activities. However, noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Due to these factors, and the fact that residential populations are away from where construction would occur, it is anticipated that implementation of Alternative B would have negligible impacts as a result of the construction activities.

Noise impacts from increased traffic due to construction vehicles using the major access roads would also be temporary in nature. These impacts would also be confined to normal working hours, and would last only as long as the installation was undergoing construction activities. However, major access routes into Buckley AFB pass by several residential areas. It is anticipated that Alternative B would have moderate noise impacts as a result of the increase in traffic, most notably in the areas around East Alameda Parkway.

Noise Impacts on Kennel Function. USAF and U.S. Army regulations require that MWD kennels not be placed in areas where the average daily weighted noise environment is more than 75 dB. The siting for Action Alternative B would construct the kennel within the DNL 65–69 dB contour. Kennel design and incorporation of noise-attenuating materials per AR 190-12 would reduce potential impacts of increased noise levels. Therefore, the siting of the facility would be in compliance with regulations. Implementation of Action Alternative B would be anticipated to have negligible adverse impacts on kennel function.

No Action Alternative

Kennel Noise. Noise from the existing kennel facilities is likely to impact residential housing nearby. Barking dogs and noise associated with training of the MWDs is likely to be seen as an annoyance to some people. Although the facility is currently operational, impending development surrounding the current kennel would increase the number of sensitive receptors and, therefore, increase the impact of kennel-associated noise. The No Action Alternative is anticipated to have long-term, minor, adverse impacts relative to kennel noise.

Construction Noise. The No Action Alternative at Buckley AFB would not construct a new kennel facility and would leave the existing facility where it is. No new buildings would be constructed and the

site would not allow for the addition of the two new MWDs anticipated. No traffic increase would be anticipated due to construction vehicles. Therefore, the No Action Alternative would have no effect relative to construction noise.

Noise Impacts on Kennel Function. Although the current kennel is operational, impending developments surrounding its location will increase the activity and noise levels in the area. It is anticipated that future noise levels might approach the 75-dB threshold at which kennel function is anticipated to be compromised. Therefore, the No Action Alternative would have long-term, minor to moderate adverse impacts on kennel function, particularly to outdoor training activities.

3.5 HAZARDOUS MATERIALS AND WASTES

3.5.1 Affected Environment

Hazardous material is defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the Toxic Substances Control Act, as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, or incapacitating reversible illness; or pose a substantial threat to human health or the environment. Hazardous waste is defined by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, 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. In general, both hazardous materials and wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health or welfare or the environment when released or otherwise improperly managed.

Evaluation of hazardous materials and wastes focuses on underground storage tanks (USTs) and aboveground storage tanks (ASTs) and the storage, transport, and use of pesticides and herbicides; fuels; and petroleum, oil, and lubricants (POL). Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of hazardous materials or wastes, the extent of contamination varies based on the type of soil, topography, and water resources.

Special hazards are those substances that might pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing material (ACM), lead-based paint (LBP), radon, polychlorinated biphenyls, and unexploded ordnance. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

To protect habitats and people from inadvertent and potentially harmful releases of hazardous substances, the DOD has dictated that all facilities develop and implement Hazardous Material Emergency Planning and Response Plans or Spill Prevention, Control, and Countermeasure Plans. Also, DOD has developed the ERP, intended to facilitate thorough investigation and cleanup of contaminated sites on military installations. Through ERP, DOD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination. Description of ERP activities provides a useful gauge of

the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contaminant plume has been completed). These plans and programs, in addition to established legislation (i.e., CERCLA and RCRA), effectively form the "safety net" intended to protect the ecosystems on which most living organisms depend.

The Civil Engineering Squadron/Environmental Flight (CES/CEV) is responsible for the hazardous material and waste plans for the installation. In conformance with the policies established by Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, the CES/CEV has developed plans to manage hazardous materials, hazardous wastes, and special hazards on the installation.

Hazardous Materials. AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials; and to those who manage, monitor, or track any of those activities. Buckley AFB has an established hazardous materials pharmacy (HAZMART) in accordance with AFI 32-7086. The HAZMART is the central location for the receipt, storage, and issue of the majority of hazardous materials (HAZMAT) at most USAF installations. However, Buckley AFB implements a "virtual" HAZMART, which does not have a central location but rather electronically tracks and controls use. The HAZMART focuses on reducing USEPA's 17 industrial toxics which have a high probability of causing human health and environmental hazards (AFCEE 2005).

The use of HAZMAT during construction should be reported to CES/CEV. A list of all HAZMAT should include a copy of each material's Material Safety Data Sheet (MSDS), an estimate of how much material will be used, amount stored, and location on the facility prior to the start of work. Prior to beginning any process that will use HAZMAT, the user will contact the CES/CEV with the duration of the action and the type and amount that will be used.

The type of HAZMAT used at the kennel following construction would remain equivalent to the existing kennel. Insecticides used at the facility to control infestations of fleas, ticks, and mites are controlled and administered by the Civil Engineering Entomology facility (Building 306). Insecticides used on the animals are kept within the facility and are unregulated.

Hazardous Wastes. The CES/CEV maintains a *Hazardous Waste Management Plan* (HWMP) as directed by AFI 32-7042. This plan prescribes the roles and responsibilities of all members of Buckley AFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for solid and hazardous waste management.

Wastes generated at Buckley AFB include pesticides, herbicides, POL, deicing fluids, flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, municipal solid waste (MSW), and other miscellaneous wastes. Management of hazardous wastes is the responsibility of each waste-generating organization and the CES/CEV. Hazardous waste is stored at an initial accumulation point (IAP), which is at or near the point of generation and under the control of the owner/manager of the generating activity. An IAP is designed to facilitate collection of hazardous wastes and ensure proper management. An IAP is allowed to accumulate up to 55 gallons of hazardous waste or 1 quart of acute hazardous waste. Once the 55 gallons (or 1 quart in the case of acute hazardous waste) limit is reached, the generating activity must transfer the hazardous waste container to the centralized accumulation point (CAP) where wastes from several

satellite accumulation points (SAPs) are placed for periods of up to 180 days pending disposal or further transfer.

Each organization has appointed a primary and alternate manager for each hazardous waste site on Buckley AFB. Hazardous waste generators are required to maintain a listing of all the hazardous waste streams generated in their section, with proper identification, handling, storage, and record keeping. For special projects generators must coordinate with CES/CEV to obtain containers, to ensure they meet U.S. Department of Transportation (USDOT), compatibility, and air emission standards.

Also, contractors must

- Obtain CES/CEV approval for all hazardous materials/wastes used/generated on the installation
- Ensure hazardous wastes are managed per 40 CFR and transported in accordance with 49 CFR to a certified disposal facility
- Ensure proper labeling, handling, segregation, collection, and storage of hazardous waste
- Ensure all personnel are properly trained for handling the hazardous waste they generate
- Ensure the CES/CEV is given notice when scheduling waste disposal requiring a manifest(s), before it is transported off installation.

Radon. Radon gas is naturally occurring in soils throughout Colorado. Radon has the tendency to accumulate in enclosed spaces that are usually below ground and poorly ventilated (e.g., basements). Radon is an odorless, colorless gas that has been determined to increase the risk of developing lung cancer. Because the proposed MWD kennel is not a residential building, would not have a basement, and would be well-ventilated by design, radon is not a concern for the Proposed Action or alternatives.

Storage Tanks. Neither the Proposed Action nor the Alternatives would involve the addition, modification, or removal of any tanks at Buckley AFB. No analysis on storage tanks would need to be undertaken for this study.

Pollution Prevention. AFI 32-7080, *Pollution Prevention Program*, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*; EO 12902, *Energy Efficiency and Water Conservation at Federal Facilities*; and EO 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*. In accordance with EO 13101, the USAF preferentially chooses recycled-content products where possible including construction materials. AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans. To fulfill this requirement, Buckley AFB has the following plans:

- Draft Storm Water P2 Plan
- Draft Hazardous Waste Management Plan
- Draft Solid Waste Management Plan
- Draft Spill Prevention, Control, and Countermeasure Plan.

These plans assist in maintaining a waste-reduction program and meeting the requirements of the Clean Water Act (CWA); the NPDES permit program; and Federal, state, and local requirements for spill prevention control and countermeasures.

Environmental Restoration Program. ERP, formerly known as the Installation Restoration Program, is a subcomponent of the Defense Environmental Restoration Program that became law under SARA. The ERP requires each DOD installation to identify, investigate, and clean up hazardous waste disposal or release sites. The ERP at Buckley AFB began in the 1980s with a installation records search that identified 10 sites and 1 area of concern. This number will likely grow as historic documents are continually searched (AFCEE 2005).

The Proposed Action is situated within a region designated as ERP site LF 003, the former base landfill that was in operation from 1942 through 1982. Municipal refuse, construction debris, solvents, paints, and pesticides were reportedly disposed of in the landfill (BAFB 2002b). Construction debris includes scrap from demolished buildings which likely contained asbestos. Field work to support a supplemental characterization study was completed in July 2006, and the draft version of the report is currently under review. The study is intended to delineate the extent of the landfill and assess the adequacy of existing landfill cover. Figure 3-2, taken from the draft study report, illustrates the extent of buried waste in the vicinity of the Proposed Action and the thickness of existing cover. The Air Force will likely make a future remedial decision to ensure all buried landfill waste is covered with at least two feet of soil. Thus, the landfill area immediately adjacent to the Proposed Action, which is currently insufficiently covered, will experience a future earth moving remedial action.

Alternative B is within the installation's RW 008, Army Aircraft Burial site. The exact location of this site has not been determined, but the site was operated from 1942 to 1945. Two areas totaling approximately 900,000 sq. ft. were reported to contain buried scrap aircraft parts, electron source tubes, and crashed aircraft scrap. An area encompassing approximately 55 acres was investigated but no evidence of the alleged burial site was discovered. This site was closed on 27 June 2001, with concurrence from the Colorado Department of Public Health and Environment (CDPHE) (BAFB 2002b).

Asbestos-Containing Material. AFI 32-1052, *Facilities Asbestos Management*, provides the direction for asbestos management at USAF installations. This instruction incorporates by reference applicable requirements of 29 CFR Part 669 et seq., 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.3.80, Section 112 of the CAA, and other applicable AFIs and DOD Directives. AFI 32-1052 requires installations to develop an asbestos management plan for the purpose of maintaining a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. ACM is regulated by USEPA with the authority promulgated under the Occupational Safety and Health Act, 29 U.S.C. Section 669, et seq. Section 112 of the CAA and the CDPHE Regulation 8 Part B, *Control of Hazardous Air Pollutants-Asbestos*, regulate emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat. Buckley AFB will comply with all applicable Federal, state, and local laws and regulations.

Asbestos at Buckley AFB is managed in accordance with the installation's *Asbestos Management Program Plan*. This plan specifies procedures for the removal, encapsulation, enclosure, and repair activities associated with ACM-abatement projects. In addition, it is designed to protect personnel who live and work on Buckley AFB from exposure to airborne asbestos fibers as well as to ensure the installation remains in compliance with Federal, state, and local regulations pertaining to ACM. Materials that might contain asbestos include pipe insulation and floor tiles. ACM are removed on an as-needed basis to minimize health risks from release of asbestos fibers during normal activities, maintenance, renovation, or demolition. The location of the Proposed Action is on top of the former landfill which likely has construction debris containing ACM. However, the Findings and Recommendations Report (Appendix F) from 5 May 2006, indicated that all asbestos screening returned negative results from 12 borings between 20 and 35 feet in depth (Merrick & Company 2006).

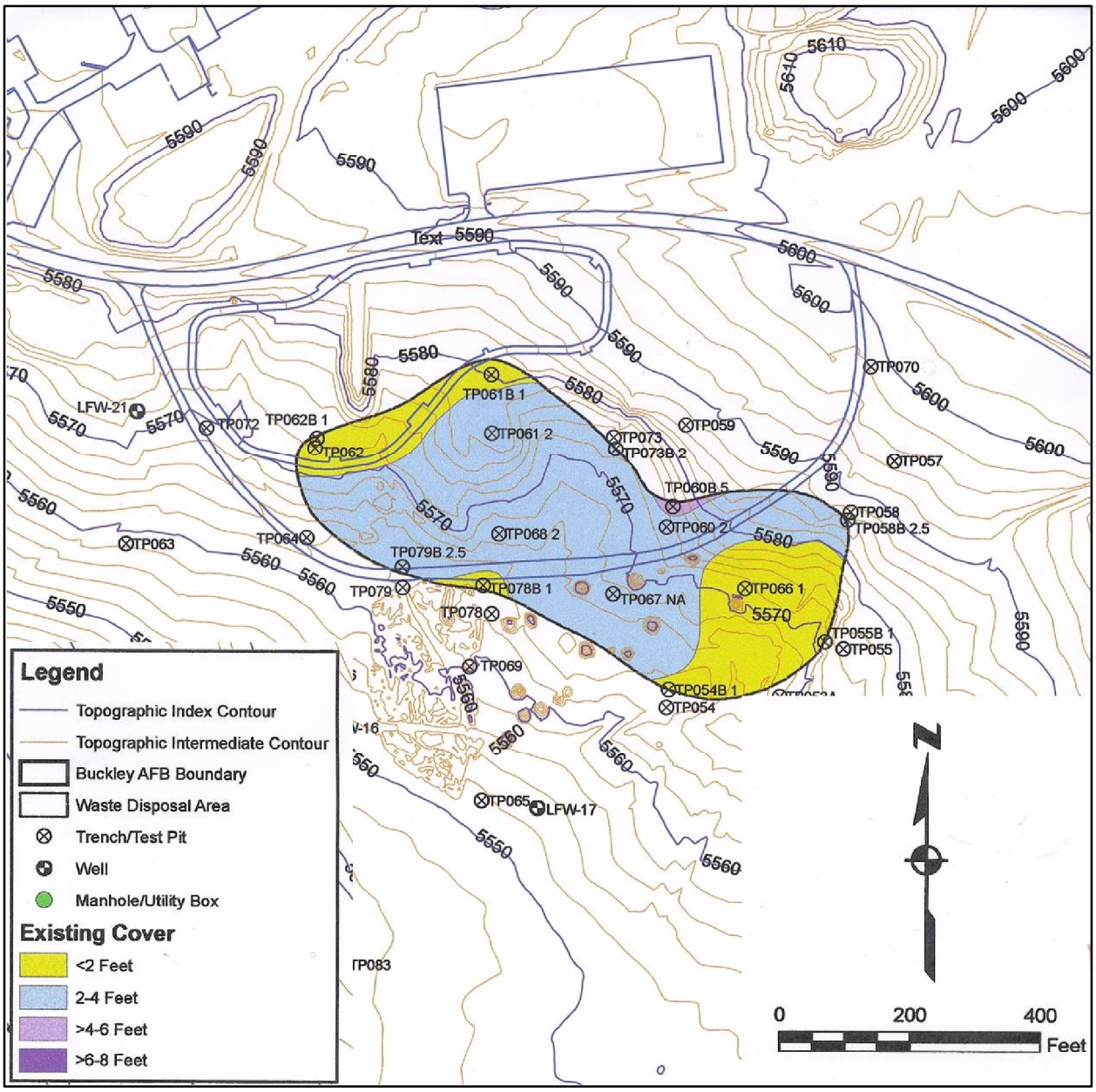

Figure 3-2. Mapped Extent of ERP Site LF 003

Lead-Based Paint. The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X), passed by Congress on 28 October 1992, regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards.

USAF policy and guidance establishes LBP management at USAF facilities. The policy incorporates by reference the requirements of 29 CFR 1910.120, 29 CFR Part 1926, 40 CFR 50.12, 40 CFR Parts 240 through 280, the CAA, and other applicable Federal regulations. In addition, the policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating LBP hazards. The lead-based paint program officer (LBPPO) is in charge of inspection, management, and abatement activities at Buckley AFB.

Flaking and peeling paint represents an obvious exposure concern in homes, day care centers, schools, and playgrounds. Less obvious, but equally dangerous, is lead-containing dust generated during renovation, demolition, sanding, and stripping of painted surfaces. Lead-containing dust can also be generated when surface abrasion occurs during such routine activities as opening and shutting doors and windows.

The Proposed Action and two alternatives do not involve any activities which would disturb any LBP.

Mold. Mold spores are commonly found in both indoor and outdoor air. Mold growth can occur indoors when excessive moisture or water accumulates. Some molds can grow on wood, paper, food, and carpets. As molds grow, they digest whatever they are growing on. Mold growth can cause damage to structures, as well as health effects via the production of allergens, irritants, and toxins.

Ordnance. The location of the Proposed Action and two alternatives are outside the installation's explosive safety distance.

3.5.2 Impacts

Proposed Action

Hazardous Materials. No effects on hazardous materials management during construction would be expected. Products containing hazardous materials would be procured and used during the proposed facilities construction projects. There would be no new chemicals or toxic substances used or stored at Buckley AFB. It is anticipated that the quantity of products containing hazardous materials used during the construction activities would be minimal and their use would be of short duration. Contractors would be responsible for the management of hazardous materials, which would be handled in accordance with Federal and state regulations. Contractors must report use of hazardous materials to the HAZMART including pertinent information (e.g., MSDS).

The type of HAZMAT used at the kennel following construction would remain equivalent to the use at the existing kennel. Insecticides used at the facility to control infestations of fleas, ticks, and mites are controlled and administered by the Civil Engineering Entomology facility (Building 306). Insecticides used on the animals are kept within the facility and are unregulated. The types of vaccinations for the MWDs would remain the same as the current. However, because the installation will be gaining MWDs, the amount of vaccinations and medicines kept in the kennel will increase. In large doses, these drugs can be dangerous.

Hazardous Waste. No effects on the installation's hazardous waste management program would be expected from the construction or operational activities. It is anticipated that the quantity of hazardous wastes generated from proposed construction activities would be negligible. Contractors would be

responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, as well as the installations's Hazardous Waste Management Plan. Best management practices (BMPs) would be followed to ensure that contamination from a spill does not occur. If, however, a spill occurs, the Spill Prevention Control and Countermeasures Plan outlines the appropriate measures for spill situations. Medical waste from the kennel would be collected in appropriate containers and disposed. The addition of two dogs would not generate a significant amount more than baseline. This increase would not be expected to impact the management plans or capacities for handling this waste.

Radon. No effects from radon are expected assuming the proper measures are taken. If not, there are potential long-term effects on personnel and MWD from radon. Buckley AFB is within an area of the highest potential for radon gas decay (USEPA 2006), which means that indoor activity is on average higher than 4 pCi/L. Radon gas is typically found in underground or enclosed spaces. It might be necessary to have ventilation to ensure that USEPA action levels are met.

Storage Tanks. No effects on the installation's fuel or water storage tanks would be expected. The Proposed Action would not involve the removal or addition of any storage tanks.

Pollution Prevention. No effect on pollution prevention at Buckley AFB would be expected. Quantities of hazardous material and chemical purchases, off-installation transport of hazardous waste, disposal of MSW, and energy consumption would increase during construction. Operation of the new facilities would require procurement of products containing hazardous materials, generation of hazardous waste, and consumption of energy consistent with the baseline condition associated with the operation of the proposed facilities. Also, it is USAF policy to procure materials (construction and office supplies) with the highest recyclable content possible.

ERP. No effect on the ERP is expected, as long as construction activities do not overlap the area of landfill buried waste (ERP site LF 003) illustrated in Figure 3-2. A Findings and Recommendations Report (Appendix F) indicated that soil borings were conducted and no remnants of this site were found. If, during construction, debris was found, it is imperative that activities cease and the Installation Engineer be contacted.

ACM. No effect on ACM is expected. The Proposed Action would not involve the removal of ACM. Building materials containing asbestos would be not used for the Proposed Action.

LBP. No effect on LBP is expected. There are no renovation or demolition activities associated with the Proposed Action.

Mold. No effect on mold is expected. Proper construction techniques and practices would be used to inhibit the growth of mold. During periods of rain it would be necessary to cover drywall and material prone to mold growth. If mold is found, the appropriate measures should be taken to inhibit its continued growth, including removal of that material if necessary.

Ordnance. No effect on ordnance is expected. Firearms and ammunition would remain consistent with baseline usage and would be kept in locked storage.

Action Alternative A

Hazardous Materials. No effects on hazardous materials management during construction or operations would be expected. See the hazardous materials subsection in Section 1.1.2.1 for description.

Hazardous Waste. No effects on the installation's hazardous waste management program would be expected from the construction or operational activities. See the hazardous waste subsection in Section 1.1.2.1 for description.

Radon. No effects from radon are expected assuming the proper measures are taken. See the radon subsection in Section 1.1.2.1 for description.

Storage Tanks. No effects on the installation's fuel or water storage tanks would be expected.

Pollution Prevention. No effect on pollution prevention at Buckley AFB would be expected. See the pollution prevention subsection in Section 1.1.2.1 for description.

ERP. No effect on the ERP is expected. Alternative A, unlike the Proposed Action, is not located on an ERP site.

ACM. No effect on ACM is expected. See the ACM subsection in Section 1.1.2.1 for description.

LBP. No effect on LBP is expected. See the LBP subsection in Section 1.1.2.1 for description.

Mold. No effect on mold is expected. See the mold subsection in Section 1.1.2.1 for description.

Ordnance. No effect on ordnance is expected. See the ordance subsection in Section 1.1.2.1 for description.

Action Alternative B

Hazardous Materials. No effects on hazardous materials management during construction or operations would be expected. See the hazardous materials subsection in Section 1.1.2.1 for description.

Hazardous Waste. No effects on the installation's hazardous waste management program would be expected from the construction or operational activities. See the hazardous waste subsection in Section 1.1.2.1 for description.

Radon. No effects from radon are expected assuming the proper measures are taken. See the radon subsection in Section 1.1.2.1 for description.

Storage Tanks. No effects on the installation's fuel or water storage tanks would be expected. See the storage tanks subsection in Section 1.1.2.1 for description.

Pollution Prevention. No effect on pollution prevention at Buckley AFB would be expected. See the pollution prevention subsection in Section 1.1.2.1 for description.

ERP. No effect on the ERP is expected. Alternative B would take place on ERP site RW 008, Army Aircraft Burial site. The exact location of this site has not been determined, but the site was operated from 1942 to 1945. This site was closed on 27 June 2001, with concurrence from CDPHE (BAFB 2002b).

ACM. No effect on ACM is expected. See the ACM subsection in Section 1.1.2.1 for description.

LBP. No effect on LBP is expected. See the LBP subsection in Section 1.1.2.1 for description.

Mold. No effect on mold is expected. See the mold subsection in Section 1.1.2.1 for description.

Ordnance. No effect on ordnance is expected. See the ordance subsection in Section 1.1.2.1 for description.

No Action Alternative

No effects would be expected under the No Action Alternative. Hazardous waste generation would remain unchanged and management and disposal of HAZMAT and wastes would continue according to procedures already in place.

3.6 SAFETY

3.6.1 Affected Environment

All contractors performing construction activities are responsible for following ground safety and Occupational Safety and Health Administration (OSHA) regulations and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and use and availability of MSDS. Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplaces; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous material), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures or engaged in hazardous waste work.

There are several areas that are constrained by quantity distance (QD) clear zones at Buckley AFB. These zones are associated with the alert area, Explosive Combat Aircraft parking, and the Munitions Storage Area. Buckley AFB is aggressively managing its development program to ensure that it meets explosive safety requirements. There are currently no electromagnetic radiation safety zones, antenna look-angles, or security clear zones that affect development on Buckley AFB.

3.6.2 Impacts

Proposed Action

Short-term, minor direct adverse effects and long-term beneficial effects would be expected from the Proposed Action. Implementation of the Proposed Action would slightly increase the short-term risk associated with construction contractors performing work at Buckley AFB during the normal workday because the level of such activity would increase. Contractors would be required to establish and maintain safety programs. Projects associated with the Proposed Action would not pose a safety risk to installation personnel or activities at the installation.

Long-term, minor to moderate, beneficial effects would result from the new location being away from family activities and thereby reduce the potential for children to be harmed by the training dogs.

Action Alternatives

The impacts on safety for Action Alternatives A and B would be the same as those for the Proposed Action.

No Action Alternative

The No Action Alternative would be anticipated to have long-term, minor to moderate, adverse impacts on the safety of individuals, particularly children, in the vicinity of the current MWD kennel.

3.7 GEOLOGY

3.7.1 Affected Environment

Topography. Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features. Buckley AFB is west of the Great Plains within the western portion of the central high plains of Colorado. The region is surrounded on three sides by higher terrain areas including the Palmer Lake Divide to the south, the Rampart Range and Rocky Mountains to the west, and the Cheyenne Ridge to the north (BAFB 2004a).

The topography of Buckley AFB comprises relatively flat land and rolling upland. Elevations range from 5,650 feet in the southeastern corner to 5,500 feet in the northwestern corner of the installation (BAFB 2004a).

Geology. Geology, the study of the earth's composition, provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Buckley AFB is within the Denver Basin approximately 50 miles east of the Continental Divide. The Denver Basin is a structural depression that is 300 miles long and 200 miles wide. This depression was created during a mountain-building event referred to as the Laramide Orogeny.

The Denver Basin consists of geologic layers in excess of 13,000 feet thick that range in age from Late Pennsylvanian through Quaternary. Five principal stratigraphic units are present within the Denver Basin: Fox Hills Sandstone, Laramie Formation, Arapahoe Formation, Denver Formation, and Dawson Arkose (BAFB 2004a). The basal (compact) unit of the Denver Basin is the Pierre Shale that underlies the Fox Hills Sandstone (Robson 1983). Surficial material consists of several layers of unconsolidated alluvial gravels, sands, clays, and eolian material (i.e., material deposited as a result of wind processes) that were deposited in response to glacial and interglacial events (BAFB 2004a).

Coal reserves are present beneath the surface of Buckley AFB; however, these reserves are economically nonrecoverable due to their low quality and depth beneath the surface. Although mineral reserves (i.e., sand and gravel) are present in the area, economically desirable reserves do not exist on Buckley AFB (BAFB 2004a). No other significant mineral resources are present at Buckley AFB.

Soils. Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use. The major soil-mapping units present on Buckley AFB include the Fondis-Weld, Alluvial Land-Nunn, and Renohill-Buick-Litle associations (Figure 3-3 and Table 3-5) (USDA/SCS 1971). Other areas on the installation have been identified as gravel pits, rock outcrop complexes, sandy alluvial land, and terrace escarpments (USDA/SCS 1971).

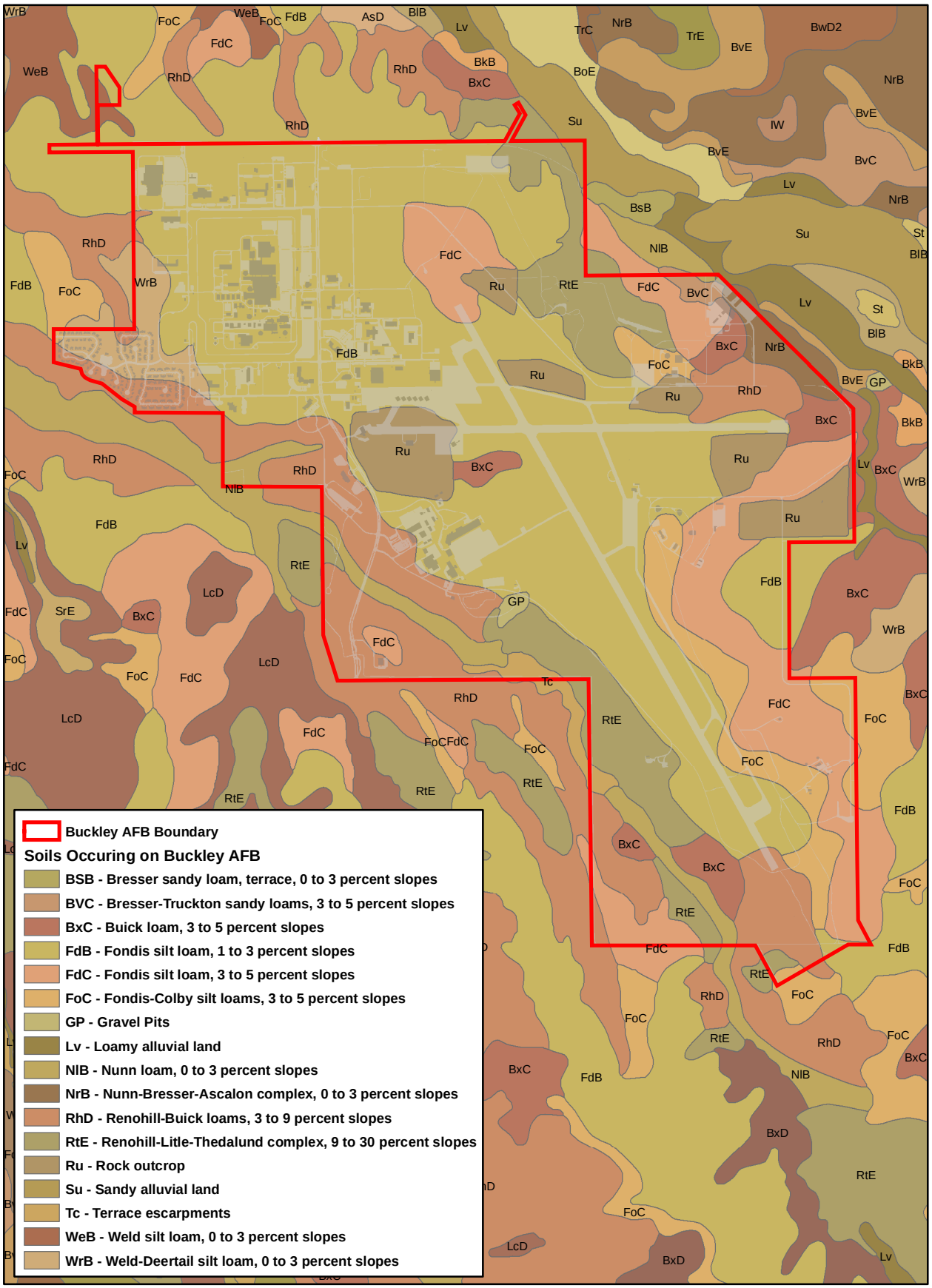

Figure 3-3. Buckley AFB Soils

Table 3-5. Properties of the Soil Types Found on Buckley AFB

Name [a]	Type	Drainage	Properties	Slope [b] (%)
Beckton (BkB)	Loam	Moderately well- and somewhat poorly drained	Soft when dry; friable when wet. Subsoil ranges from clay loam to clay, contains salt throughout, and is slightly calcareous, at least in the lower part.	0–3
Bresser (BsB)	Sandy Loam	Well-drained	Moderate available water-holding capacity. Water table is at a depth of about 10 feet for most of the year. Sandy clay loam subsoil. A zone of lime accumulation does not occur.	0–3
Bresser-Truckton (BvC)	Sandy Loam	Well-drained	Bresser soils occupy the slopes. Surface layer about 6 inches, with a sandy clay loam subsoil about 20 inches thick. Truckton soils occur at ridgetops and are susceptible to soil blowing.	3–5
Bresser-Truckton (BvE)	Loamy Sand	Well-drained	Bresser soil is on the side slopes. Truckton soils occur in the higher areas.	5–20
Buick (BxC)	Loam	Moderately well-drained	Deep, gently sloping to sloping soils that occur in uplands. Surface layer is a brown loam that is free of lime and about 6 inches thick, with a clay loam to sandy clay loam subsoil about 50 inches thick.	3–5
Fondis (FdB)	Silt Loam	Well-drained	Occurs mainly on uplands. Surface layer is approximately 7 inches thick, with an upper clay subsoil about 20 inches thick. Moderate runoff and water intake, and the hazards of soil blowing and water erosion are slight to moderate.	1–3
Fondis (FdC)	Silt Loam	Well-drained	Occurs mainly on uplands. Surface layer is approximately 6 inches thick, and rests abruptly on dense clay subsoil about 18 inches thick.	3–5
Fondis-Colby (FoC)	Silt Loam	Moderately well-drained	Fondis silt loams make up about 60–80% of this complex and Colby silt loam 20–40%. Runoff is moderate, and the available water-holding capacity is high.	3–5
Litle (LcD)	Silty Clay Loam	Well-drained	Occurs on uplands; moderately deep, well-drained, gently sloping to sloping. Runoff is moderate to rapid, and the hazards of water erosion and soil blowing are moderate.	1–9
Alluvial Land (Lv)	Loamy	Well-drained	Occurs near narrow drainageways and major streams, and is subject to flooding. Surface layer is dark, generally noncalcareous, stratified loam and sandy loam about 6 inches thick. Moderate high available water-holding capacity and generally well-drained.	NA

Table 3-5. Properties of the Soil Types Found on Buckley AFB (continued)

Name [a]	Type	Drainage	Properties	Slope [b] (%)
Nunn (NIB)	Loam	Well-drained	Deep, well-drained, level or nearly level soils that occur on uplands and terraces along major streams. The surface layer is grayish-brown, noncalcareous loam about 3 inches thick, with a 19-inch thick subsoil.	0–3
Nunn-Bresser-Ascalon Complex (NrB)	Loam	Well-drained	Deep, nearly level and undulating, loamy soils that have a clayey to loamy subsoil; developed in outwash; on uplands and terraces.	0–3
Renohill-Buick (RhD)	Loam	Well-drained	Sloping to steep, loamy soils that have a loamy to clayey subsoil; moderately deep and deep over shale or sandstone; on uplands.	3–9
Renohill-Litle-Thedalund (RtE)	Loam, Silty Clay Loam, Clay Loam	Well-drained	Renohill loam comprises 20–40% of this complex; Litle silty clay loam, 10–30%; and Thedalund loam or clay loam, 10–30%. Too shallow and steep to be cultivated. Runoff is medium to rapid, and there are a few small gullies and landslips.	9–30
Rock Outcrop (Ru)	NA	NA	Soils have been stripped so that interbedded shale and sandstone are exposed at the surface. Shale is dominant, varies in color and texture, is hard and platey, and resists water penetration. The sandstone is very hard and coarse-grained.	NA
Sandy Alluvial Land (Su)	Sandy and Fine Gravel	Moderately well-drained	Occurs as narrow areas along major drainageways and next to stream channels. Droughty and unstable, subject to yearly flooding, to deposition of sand, and to soil blowing.	NA
Terrace Escarpments (Tc)	Clayey and Sandy	Well-drained	Occurs next to streams and drainageways, and consists of areas in which vertical banks as much as 20 feet tall have been cut. Deep, clayey to sandy, and generally is stratified and calcareous. Water erosion is a severe hazard, and soil slipping and sloughing are common.	NA
Weld-Deertrail (WrB)	Silt Loam	Well-drained	Weld silt loams make up 60–90% of this complex and Deertrail silty clay loams 10–40%. Runoff is slight, and the hazard of soil blowing is moderate.	0–3

Source: USDA/SCS 1971

Notes: [a] These names are for soil types not soil associations; soil types can occur in multiple associations. Please see text to determine which association the soil type most commonly occurs.

[b] Slope is the average grade of a particular phase in a soil series. Phases are divisions of soil series defined by differences in textural class, slope degree of erosion, stoniness, or depth to bedrock.

NA = not applicable

The Fondis-Weld association mapping unit, composed of the Fondis and Weld soil series, covers the most surface area at Buckley AFB. This association consists of deep loamy soils that formed mainly in silty

material deposited by the wind (loess). The Fondis soils are gently sloping (1 to 5 percent slope), well-drained, fertile upland soils with a high water-holding capacity (0.25 inch per inch of soil) and moderately slow permeability (< 0.63 inch per hour), and are susceptible to wind and water erosion. The Weld soil series consists of deep, well-drained, level to gently sloping (0 to 3 percent slope) soils that occur mainly in uplands. The Weld soils have a moderate rate of water intake and a high available water-holding capacity (0.20 to 0.25 inch per inch of soil). The most common soils in the Buckley AFB area are the Fondis silt loam and the Fondis-Colby silt loam (USDA/SCS 1971).

The Alluvial Land-Nunn association consists of soils that have moderate permeability (0.63 inch per hour) and high water-holding capacity (0.20 inch per inch of soil), and are typically found along floodplains and terraces. On installation, these soils are found along Toll Gate Creek and Sand Creek. These soils are deep, nearly level, loamy, and sandy soils. These soils support crops well, but flood protection is needed to prevent erosion and gully formation. The most common soil types in this association are the Nunn-Bresser Ascalon and the Nunn Loam series, both of which have moderate permeability (0.63 to 6.3 inches per hour) and high water-holding capacity (0.20 inch per inch of soil). Both are typically well-drained, gently sloping soils (0 to 3 percent slope) (USDA/SCS 1971).

The Renohill-Buick-Litle association comprises moderately deep, well-drained, loamy to clayey soils. The most common soil series within this association are the Renohill-Litle complex and the Renohill-Buick loam. Renohill soils are characterized as being moderately fertile with moderate internal drainage, steep slopes (3 to 30 percent slope), moderately slow to slow permeability (less than 0.63 inch per hour), and moderate water-holding capacity (0.15 inch per inch of soil) (BAFB 2004a).

3.7.2 Impacts

Conditions that have been identified that might require standard BMPs during construction include the potential for erosion and expansive soils. Expansive soils are present at Buckley AFB. The altered volcanic ash layers that are common in most underlying bedrock units are composed primarily of swelling clay minerals. Soils that develop from and upon them tend to have elevated swell potential as well. Expansive soils and bedrock can repeatedly swell when wet and contract when dry, damaging man-made structures. However, engineering measures, such as installation of deep foundation systems, can decrease potential impacts from expansive soils.

Proposed Action

The Proposed Action would construct the new MWD kennel on an area characterized as the Renohill-Buick-Litle soil association. A geotechnical site assessment conducted in April 2006 (BAFB 2006a) found upper level soils classified as sandy lean clays and clayey sands with low to moderate swell potential and good bearing strength. Lower level sandstone and claystone bedrock with high swell potential was reported in some of the bores. The geotechnical site assessment report concluded that the site is suitable for spread footings and slab-on-grade construction. The presence of high swell potential bedrock would require importing of fill material. Assuming standard BMPs for minimizing soil erosion during construction activities, impacts on geology and soils as a result of implementing the Proposed Action are anticipated to be short-term negligible.

Action Alternative A

Action Alternative A would construct the new MWD kennel on the Fondis-Weld soil association. This soil association is found in upland areas and historically supported native grass prairie. As no geotechnical survey was conducted at this site, the specifics of subsurface soils are not known. Assuming a similar distribution of high swell potential bedrock, fill material would need to be brought in for this site. Other construction recommendations and BMPs would follow those outlined for the Proposed

Action. As such, no to short-term negligible impacts on geology or soils are anticipated as a result of implementing Action Alternative A.

Action Alternative B

Action Alternative B would construct the new MWD kennel across the Fondis-Weld and Alluvial Land-Nunn soil associations. The Alluvial Land-Nunn soil association is associated with drainages and might have historically been subject to flooding. As no geotechnical survey was conducted at this site, the specifics of subsurface soils are not known. Assuming a similar distribution of high swell potential bedrock, fill material would need to be brought in for this site. Other construction recommendations and BMPs would follow those outlined for the Proposed Action. As such, no to short-term negligible impacts on geology or soils are anticipated as a result of implementing Action Alternative B.

No Action Alternative

No impacts on geology or soils are anticipated as a result of implementing the No Action Alternative.

3.8 WATER RESOURCES

3.8.1 Affected Environment

Groundwater. Groundwater consists of subsurface hydrologic resources. It is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications.

Buckley AFB is within the Denver Basin groundwater basin. There are four major bedrock aquifers that underlie Buckley AFB within the Denver Basin: the Denver, Upper Arapahoe, Lower Arapahoe, and Laramie-Fox Hills aquifers. These aquifers are separated by a bed of shale with low permeability and are located in zones of sandstones and siltstones (USGS 1995).

Surficial aquifers at Buckley AFB are associated with present and ancestral surficial stream and river valleys. The aquifer systems are the result of alluvial deposition from erosion of upland bedrock areas. The alluvial aquifer identified on Buckley AFB is associated with Toll Gate and Sand creeks and consists of primarily coarse-grained materials. Groundwater is recharged to this aquifer through direct infiltration of precipitation and irrigation water and by lateral and upward seepage of groundwater. Groundwater is discharged from the alluvial aquifer through seepage to streams, evapotranspiration, downward seepage into underlying bedrock aquifers, and extraction via pumping wells. Groundwater flow in these surficial aquifers is generally toward the north-northwest along creekbeds, toward the South Platte River (BAFB 2004a).

Surface Waters. Surface water resources consist of lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. Storm water flows, which can be exacerbated by high proportions of impervious surfaces associated with buildings, roads, and parking lots, are important to management of surface water. Storm water is also important to surface water quality because of the potential to introduce sediments and other contaminants into lakes, rivers, and streams. Storm water systems convey precipitation away from developed sites to appropriate receiving surface waters. For several reasons, storm water systems can employ a variety of devices to slow the movement of water. For instance, a large, sudden flow could scour a streambed and harm biological resources in that habitat. Storm water systems provide the benefit of reducing amounts of sediments and other contaminants that would otherwise flow directly into surface waters. Failure to size storm water systems appropriately to hold or delay conveyance of the largest predicted precipitation event will often lead to downstream flooding and the environmental and economic damages associated with flooding. As a general rule, areas with higher densities of development, such as urban areas, require

greater degrees of storm water management because of the higher proportions of impervious surfaces that occur in urban centers.

The South Platte River, approximately 15 miles (27.8 km) northwest of Buckley AFB, is the primary surface water drainage in the region. Several smaller intermittent tributaries within or adjacent to Buckley AFB feed this drainage system. Off-installation tributaries include Sand Creek to the north and northeast, and Murphy Creek to the east (Figure 3-4). East Toll Gate Creek, an intermittent stream, is in the western section of the installation.

The most prominent surface water feature on the installation is Williams Lake, a reservoir in the northeastern section of the installation (BAFB 2004a).

The Proposed Action is upslope from the East Toll Gate Creek drainage (Figure 3-4). Action Alternatives A and B are in the Murphy Creek watershed.

Storm Water. On Buckley AFB, stormwater regulations are under the purview of USEPA, as the agency responsible for regulatory enforcement on Federal facilities in the state of Colorado. USEPA's stormwater regulations consist of three permit programs.

The General Permit for Stormwater Discharges from Construction Activities (Construction General Permit or [CGP]) Program has the objective of preventing pollutants on constructions sites (e.g., sediment, POLs) from being transported off site by stormwater runoff. The CGP is applicable to projects that disturb an area 1 acre or more in size, and requires that a Notice of Intent (NOI) be obtained by both the contractor doing the construction work and the owner/operator responsible for directing the work, per the definitions in the CGP. In addition to applying for an NOI, the CGP requires each project to develop and implement an SWPPP. The SWPPP includes BMPs for erosion and sediment control, control of waste at the site, self-inspection/monitoring, and reporting efforts.

The purpose of the NPDES Stormwater Multi-Sector General Permit for Industrial Activities Program (MSGP) is to identify, permit, and limit stormwater discharges from nonpoint sources associated with activities of industries specified in the regulation that are or have the potential to carry industrial pollutants in the runoff. Presently, discharges associated with the MSGP Sector L (landfills) and Sector S (air transportation) industries are permitted under Buckley AFB's MSGP. The MSGP is not applicable to the MWD kennel project because it is not associated with either of these industry sectors.

The General Permit for Stormwater Discharges from Federal Facility Small Municipal Separate Storm Sewer Systems (MS4) in Colorado Program provides an overall management and compliance program for the owners and operators of stormwater conveyance systems. Requirements of the MS4 program include preparation and implementation of a Stormwater Management Plan (SWMP). The SWMP identifies BMPs that address each of six minimum control measures, which include construction site stormwater runoff control and post-construction stormwater management in new development/redevelopment.

Buckley AFB holds active permits under all three of these USEPA stormwater programs. In addition to the USEPA permit program requirements, the USAF mandates compliance with Engineering Technical Letter (ETL) 03-01: Stormwater Construction Standards.

There are two primary drainage basins: Sand Creek Basin and the East Toll Gate Creek Basin. To offset impacts from channel erosion in the East Toll Gate Creek, structures have been installed to detain surface flows and release them at a controlled rate (BAFB 2003). Storm water runoff from the Proposed Action site would drain to East Toll Gate Creek.

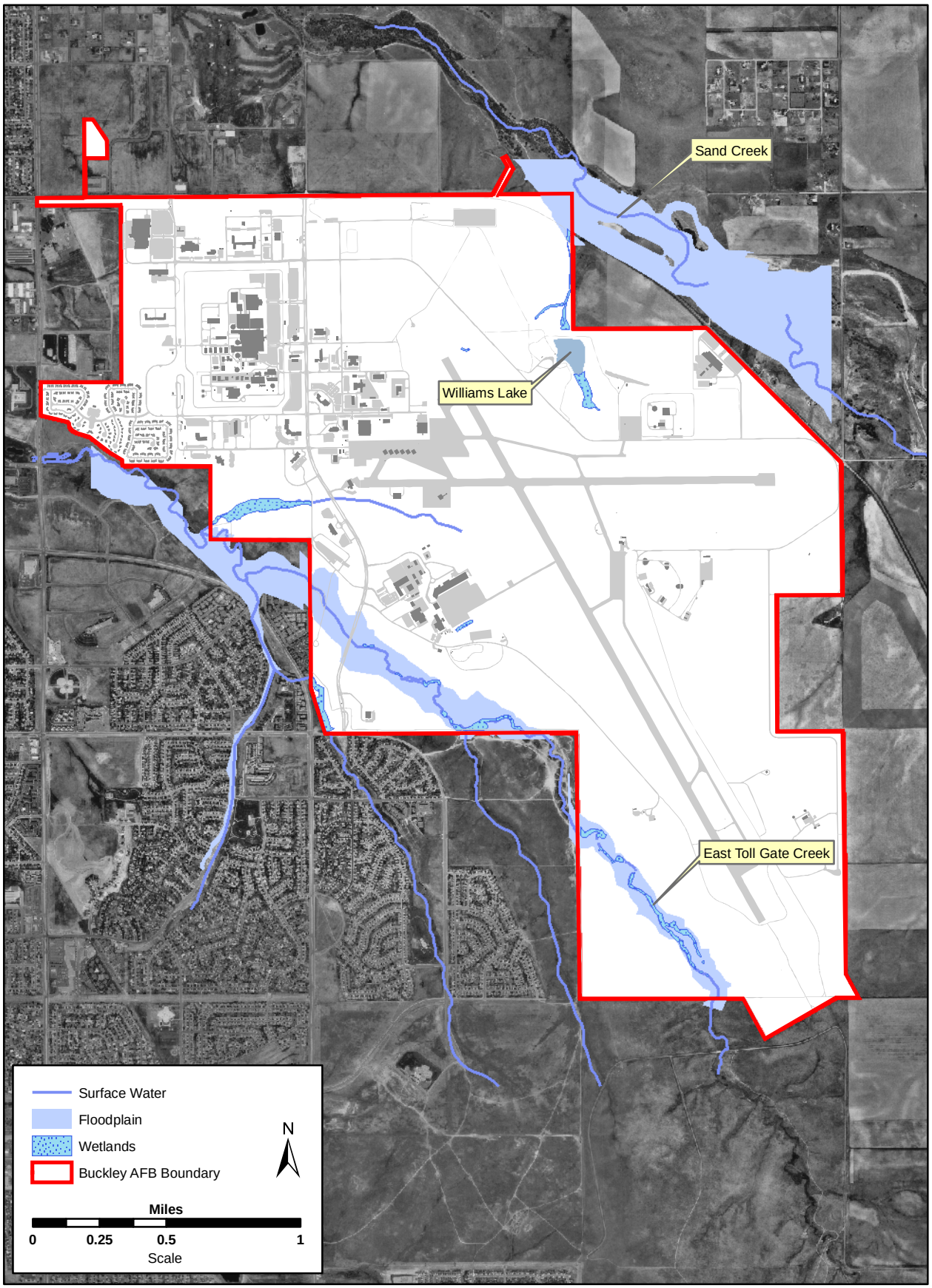

Figure 3-4. Surface Water Resources

Floodplains. Floodplains are defined as areas along a linear surface water feature (e.g., stream, creek, or river) that are inundated by the water leaving its banks. Floodplains are important because they temporarily store floodwaters, improve water quality, provide important habitat for wildlife, and create opportunities for recreation. Typically, in the United States, rivers have a 100-year floodplain, or an area that is inundated by a 100-year flooding event. The Federal Emergency Management Agency (FEMA) has designated the 100-year floodplain as an area in which construction activities are regulated. FEMA prints 100-year floodplain maps that show the floodplain for rivers in the United States. FEMA maps are based on historic events and insurance claims. Figure 3-4 presents the location and extent of floodplains on and adjacent to Buckley AFB. The Proposed Action is upslope from the floodplain associated with East Toll Gate Creek. Action Alternatives A and B are within the watershed of, but distant from, the Sand Creek floodplain.

3.8.2 Impacts

Depth to groundwater is greater than 20 feet (6.1 meters) below ground surface. Therefore, it is not expected that groundwater would be impacted during construction activities under the Proposed Action, Action Alternatives, or the No Action Alternative. However, selection of Action Alternative A or B could result in the drilling of a well to supply water for the facility. Therefore, impacts on groundwater resources are included in this section.

Potential impacts include disruption of natural drainage patterns, contamination entering storm water discharge, or heavy sediment loading from construction activities. Preparing and implementing an SWPPP can minimize adverse impacts. These plans provide construction and post-construction BMPs intended to control and manage the loading of sediment and other pollutants to levels that would minimize degradation of downstream water quality. Compliance with Air Force ETL 03-1: *Storm Water Construction Standards*, requires implementation of BMPs to reduce site storm water discharges and pollutant loadings to preconstruction levels or better. A storm water control site plan will be required for this project and must contain an NPDES permit declaration. Revegetation, which would ameliorate long-term sediment loading, is one of the requirements for the NPDES permit.

The two streams that could potentially receive storm water runoff from the Proposed Action and Action Alternative sites are East Toll Gate Creek to the west and Sand Creek to the northeast. Potential impacts on both of these streams could result from the Proposed Action and Action Alternatives.

A minor increase in storm water volume would result from the reduction of pervious surfaces on the installation as a consequence of constructing the kennel facility (building, parking lot, driveway). There are approximately 3,200 acres (1,295 hectares) of drainage area at Buckley AFB, of which 525 acres (212.5 hectares), or 16.4 percent, are impervious surface. The Proposed Action and Action Alternatives would increase the total impervious surface of the installation by approximately 1 acre, resulting in a new total of 526 acres of impervious surface on the installation (an increase of less than 0.009% in installationwide impervious surface). Assuming an annual precipitation rate of 16.3 inches per year and no losses due to evaporation, the anticipated increase in storm water due to the Proposed Action would be approximately 442 thousand gallons per year. BMPs can be implemented to reduce post-construction runoff peak flows from the increased impervious surfaces, including the use of porous pavement design for portions of the parking lot and minimizing contiguous areas of impervious surfaces by using landscaping, grass buffer strips, or grass-lined swales and directing runoff from the site to these features.

Construction BMPs would also be implemented for each Proposed Action or Action Alternative to decrease sedimentation by erosion. Common BMPs for construction and demolition activities would be followed to minimize erosion. Preventive BMPs include the following:

- Limit stockpiling of materials onsite
- Manage stockpiled materials to minimize the time between delivery and use
- Cover stockpiled materials with tarps
- Install snow or silt fences around material stockpiles, stormwater drainage routes, culverts, and drains
- Install hay or fabric filters, netting, and mulching around material stockpiles, storm water drainage routes, culverts, and drains.

Proposed Action

Construction of the new MWD Kennel at the Proposed Action site would not necessitate the drilling of a well for water supply, and would therefore have no effect on groundwater resources. Construction of the new MWD kennel under the Proposed Action would increase impermeable surfaces by approximately 1.0 acre (0.4 hectares). Storm water drainage systems associated with the building construction would be constructed to handle the increased runoff; the BMPs discussed previously would also be implemented, as appropriate. The construction activities and the associated increased amount of impervious surface is expected to have negligible, short- and long-term, adverse impacts on floodplains and surface waters at Buckley AFB.

Action Alternatives A and B

Construction of the new MWD Kennel at either of the Alternative sites could result in drilling of a well for water supply. A well drilled in either of these locations would draw on the aquifer utilized by residential developments to the east. There is concern that this aquifer is already losing capacity and that additional demand (i.e., to supply the new MWD kennel) would exacerbate an already-falling water table. Therefore, impacts on groundwater of Action Alternatives A and B would be long-term, minor, and adverse.

Impacts on floodplains and surface waters from construction of the new MWD kennel under Action Alternatives A and B would be similar to those described for the Proposed Action, differing only in that the sites for these alternatives are even further removed from potential receiving surface waters.

No Action Alternative

The No Action Alternative would have no impacts on water resources of the installation.

3.9 BIOLOGICAL RESOURCES

3.9.1 Affected Environment

Biological resources include native or naturalized plants and animals, and the habitats, such as wetlands, forests, and grasslands, in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) or a state.

Biological resources also include wetlands, which are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, providing wildlife habitat, supporting unique and niche flora and fauna, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the "waters of the

United States" under Section 404 of the CWA. The U. S. Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support—and under normal circumstances do support—a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR 328). EO 11990, *Protection of Wetlands,* directs Federal agencies to avoid destruction or modification of wetlands whenever there is a practicable alternative.

This section describes the affected environment for vegetation; wetlands; native and nonnative wildlife; and threatened, endangered, and other sensitive species known or likely to occur at Buckley AFB, and potential impacts on those resources for the Proposed Action and Alternatives. This analysis is based on site visits conducted in January, February, April, and May 2006, as well as literature and previous surveys conducted at Buckley AFB.

3.9.1.1 Vegetation

Buckley AFB is in the Great Plains-Palouse Dry Steppe Province Ecoregion (Bailey 1995), an ecoregion also classified as shortgrass prairie (BAFB 2004a). The Draft Integrated Natural Resources Management Plan (BAFB 2004a) identifies 10 vegetation types occurring within the shortgrass ecosystem represented on Buckley AFB. Of those 10, only 4 are mapped or have been more recently (May 2006) observed at the Proposed Action or Action Alternatives:

- Midgrass prairie composed of blue grama, western wheatgrass, crested wheatgrass
- Crested wheatgrass
- Riparian corridors consisting of bottomland meadows or cottonwood/willow habitat
- Weedy/disturbed areas.

Midgrass prairie is dominated by native grass species such as blue grama (*Bouteloua* sp.), western wheatgrass (*Agropyron smithii*), and buffalo grass (*Buchloe dactyloides*). Other common grasses include tumble grass (*Schedonnardus paniculatus*) and three-awns (*Aristida fendleriana* and *A. longiseta*). Fringed brome grass (*Bromus ciliatus*) dominates depressions and gullies within the mixed grass prairie. Herbaceous species associated with mixed grass prairie are scarlet globe mallow (*Sphaeralcea coccinea*), prickly pear (*Opuntia macrorhiza*), rabbitbrush (*Chrysothamnus nauseosus*), and snakeweed (*Gutierrezia sarothrae*).

Areas dominated by crested wheatgrass (*Agropyron cristatum*), a nonnative grass species historically used to revegetate disturbed ground, occur throughout the installation. Some of these areas contain primarily crested wheatgrass and very little, in terms of cover or diversity, of other/native species. Other areas contain a more even distribution of crested wheatgrass, blue grama, western wheatgrass, and associated species.

Riparian habitats are characterized as bottomland meadows or cottonwood/willow. Bottomland meadows occur within the mixed grass prairie and can support wetlands. Fringed brome grass dominates the bottomland meadows and is generally associated with moist soil conditions (BAFB 2004a). Plains cottonwood (*Populus deltoides*)/willow *(Salix* sp.) communities dominate riparian corridors. Cottonwood/willow habitat does not occur within the Proposed Action or Action Alternative sites.

Areas dominated by weeds have been disturbed by past or current ground-disturbing construction activities or past grazing activities. Weed species observed include fringed sagewort (*Artemisia frigida*), cheatgrass (*Bromus tectorum*), field bindweed (*Convolvulus arvensis*), Canada thistle (*Cirsium arvense*),

kochia (*Kochia scoparia*), and Russian thistle (*Salsola kali*). Noxious weeds observed at Buckley AFB include Dalmation toadflax (*Linaria dalmatica*) and leafy spurge (*Euphorbia esula*) (BAFB 2004a).

Vegetation of the Proposed Action site is sparse and dominated by weedy species including Russian thistle and kochia. Vegetation at the Action Alternative A site is characterized as good quality upland midgrass prairie as described above. Action Alternative B vegetation is dominated by crested wheatgrass.

3.9.1.2 Wetlands

A total of 23 wetlands were identified during a 2001 survey (BAFB 2004a). Of these 23 wetlands, only those along East Toll Gate Creek and in the vicinity of the Proposed Action site (Figure 3-4) are susceptible to impacts from construction of the MWD kennel. These wetlands are classified under the Cowardin system (Cowardin et al. 1979) as palustrine scrub-shrub with broad-leaved deciduous shrubs including primarily willows. The closest of these wetlands is approximately 750 feet from, and indirectly downslope of, the construction boundary for the Proposed Action.

3.9.1.3 Wildlife

This section describes the wildlife species and their habitat associations at Buckley AFB. No aquatic habitat occurs within the Proposed Action or alternatives; therefore, animals associated with permanent water sources are not included in this analysis.

Mammals. No ungulates occur on the installation due to the exclusion fencing around the perimeter, although pronghorn (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*) historically occurred on the base and still inhabit surrounding properties (BAFB 2004a). Carnivores inhabiting Buckley AFB include red fox (*Vulpes vulpes*), coyote (*Canis latrans*), American badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), and long-tailed weasel (*Mustela frenata*). Small mammals observed at Buckley AFB include rodents and lagomorphs (rabbits and hares). The most widely observed of the rodents is the black-tailed prairie dog (*Cynomys ludovicianus*). Prairie dogs are considered keystone species of the shortgrass prairie ecosystem as they support a diverse array of other plant and wildlife species within their colonies. Prairie dogs are discussed in more detail in Section 3.10.2.4. Other rodents known to inhabit Buckley AFB include plains pocket gopher (*Geomys bursarius*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), fox squirrel (*Sciurus niger*), deer mouse (*Peromyscus maniculatus*), and prairie vole (*Microtus ochragaster*). Common lagomorphs include black-tailed jackrabbit (*Lepus californicus*), white-tailed jackrabbit (*Lepus townsendii*), eastern cottontail (*Sylvilagus floridanus*), and desert cottontail (*Sylvilagus auduboni*).

Birds. The midgrass prairie community supports numerous bird species, many of which are ground-nesters. The most common songbirds inhabiting prairie habitats include western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), lark bunting (*Calamospiza melanocorys*), killdeer (*Charadrius vociferous*), blackbilled magpie (*Pica hudsonia*), mourning dove (*Zenaida macroura*), western kingbird (*Tyrannus verticalis*), and eastern kingbird (*Tyrannus tyrannus*). Species more common in urbanized areas include house finch (*Carpodacus mexicanus*), common grackle (*Quiscalus quiscula*), nonnative house sparrow (*Passer domesticus*), rock dove (*Columba livia;* aka pigeon), and European starling (*Sturnus vulgaris*). Raptor species known or likely to occur at Buckley AFB include burrowing owl (*Athene cunicularia*) (discussed further in Section 3.7.4), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), and American kestrel (*Falco sparverius*). In addition, bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), and rough-legged hawk (*Buteo lagopus*) can be observed in winter.

Reptiles and Amphibians. Plains spadefoot toad (*Spea [Scaphiopus] bombifrons*) and Great Plains toads (*Bufo cognatus*) occupy grassland habitat along riparian floodplains and can occur on Buckley AFB (Hammerson 1999). Bullfrog (*Rana catesbeiana*) and northern leopard frog (*Rana pipiens*) have been observed on the installation but are generally found near a permanent water source, which does not occur in the vicinity of either the Proposed or Alternative sites. A variety of reptile species inhabit Buckley AFB; some of the more commonly observed species include northern prairie lizard (*Sceloporus undulatues garmani*), bullsnake (*Pituophis catenifer*), western hog-nosed snake (*Heterodon nasicus*), plains garter snake (*Thamnophis radix*), and prairie rattlesnake (*Crotalus viridis*) (BAFB 2004a).

The existing wildlife habitats at the Proposed Action and Action Alternatives sites are described below.

Proposed Action

An active prairie dog colony occupies the Proposed Action site (discussed further in Section 3.10.2.4). A black-tailed jackrabbit was observed on the site on 9 May 2006. Because of substantial bare ground intercalated among the scattered plants, this area could provide foraging habitat for small birds. Otherwise, the site does not provide notable wildlife habitat.

Action Alternative A

Action Alternative A occupies relatively high-quality upland midgrass prairie. As such, it provides nesting habitat for ground-nesting birds, and likely supports a healthy population of small mammals (e.g., rodents) which would, in turn, provide food sources for a number of carnivores including foxes, coyotes, raptors, and snakes. No unique wildlife habitats (e.g., caves or dens) were observed at this site.

Action Alternative B

Action Alternative B occupies the same type of habitat and supports the same wildlife community as does Alternative A. No unique wildlife habitats were observed at this site.

3.9.1.4 Threatened, Endangered, and Other Sensitive Species

Threatened and endangered plant and animal species are protected under the ESA or Colorado state law. An endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range; a threatened species is one that is likely to become endangered in the foreseeable future. Other sensitive species include those listed by the Colorado Division of Wildlife (CDOW) as species of special concern. Special concern species receive no formal protection, but are still considered when assessing potential project impacts.

Federal- and Colorado state-listed threatened and endangered species, as well as CDOW species of concern, are shown in Table 3-6. A number of species that lack suitable habitat, are unlikely to occur, or would not be impacted are not discussed further. These species include black-footed ferret, swift fox, Preble's meadow jumping mouse, bald eagle, ferruginous hawk, plains sharp-tailed grouse, loggerhead shrike, northern leopard frog, Utes ladies'-tresses, and Colorado butterfly plant.

The only site under consideration at which black-tailed prairie dogs are known to exist is the Proposed Action. No burrowing owls have been recorded at this site or any of the alternative sites, nor were any observed during the early spring 2006 field session. These species are discussed in more detail below.

Black-tailed Prairie Dog. The black-tailed prairie dog was a Candidate for Listing under the ESA in 2000, but was removed from this status in 2004. However, black-tailed prairie dogs are still considered a

Species of Special Concern by the CDOW due to their role as a keystone species and their importance to the shortgrass prairie ecosystem.

Table 3-6. Threatened and Endangered Species and Species of Special Concern

Common Name	Scientific Name	Status		Potential for Occurrence on Sites
		Federal	State	
Mammals				
Black-tailed prairie dog	*Cynomys ludovicianus*	--	SC	Present
Black-footed ferret	*Mustela nigripes*	E	E	Not present; Buckley AFB is within Block Clearance Zone in Colorado.
Swift fox	*Vulpes velox*	--	SC	Unlikely; occurs in native prairie of easternmost Colorado; never observed at Buckley AFB.
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	T	T	Not present; Buckley AFB is within Denver Metropolitan Area Block Clearance Zone.
Birds				
Burrowing owl	*Athene cunicularia*	--	T	Present. No nesting locations in vicinity of Proposed Action or Alternatives.
Ferruginous hawk	*Buteo regalis*	--	SC	Potentially present; no known nesting locations on Buckley AFB.
Bald eagle	*Haliaeetus leucocephalus*	T	T	Occasional visitor; no known nests or roosts on Buckley AFB.
Loggerhead shrike	*Lanius ludovicianus*	--	SC	Present as spring/fall migrant but not known to nest on Buckley AFB. No nesting habitat in proximity of Proposed or Alternative sites.
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesii*	--	E	Potentially present; no known nesting locations on Buckley AFB.
Amphibians				
Northern leopard frog	*Rana pipiens*	--	SC	Potentially present in/near permanent water sources; no such habitat near Proposed Action or alternatives.
Plant Species				
Colorado butterfly plant	*Gaura neomexicana* ssp. *coloradensis*	T	--	Unlikely; survey conducted in 2004 found no occurrences.
Utes ladie's-tresses	*Spiranthes diluvialis*	T	--	Unlikely; survey conducted in 2001 found no occurrences.

Source: BAFB 2005

Notes: T = Threatened

E = Endangered

SC = Species of Special Concern in Colorado (CDOW listing)

Black-tailed prairie dogs occur in many areas throughout Buckley AFB. They inhabit burrows, which form networks of tunnels, typically 3 to 6 feet (0.7 to 1.8 meters) deep. Many other species inhabit prairie dog burrows, including burrowing owls, cottontails, other rodents, reptiles, insects, and spiders (Hoogland 1995). During the May 2006 site visit, prairie dog burrows and prairie dogs were observed on the Proposed Action site. They were not observed at the Action Alternative A and B sites and would not be expected to occur there due to the height and density of grasses.

Buckley AFB has a *Supplement to Environmental Assessment of Proposed Prairie Dog Practices at Buckley Air Force Base* (BAFB 2001) in place to address management of active black-tailed prairie dog colonies. This EA specifies that if a prairie dog colony would be impacted by a proposed action, then prairie dogs would be removed prior to construction using approved removal methods described in the EA, including removal to a raptor or black-footed ferret facility.

Burrowing Owl. Burrowing owls are listed as threatened in Colorado but also receive Federal protection under the Migratory Bird Treaty Act. Burrowing owls nest in abandoned prairie dog burrows and are generally present on installation from early March to late October. Burrowing owls would not be expected at the Action Alternative A and B sites due to the lack of prairie dog activity in that area of the installation. Burrowing owls have not historically or recently (May 2006) been observed at the Proposed Action site. However, burrowing owls establish nests in new locations from year to year and it is possible that they might do so in the Proposed Action site in subsequent years.

3.9.2 Impacts

Impacts were assessed by comparison of the footprint of the facility to the biological resources described under the Affected Environment section for each resource. The measures proposed to offset impacts are based on standard methods and actions recommended by wildlife management agencies and organizations. To quantify impacts resulting from the replacement of native habitat with the proposed facility, it was assumed that the actual construction impact area would be 9 acres (six times greater than the proposed facility footprint of 1.5 acres) to accommodate construction activity and staging of materials and equipment.

3.9.2.1 Vegetation

This section describes impacts on vegetation from construction of the Proposed Action or Alternatives for the MWD kennel. The ROI is tiered at the footprint of the facility (1.5 acres in all but the No Action Alternative), the construction footprint (estimated at 9 acres for all action alternatives), and the overall vegetative composition of the installation. In general, impacts on vegetation would be construction-related, since operation of the facility would have no direct or indirect effects on vegetation. Additional impacts on existing vegetation would occur from any required utility connection to the facility during construction. Construction impacts on vegetation would be generally direct and long-term in duration, though short-term impacts are discussed when applicable. Impacts on vegetation are generally categorized by their mode of action (direct/indirect) and intensity (minor/moderate) depending on the existing condition of each site. Adverse impacts on vegetation would be reduced by revegetating disturbed areas not planned for buildings, parking lots, streets, or landscaping. The areas would be seeded with native vegetation as soon as possible after construction is complete.

Proposed Action

Under the Proposed Action, the MWD kennel would be constructed on a sparsely vegetated area dominated by weedy species. Given that the site is dominated by weedy vegetation and assuming

revegetation of the nonfacility construction footprint with native species, the impacts on the vegetative composition of the installation should be long-term, minor, and beneficial.

Action Alternative A

Under this Alternative, the construction of the MWD kennel would have short-term, moderate, adverse impacts on 9 acres of upland midgrass prairie. The long-term impact would be similar in intensity and nature (moderate, adverse), but reduced to the footprint of the facility (1.5 acres). Given the extent of upland midgrass prairie on the installation and assuming revegetation of the nonfacility construction footprint with native species, the overall impact on the vegetative composition of the installation is anticipated to be short- and long-term, minor, and adverse.

Action Alternative B

The impacts of this alternative to the crested wheatgrass-dominated vegetation at the Action Alternative B site would be the same as those described for Action Alternative A.

No Action Alternative

No impacts on vegetation would occur as a result of implementing the No Action Alternative.

3.9.2.2 Wetlands

The filling of wetlands and waters of the United States is regulated under the CWA, and construction in or near these sensitive areas would require Buckley AFB to apply for Section 404 permits (BAFB 2004a). The ROI consists of the boundaries of the impacted wetland. While construction at the Proposed Action site might be the closest to wetlands of the three action alternatives, this construction is not expected to impact the wetlands associated with East Toll Gate Creek, provided that BMPs (e.g., stormwater control, sediment control) are implemented, and disturbed areas are revegetated immediately after construction is complete. Therefore, it is expected that no permits would be required.

Proposed Action

The distance and position within natural drainage patterns of the Proposed Action site makes it unlikely that the associated construction activities would have any impacts on wetlands along East Toll Gate Creek. Erosion- and sediment-control BMPs required by SWPPPs (e.g., silt fences), as well as spill prevention, control, and countermeasure procedures identified in the Buckley AFB Integrated Environmental Response Plan, would be implemented to further reduce the potential for impacts on these wetlands.

Action Alternative A

No impacts on wetlands would be anticipated as a result of implementing Action Alternative A.

Action Alternative B

No impacts on wetlands would be anticipated as a result of implementing Action Alternative B.

No Action Alternative

No impacts on wetlands would be anticipated as a result of implementing the No Action Alternative.

3.9.2.3 Wildlife

Proposed Action

The Proposed Action would have direct, long-term, negligible, adverse impacts on 1.5 acres of marginal wildlife habitat for the installation (excluding consideration of prairie dogs). This action is also anticipated to have indirect, long-term, minor, adverse impacts on wildlife habitat in the vicinity of the facility as the sight, sound, and smell of the dogs could cause some wildlife to avoid the area. For species that habituate quickly to stimuli that have no consequences, this impact might be only short-term.

Action Alternative A

Action Alternative A would be anticipated to have direct, short- and long-term, moderately adverse impacts on small mammal and ground-nesting bird habitat; approximately 9 acres would be subject to short-term impacts during active construction, and approximately 1.5 acres would be permanently removed from this habitat on the installation. Indirect impacts would be the same as those for the Proposed Action.

Action Alternative B

Impacts on wildlife and wildlife habitat would be the same as those described for Action Alternative A.

No Action Alternative

No impacts on wildlife or wildlife habitat are anticipated as a result of implementing the No Action Alternative.

3.9.2.4 Threatened, Endangered, and Other Sensitive Species

This section analyzes potential impacts on black-tailed prairie dogs (Colorado Species of Special Concern) and burrowing owls (Colorado Threatened) from implementation of the Proposed Action and Action Alternatives for the MWD kennel.

Approved prairie dog removal methods, including nonlethal and lethal methods, are described and analyzed in the *Supplement to Environmental Assessment of Proposed Prairie Dog Practices at Buckley Air Force Base* (BAFB 2001). Because the black-tailed prairie dog was a Federal candidate species when the EA was written, it only described and analyzed the use of approved lethal removal methods under specific circumstances. Therefore, impacts from lethal removal methods and transfer to black-footed ferret facilities are analyzed in this construction EA.

The ROI includes the Proposed Action site and adjacent areas, as well as the metapopulation of the installation. No federally listed species would incur impacts from construction of the proposed or alternative actions associated with the MWD kennel facility. Where applicable, measures to eliminate or minimize impacts are suggested.

Proposed Action

Black-tailed Prairie Dogs. Direct adverse impacts on prairie dogs would occur from implementation of the Proposed Action. Although black-tailed prairie dogs were recently delisted as a Federal candidate species, the *Supplement to Environmental Assessment of Proposed Prairie Dog Practices at Buckley Air Force Base* (BAFB 2001) still provides black-tailed prairie dog management directive until it is revised or replaced by another EA or management directive. Prairie dogs are still considered a Species of Special Concern in Colorado and their burrows support numerous other wildlife species, including nesting burrowing owls.

Approved nonlethal and lethal methods would have the same impact on the metapopulation of black-tailed prairie dogs on the installation, as either would remove individuals from that population. However, although prairie dogs were observed at the Proposed Action site, the density and therefore number of individuals to potentially be removed is relatively low.

Therefore, impacts on prairie dogs as a result of habitat loss, transfer, or lethal removal under the Proposed Action would be minor to moderate and long-term. Long-term and indirect effects on prairie dogs from operation of the MWD kennel could result from the sight, sound, and scent of the dogs, although this impact is anticipated to be negligible given the rapidity with which prairie dogs acclimate to such stimuli when those stimuli are not directly associated with negative consequences.

Burrowing Owls. Burrowing owls have nested in various locations throughout Buckley AFB where suitable prairie dog habitat occurs. Indirect and long-term impacts on burrowing owls would include loss of habitat as a portion of a prairie dog colony is destroyed and replaced with the Proposed Action. The loss of prairie dog burrows would reduce the availability of potential burrowing owl nest sites, although nest sites would still be available in other areas of Buckley AFB.

Burrowing owls might be present during the breeding season (between March 1 and October 31) at the Proposed Action site. To deter a burrowing owl from nesting in or near the construction site, prairie dogs should be removed and burrows destroyed prior to March 1. However, if this is not possible, and should construction occur during the burrowing owl nesting season, pre-construction surveys would be conducted to determine the presence or absence of nesting burrowing owls at the proposed site, in accordance with the *Supplement to Environmental Assessment of Proposed Prairie Dog Practices at Buckley Air Force Base* (BAFB 2001). If nesting burrowing owls are present, a 150-foot (45.72-meter) buffer would be established around active nest sites during the breeding season to protect owls from disturbances associated with construction, especially increased noise. Given these measures, direct and short-term impacts on nesting individuals or young burrowing owls from construction-related activities would be negligible.

No direct impacts on burrowing owls would be anticipated from black-tailed prairie dog removal under the Proposed Action. In accordance with the *Supplement to Environmental Assessment of Proposed Prairie Dog Practices at Buckley Air Force Base* (BAFB 2001), should construction occur during the burrowing owl nesting season, preconstruction surveys would be conducted to determine the presence or absence of nesting burrowing owls at the proposed site. If nesting burrowing owls are identified, prairie dog removal would not be conducted.

Long-term and indirect effects on burrowing owls from operation of the MWD kennel could result from disturbances associated with the presence of the MWDs (i.e., sight, sound, or scent). Burrowing owls in the vicinity of the range could be temporarily, and possibly permanently, displaced due to the presence of these stimuli. However, these impacts are anticipated to be negligible given the paucity of owls in the immediate vicinity of the Proposed Action.

Action Alternative A

No impacts on threatened, endangered, or other sensitive species are expected under Action Alternative A, as no such species occur in the vicinity of this site.

Action Alternative B

No impacts on threatened, endangered, or other sensitive species are expected under Action Alternative B, as no such species occur in the vicinity of this site.

No Action Alternative

No impacts on threatened, endangered, or other sensitive species are expected under the No Action Alternative , as no new MWD kennel would be constructed or operated.

3.10 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.10.1 Affected Environment

Buckley AFB occupies approximately 3,283 acres 8 miles east of Denver, Colorado, within the city of Aurora, in Arapahoe County. The city of Denver and Arapahoe County have populations of 557,478 and 487,697, respectively (U.S. Census Bureau 2000). The populations of Arapahoe County and Denver increased by 24.6 percent and 18.6 percent, respectively, between 1990 and 2000 (U.S. Census Bureau 2000). The population of Aurora increased by 24.6 percent between 1990 and 2000. These increases in population are lower than the statewide increase of 30.6 percent, but higher than the national increase of 13.1 percent (U.S. Census Bureau 2000). The installation supports 2,712 active-duty personnel, 1,716 Air Force Reserves, 2,497 Army/Navy/Marine Reserves, and 2,811 contract and private citizens (Spann 2006). In addition, the installation serves approximately 16,363 installation dependents, 22,000 Air Force retirees, and approximately 55,000 other retirees (Spann 2006).

Employment Characteristcs. Table 3-7 lists industry of employment for residents in the ROI, Arapahoe County, and Colorado. As would be expected, a larger portion of residents in the ROI are in the Armed Services than in Arapahoe County or Colorado. A larger percentage of residents in the ROI are employed in construction, retail trade, transportation and warehousing, and utilities than county or statewide averages. Lower percentages are employed in arts; entertainment; recreation; accommodation and food services; educational, health, and social services; or other services in comparison to county and statewide averages (U.S. Census Bureau 2000). As of April 2006, the Denver Metropolitan Statistical Area (MSA) had an unemployment rate of 4.4 percent compared to 4.3 percent for Colorado (BLS 2006).

The presence of Buckley AFB has had a positive impact on the Denver MSA. In 2003 Buckley AFB generated an annual payroll of $490,092,390, of which $228,175,272 was for military payroll; $81,214,065 for civilian payroll; and $180,703,053 for nonappropriated funds, contract civilians, and private businesses (AFCEE 2005). The total annual installation impact from expenditures, services, and procurement of materials from Buckley AFB was $878,919,917 in 2003 (AFCEE 2005).

Environmental Justice. On February 11, 1994, President Clinton issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was created to ensure that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal, and local programs and policies.

For the purposes of this EA the ROI is defined as census tract 71.02 (which contains Buckley AFB) and census tract 70.33. These census tracts contain the area that could be affected under the Proposed Action and Alternatives. Table 3-8 shows race and poverty characteristics for the ROI, Colorado, and Arapahoe County. Demographic data from Table 3-8 show that the ROI has a higher percentage of African Americans than Colorado but has a lower percentage than Arapahoe County. Comparison of the demographic data from Table 3-8 reveals that the ROI has very similar race and poverty profiles as

Table 3-7. Employment by Industry

Employment by Industry	Region of Influence [a]	Arapahoe County	State of Colorado
Percent of Employed Persons in Armed Forces	4.1	0.5	0.8
Industry of Civilian Labor Force			
Agriculture, forestry, fishing and hunting, and mining	1.6	0.7	2.0
Construction	11.5	7.2	9.1
Manufacturing	7.4	6.7	9.1
Wholesale trade	4.2	4.2	3.5
Retail trade	11.0	12.1	11.8
Transportation and warehousing, and utilities	11.5	5.6	4.9
Information	6.9	7.4	4.9
Finance, insurance, real estate, and rental and leasing	9.1	11.4	7.7
Professional, scientific, management, administrative, and waste management services	11.0	13.2	11.7
Educational, health, and social services	11.6	15.7	17.0
Arts, entertainment, recreation, accommodation, and food services	4.7	6.9	9.0
Other services (except public administration)	4.3	4.7	4.8
Public administration	5.5	4.1	4.6

Source: U.S. Census Bureau 2000

Note: [a] The ROI consists of the U.S. Census Tract encompassing Buckley AFB tracts 71.02 and 70.33

Table 3-8. Race and Poverty Characteristics

	Colorado	Arapahoe County	ROI [a]
Total Population	4,301,261	487,967	12,323
Percent White	82.8	79.9	82.3
Percent Black or African American	3.8	7.7	5.8
Percent American Indian, Eskimo, or Aleut	1.0	0.7	0.8
Percent Asian	2.2	3.9	3.6
Percent Native Hawaiian and Other Pacific Islander	0.1	0.1	0.1
Percent other	7.2	4.5	4.0
Percent reporting 2 or more races	2.8	3.2	3.5
Percent below poverty	6.2	4.2	3.1

Source: U.S. Census Bureau 2000

Note: [a] The percent of persons below poverty level in the ROI is the average of the two census tracts evaluated.

Colorado and Arapahoe County. According to U.S. Census Bureau 2000 information, 3.1 percent of the population in the ROI lives below the poverty level. The percentage of persons living below the poverty level in the ROI is lower than both Colorado (6.2 percent) and Arapahoe County (4.2 percent).

3.10.2 Impacts

Proposed Action

Socioeconomics. The Proposed Action at Buckley AFB would have negligible, short-term, direct and indirect, beneficial effects on economics and employment in the ROI. It is assumed that local construction crews and materials would be used for construction. The proposed construction of the new kennel facility has an estimated cost of $1.4 million which would not significantly impact employment levels or economic indicators in the ROI. These costs would not provide any long-term economic gains to the surrounding area but would provide short-term employment opportunities. No long-term effects are expected on socioeconomics under the Proposed Action.

The Proposed Action would have no effect on personal income, poverty levels, or other demographic employment indicators in the MSA.

Environmental Justice. The Proposed Action does not have the possibility to disproportionately affect low-income or minority residents. The construction footprint of the Proposed Action is small and would therefore have a minimal impact on the adjacent areas. The census tract that contains Buckley AFB and the tract directly adjacent to the installation do not have a disproportionately high percentage of minorities or low-income inhabitants. Therefore there is no potential for any short- or long-term adverse impacts from construction or operation activities on any low-income or minority populations.

Action Alternative A

Socioeconomics. Under this alternative the design and footprint of the kennel and associated support structures would be identical to that described for the Proposed Action. Therefore the impacts on socioeconomics under this alternative would be the same as under the Proposed Action.

Environmental Justice. Under this alternative the proposed kennel would have the same footprint as the Proposed Action and would affect the same census tracts as the Proposed Action. Therefore environmental justice effects from this alternative would be the same as the Proposed Action.

Action Alternative B

Socioeconomics. Under this alternative the design and footprint of the kennel and associated support structures would be identical to that described for the Proposed Action. Therefore the impacts on socioeconomics under this alternative would be the same as under the Proposed Action.

Environmental Justice. Under this alternative the proposed kennel would have the same footprint as the Proposed Action and would affect the same census tracts as the Proposed Action. Therefore environmental justice effects from this alternative would be the same as the Proposed Action.

No Action Alternative

Under the No Action Alternative, Buckley AFB would not implement the Proposed Action. The installation would continue use of its current kennel facility in an incompatible land use area. Kennel operations would continue under baseline conditions with the need for more trained canines to support daily antiterrorism training at Buckley AFB. There would be no effect on socioeconomics or environmental justice.

3.11 SUMMARY

Table 3-9 provides a summary comparison of the anticipated environmental effects of the Proposed Action, Action Alternatives, and the No Action Alternative.

Table 3-9. Comparison of Environmental Effects

Environmental Resource Area	Proposed Action	Alternative A	Alternative B	No Action Alternative
Land Use	Long-term, minor adverse	Long-term, negligible adverse	Long-term, minor to moderate adverse	Long-term, moderate adverse
Utilities	No effect	No effect	No effect	No effect
Air Quality	Short-term, minor adverse	Short-term, minor adverse	Short-term, minor adverse	Short-term, minor adverse
Noise	Short-term, negligible to moderate, adverse and long-term, negligible to moderate adverse	Short- and long-term, negligible to moderate, adverse	Short- and long-term, negligible to moderate, adverse	Long-term, minor to moderate adverse
Hazardous Materials/Waste	No effect	No effect	No effect	No effect
Safety	Short-term minor adverse and long-term minor beneficial	Short-term minor adverse and Long-term minor beneficial	Short-term minor adverse and Long-term minor beneficial	Long-term, minor to moderate, adverse
Geology	Short-term, negligible adverse	No effect to short-term, negligible adverse	No effect to short-term, negligible adverse	No effect
Water Resources	No effect on groundwater; short- and long-term, negligible adverse impacts on surface waters and floodplains	Long-term, minor adverse impacts on groundwater; short- and long-term, negligible, adverse impacts on surface waters and floodplains	Long-term, minor adverse impacts on groundwater; short- and long-term, negligible, adverse impacts on surface waters and floodplains	No effect
Biological Resources				
Vegetation	Long-term, minor beneficial	Short- and long-term, minor adverse	Short- and long-term, minor adverse	No effect
Wetlands	No effect	No effect	No effect	No effect

Table 3-9. Comparison of Environmental Effects (continued)

Environmental Resource Area	Proposed Action	Alternative A	Alternative B	No Action Alternative
Biological Resources (continued)				
Wildlife	Long-term, minor adverse	Short- and long-term, minor to moderate, adverse	Short- and long-term, minor to moderate, adverse	No effect
Threatened, Endangered, and Special Concern Species	Short- and long-term, negligible to moderate adverse	No effect	No effect	No effect
Socioeconomics and Environmental Justice	No effect to short-term, negligible, Beneficial	No effect to short-term, negligible, beneficial	No effect to short-term, negligible, beneficial	No effect

Table 3-10 provides a summary of the BMPs or the plans providing BMPS identified in this EA for each resource topic.

Table 3-10. BMPs or Plans Providing Applicable BMPs

Environmental Resource Area	BMPs or Plans Providing Applicable BMPs			
	Proposed Action	Alternative A	Alternative B	No Action
Land Use	None	None	None	None
Utilities	None	None	None	None
Air Quality	General fugitive dust BMPs (e.g., daily watering of construction site as needed)	General fugitive dust BMPs (e.g., daily watering of construction site as needed)	General fugitive dust BMPs (e.g., daily watering of construction site as needed)	None
Noise	Kennel design and use of noise-dampening materials in kennel and fence as needed	Kennel design and use of noise-dampening materials in kennel and fence as needed	Kennel design and use of noise-dampening materials in kennel and fence as needed	None

Table 3-10. BMPs or Plans Providing Applicable BMPs (continued)

Environmental Resource Area	BMPs or Plans Providing Applicable BMPs			
	Proposed Action	**Alternative A**	**Alternative B**	**No Action**
Hazardous Materials/Waste	Hazardous Waste Management Plan; Solid Waste Management Plan; Spill Prevention, Control and Countermeasure Plan	Hazardous Waste Management Plan; Solid Waste Management Plan; Spill Prevention, Control and Countermeasure Plan	Hazardous Waste Management Plan; Solid Waste Management Plan; Spill Prevention, Control and Countermeasure Plan	None
Safety	Contractor-established and -maintained safety programs per OSHA	Contractor-established and -maintained safety programs per OSHA	Contractor-established and -maintained safety programs per OSHA	None
Geology	Standard soil erosion and sediment retention BMPs; expansive soil BMPs for construction	Standard soil erosion and sediment retention BMPs; expansive soil BMPs for construction	Standard soil erosion and sediment retention BMPs; expansive soil BMPs for construction	None
Water Resources	CGP, SWPPP, MS4, SWMP, USAF ETL 03-01	CGP, SWPPP, MS4, SWMP, USAF ETL 03-01	CGP, SWPPP, MS4, SWMP, USAF ETL 03-01	None
Biological Resources				
Vegetation	Post-construction revegetation with native species	Post-construction revegetation with native species	Post-construction revegetation with native species	None
Wetlands	Soil erosion, sediment retention, and stormwater runoff BMPs	Soil erosion, sediment retention, and stormwater runoff BMPs	Soil erosion, sediment retention, and stormwater runoff BMPs	None
Wildlife	None	None	None	None
Threatened, Endangered, and Special Concern Species	Removal of prairie dogs; establishment of 150-ft buffer around burrowing owl nests	None	None	None
Socioeconomics and Environmental Justice	None	None	None	None

Table 3-11 summarizes required mitigation measures identified for each resource in this EA.

Table 3-11. Required Mitigation Measures

Environmental Resource Area	Mitigation			
	Proposed	**Alt. A**	**Alt. B**	**No Action**
Land Use	None	None	None	None
Utilities	None	None	None	None
Air Quality	None	None	None	None
Noise	None	None	None	None
Hazardous Materials/Waste	None	None	None	None
Safety	None	None	None	None
Geology	None	None	None	None
Water Resources	None	None	None	None
Biological Resources				
Vegetation	None	None	None	None
Wetlands	None	None	None	None
Wildlife	None	None	None	None
Threatened, Endangered, and Special Concern Species	None	None	None	None
Socioeconomics and Environmental Justice	None	None	None	None

Conclusion. The current MWD kennel location is no longer in a compatible land use area. Incompatible features of the current location (i.e., the No Action Alternative) include impacts of kennel noise on surrounding (current and future) residential complexes, proximity of MWDs to children and to youth-oriented activities and the associated safety risks thereof, and the impacts of increased noise levels on MWD training and effectiveness.

The noise environment relative to MWD training and effectiveness might not be substantially improved by relocation to the Proposed Action site. However, the noise environment at the Proposed Action site is not anticipated to be any worse than at the current location. Careful design of the new kennel facility, and incorporation of noise-attenuating materials in critical structures (e.g., the kennel and fences around training and exercise areas) would effectively reduce the noise environment below that anticipated at the current location.

The impacts of kennel noise on the closest residential areas to the Proposed Action site would be substantially less than such at the current location. Furthermore, the safety risks associated with having MWDs in close proximity to residential complexes, children, and youth-oriented activities are effectively eliminated by relocation to the Proposed Action site. While the Action Alternatives would also address these needs, the lack of utilities at these sites and the prohibitive cost of installing such utilities with this project, precludes the viability of these alternatives. Finally, due to the lack of utilities at these sites, they do not meet Selection Criterion #3: Kennel location is supplied by necessary infrastructure per AR 190-

12. Therefore, the Proposed Action provides the most efficient and effective solution to addressing the purpose and need as described in Section 1.

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4. CUMULATIVE IMPACTS

Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

4.1 IMPACT ANALYSIS

Other projects evaluated in the cumulative impacts analysis include planned or reasonably foreseeable projects both on-installation and off-installation. Planned or reasonably foreseeable projects were identified through a review of public documents and coordination with multiple agencies, and include both on- and off-installation activities.

Off-Installation Activities. The land adjacent to Buckley AFB is split between developed, agricultural, and grassland conservation areas. The city of Aurora's 2003 Comprehensive Plan identifies three planning areas near the installation, each of which has its own identity and planned development pattern.

Colfax Corridor East of I-225. This area occurs adjacent to the northern boundary of Buckley AFB. The properties along Colfax Avenue tend to include older commercial uses, while many are vacant. The Northeast Colfax Area also includes the neighborhoods that are north and south of the corridor.

Strategies for development in this area include

- Working to enhance open-space corridors through additional dedications or other means; confining nonresidential uses to the corridor and to the planned industrial areas with the exception of neighborhood commercial or neighborhood institutional uses
- Locating multifamily and attached housing in appropriate areas, including those adjacent to major streets, similar existing housing types, and other properties in the corridor
- Promoting infill development in residential neighborhoods, maintaining the overall average residential density close to the current benchmarks
- Encouraging and supporting the consolidation of parcels in the corridor to allow well-planned businesses or mixed-use projects.

There are no known developments that would occur in this strategic area at this time.

I-225 Corridor and City Center Strategic Area. This area is to the west of Buckley AFB and is associated with I-225 and the Aurora City Center. The I-225 corridor is the geographic center of the city of Aurora and on the east side of the highway, the Aurora Mall, Aurora City Place, and Abilene power corridors compose a regional retail location. Midway in the corridor lies the Aurora City Center, historically planned as the city's "downtown."

Strategies for development in this area include

- Continuing to work for transportation improvements including improvements to interchanges and Park-n-Ride locations
- Developing a strategy to encourage adaptive reuse of empty big box retail buildings
- Encouraging additional retail and medical-related office development in the corridor
- Working to expand the restaurant node at Iliff Avenue.

Important development associated with the City Center includes the Aurora Municipal Center (complete), Arapahoe County administrative annex (complete), new ADT company office building, a 355-unit townhouse and elevator apartment complex (The Village), a 225-residential unit project (The Retreat at City Center), and a revitalization of the Aurora Mall. In addition, the Regional Transportation District purchased property for development of a new bus transfer facility at the City Center. A light rail station could be constructed in the future. Finally, a much smaller single family housing development comprising 36.5 acres is under construction approximately 0.5 mile west of Buckley AFB (Aurora 2003, Aurora 2006).

E470 Corridor Strategic Area. This area is adjacent to the eastern and extreme southern boundary of the installation and includes the prairie areas east of the developed portion of the city where development is expected through 2020. The major feature of this area is the E470 corridor from Denver International Airport (DIA) in the north to Douglas County in the south. E470 is a major interstate running north-south near the eastern boundary of Buckley AFB. The 1999 completion of the E470 segment serving the Buckley AFB area, and the subsequent Jewell Avenue Extension, provides the installation with major highways on both its east and west sides with access to both the north and south gates. The E470 toll road also provides a major regional beltway connecting the northern and southern limits of the metropolitan area and linking DIA with the I-25 corridor, opening significant amounts of vacant land for development.

The City of Aurora E-470 Corridor Land Use Study identifies regional activity centers and the following theme areas within the corridor (Aurora 2003):

- Airport Corporate
- Airport Commercial/Distribution
- Regional Retail/Commercial
- Light Industrial/Flex Office
- Buckley Research and Development
- Residential
- Regional Park and Open Space
- Recreation/Entertainment.

Strategies for development in the E-470 Corridor Strategic Area include locating a major office park, retail centers, and airport-related activities in the corridor and working with the counties to ensure that critical, undeveloped enclaves of land in the corridor are annexed into Aurora.

Planned land use for the entire area abutting the eastern boundary of Buckley AFB is to incorporate the Buckley Research and Development theme. Small-scale office development is allowed to complement the Research and Development land use, and limited industrial and commercial services are permitted. Regionally, a residential development comprising 435 acres is currently under construction within 0.5

mile of the southern limits of Buckley AFB. Just east of this development, a 490-acre residential development is also under construction (Aurora 2003).

On-Installation Activities. Buckley AFB has in place a General Plan (BAFB 2003), one chapter of which is dedicated to land use planning to guide current and future development. Land use planning at Buckley AFB follows a rational and sequential decisionmaking process to reach a consensus for future growth while ensuring the efficient and compatible use of available land. The General Plan establishes long-range goals and provides starting points to discuss land acquisition or disposal actions and siting of new facilities. This plan helps to define the best layout of land uses and transportation corridors to support functional effectiveness, efficiency, and compatibility. Both on- and off-installation factors are considered. The General Plan would guide infill development on currently vacant land, functional consolidation, and redesignation of land uses to accommodate doubling of the installation's current population (BAFB 2003).

There are a number of recent, current, and planned Capital Improvement Projects to support Buckley AFB's continuing transition from an ANGB to an AFB and to facilitate future growth (Table 4-1). As the prioritization, initiation, and completion of construction projects are dynamic, Table 4-1 represents the current schedule at the time of this EA; scope, priority, and schedule of individual projects could change.

Table 4-1. Recent, Current, and Planned Capital Improvement Projects

Fiscal Year	Projects	Project Footprint (ft2) [a]
02	BX/Commissary (completed)	200,152
02	Dormitory II (144 person)	54,250
02	Fitness Center (completed)	54,500
02	Military Family housing = 71 acres total land (e.g., for houses, landscaping, roads)	712,298
02	Telluride Gate (completed)	120
03	460 ABW Headquarters	51,066
03	ADAL SBIRS Mission Control (under construction)	18,000
03	Child Development Center 4-room Addition (Bldg 725)	743
03	Control Tower (COANG)	5,800
03	Demolish Building 25 (demolished)	NA
03	Engine Shop Addition Bldg 960 (COANG)	2,000
03	Entomology (O&M) Replace Entomology Shop	2,255
03	Fire Station Addition	21,531
03	Golf Driving Range	12
03	H-70 Fuel Storage Facility (O&M)	1,045
03	New northern runway extension (COANG)	37,500
03	Repair Runway, Taxiways, Ramps (COANG)	1,950,000
03	Two Pavilions at Williams Lake	60
03	Two Warehouses - Civil Engineering	10,000

Table 4-1. Recent, Current, and Planned Capital Improvement Projects (continued)

Fiscal Year	Projects	Project Footprint (ft^2) [a]
04	ADD/Alter Access Roads (Airfield) (COANG)	443,520
04	Approach Lighting (COANG)	672
04	Civil Engineering Complex (COANG)	37,350
04	Demolish Entomology Facility (306)	1,160
04	Demolish Hydrazine Bldg (310)	820
04	Demolish Radio Relay Bldg (1620)	1,600
04	Fire Training Facility - Originally 08	44,512
04	Headquarters	51,066
04	Impound Lot (asphalt paved)	8,000
04	New East Gate (estimate based on existing structure at Peterson AFB)	128
04	New Visitor Center (estimate based on existing structure at Peterson AFB)	525
04	Repair Parking Lot East of Bldg 471	316,798
04	Repair Parking Lots ANG wide (COANG)	144,000
04	Upgrade Base Infrastructure, Ph III	NA
05	Vail Street Improvements	91,200
05	Army Aviation Support Facility (COARNG)	120,000
05	Athletic Fields (two ball fields, 1 track, and 1 football field)	Fence 3,600 meters
05	CDCII Preschool Playground	8,800
05	CDCII Pretoddler Playground	5,225
05	CDCII Toddler Playground	6,450
05	Chapel Center	26,081
05	Child Development Center CDCII	24,197
05	Demolish Building 902	4,428
05	Demolish Electrical Shop (1631)	3,025
05	Demolish Marine Area Foundations	NA
05	Demolish Reserve Forces Bldg (1632)	600
05	Medical Clinic ADAL	4,563
05	Medical Warehouse	NA
05	Repair Taxiways A&K	NA
06	Athletic Fields Concession (NAF)	1,399
06	BITC Mailroom	NA
06	Car Wash (AAFES) – 06 MILCON project	2,000

Table 4-1. Recent, Current, and Planned Capital Improvement Projects (continued)

Fiscal Year	Projects	Project Footprint (ft^2) [a]
06	Communications Center (ADAL 730) - Originally 05 – moved to 07	60,988
06	Consolidated Services Facility Admin	15,145
06	Demolish Warehouse (1011/1012)	22,949
06	Haz Materials Storage (Env. Level 1) HAZMART Pharmacy Construction initiated in 06	5,457
06	Haz Waste Facility (Env. Level 1) Construction initiated in 06	1,615
06	Leadership Development Center	17,631
06	Outdoor Rec Equip Rental (NAF) Originally 05, contract still not awarded.	9,288
06	Permanent Alert Shelters (COANG) FY08 - request congressional add for FY06 (Origiinally 05)	41,400
06	Youth Center (NAF) 06 MILCON project	28,586
07	Military Working Dog Kennel	5,205
07	-POL Ops Building	2,745
07	-Pump house	1,001
07	-Storage Pol Bulk Ops Building	452
07	Consolidated Fuels Includes Demo of existing structures, construction of POL Ops Bldg, Pump House, and Storage POL Bulk Ops Bldg - are all listed separately in this table) NOTE: 06 Construction Project, proposed NTP is Jan 07; therefore, considering 07 project.	4,198
07	Construct FE Maintenance Facility	NA
07	Demolish Building 940	14,758
07	Demolish Building 950	20,303
07	Demolish Crash House (1606)	8,327
07	Demolish Engine Test Pad	2,045
07	Demolish Fuel Storage (200)	1,576
07	Demolish Fuel Tanker Stands	NA
07	Demolish Fuels Admin (302)	1,185
07	Demolish Fuels Lab (300)	1,503
07	Permanent Alert Crew Qtrs (COANG) - States Alert Facility	6,500
07	Replace Squadron Operations Facility	NA
07	Temporary Lodging Facility (NAF) - Originally 03	NA
07	Visitors Quarters	38,000
07	Widen 6th Avenue (DAR Project) - was 08	3 Lanes
08	Demolish Bulding 341 (Part of consolidated fuels)	216
08	FAMCAMP - Originally 07	Tent Sites 10 each

Table 4-1. Recent, Current, and Planned Capital Improvement Projects (continued)

Fiscal Year	Projects	Project Footprint (ft^2) [a]
08	NSA/CSS	NA
08	Pharmacy	6,000
08	Taxiway and Arm/Disarm (COANG) Includes Demoliton of existing parking apron and portion of Sunlight Road and taxiways F, W, X, and Y. Originally 08	877,500
08	Vehicle Maintenance Facility - Originally 07	19,504
09	Demolish Building 31	204
09	Entry Control Facility (was 08)	NA
09	Logistics Readiness Complex - Originally 06, now states in clear zone	12,917
09	RV Storage Lot	NA
10	Arts, Crafts, Auto Skills Development Ctr	11,119
10	Bowling Center and Community Activities (Peterson)	19,999
10	Education Center/Library - Originally 07	22,012
10	Fire Station Additon (crash house) – 2 Originally 09 – requesting FY 07. Joint ANG/AF	10,600
10	Fitness Center Addition (estimate based on existing swimming pool at Peterson AFB) Originally 09	12,652
10	SF Operations Facility – was 06, then 07	26,910
11	6^{th} Ave Entry Gate	NA
11	Consolidated Base Warehouse - Originally 08	100,029
11	Construct Admin Facility (ADF)	NA
11	SBIRS Remote Ground Station	NA
11	Small Arms Range Outdoor Arm Range – now indoor with outdoor grenade launcher (originally 06)	6,512
11	Upgrade Based Infrastructure Ph IV - Originally 09	NA
11	Weapons Loading Facility (COANG) - Originally 09 – requesting 08	7,400
11	Youth Athletic Fields	NA
12+	Weapons Release Complex (COANG) - Originally 09 – requesting 09	6,000
12+	ADAL Weapons Release Complex (COANG)	NA
12+	Airmen Dining Facility	NA
12+	East Parking Apron	NA
12+	Mississippi Entry Gate	NA
12+	Spaced Based Infrared (SBIR) Operational Support Facility - Originally 09.	NA
12+	Telluride Entry Gate	NA

Table 4-1. Recent, Current, and Planned Capital Improvement Projects (continued)

Fiscal Year	Projects	Project Footprint (ft^2) [a]
TBD	Expand Bldg 700 (COANG)	NA
TBD	Golf Course	NA
TBD	Reroute Steamboat Ave	NA

Source: BAFB 2006b.

Notes: [a] Project footprint does not include disturbance due to construction, such as laydown areas, and generally does not include parking lots.

NA = Not Available

Cumulative effects were evaluated based on calculations incorporating data from projects occurring since 2002, current projects, and projects planned out to 2012, and are tiered from the Capital Improvement Projects EA (BAFB 2006c). Summary tables for these calculations, which are updated and current at the time of this EA, are provided in Appendix E.

Table 4-2 presents potential cumulative effects on resources from the Proposed Action, when combined with other past, present, and future activities.

Table 4-2. Cumulative Effects on Resources

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Land Use	Development of Aurora and Buckley AFB has extensively modified land use.	Military installation, commercial, residential, light industrial land uses.	No change in overall land use.	Expansion of Aurora east of Buckley AFB.	Proposed Action would have short- and long-term, negligible to minor adverse impact on further development on or around Buckley AFB.
Utilities	Buckley AFB has recognized the need to upgrade the potable water, electric, natural gas, and sanitary networks.	All required utilities are currently available to the Proposed Action site.	Operation of the new kennel facility would not significantly increase demand on utitilies.	Continued development of Buckley AFB and Aurora would result in a continued increase in utility demands.	Negligible short- to long-term, adverse impacts on utilities are anticipated from the Proposed Action.

Table 4-2. Cumulative Effects on Resources (continued)

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Air Quality	Region was in non-attainment for CO, O_3 (1-hour standard), and PM_{10}. Currently in attainment/maintenance for CO and deferred (early action compact) for O_3 (8 hour standard).	Emissions from aircraft, vehicles, buildings.	Potential dust generation during soil removal, site grading and construction, and increased vehicle travel.	Growth at Buckley AFB and Aurora anticipated to result in increased traffic and emissions.	Proposed Action would make short-term, negligible to minor, contributions to cumulative adverse impacts on air quality
Noise	Aircraft activities have been dominant noise source.	Aircraft activities are dominant noise source.	Short-term noise from construction activities.	Installation growth will result in increased traffic and noise.	Proposed Action would contribute negligible adverse, short-and long-term, impacts as aircraft activities would be dominant noise source.
Hazardous Waste/Materials	Past activities on installation including demolition and burial of ACMs and other hazardous substances has resulted in contamination of some sites.	ERP site near the Proposed Action is currently undergoing full delineation.	Geotechnical survey at Proposed Action site revealed no evidence of hazardous wastes or materials.	Continued development of Buckley AFB would incur use or generation of hazardous materials and wastes.	Negligible, short- and long-term, adverse effect since all hazardous materials and wastes used or generated during project implementation would be used and disposed of according to all applicable regulations.
Safety	Past assessments have identified the need for MWDs to augment AT/FP efforts.	Area around current kennel is being developed for housing, putting MWDs and people at risk.	Proposed Action addresses safety concerns for people and MWDs.	Proximity of future Army Aircraft Maintenance Facility and high-speed taxiway could impact MWD ability to perform AT/FP functions.	Short-term, negligible, adverse impacts due to construction risks. Long-term minor to moderate beneficial impacts on safety due to movement of MWDs away from residential area.

Table 4-2. Cumulative Effects on Resources (continued)

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Geological Resources	Past urban and Buckley AFB development has modified soils.	Current development activities continue to alter soils.	Grading, excavating, and recontouring would result in further soil disturbance.	Continued development on Buckley AFB would locally impact soils.	Permanent but localized effects of the Proposed Action would contribute only negligibly to cumulative impacts.
Water Resources	Surface water quality moderately impacted by development.	Surface water quality moderately impacted by development.	Potential increase in sedimentation from construction would be ameliorated through use of BMPs. Insignificant increase in area of impervious surfaces.	Continued development of Buckley AFB would result in sedimentation from construction activities, and further increase in impervious surface area.	Increased impervious surface area would have long-term, minor, adverse impacts on storm water discharges and water quality.
Biological Resources	Degraded historic habitat of sensitive and common species.	Buckley AFB and Aurora operations and development impact plants and animals.	Negligible disturbance of vegetation by construction. Permanent loss of black-tailed prairie dog habitat.	Continued development of Buckley AFB would impact biological resources.	Permanent, negligible to minor loss of weedy vegetation (beneficial impact), low-quality habitat, and black-tailed prairie dog habitat (adverse impacts).
Socioeconomics and Environmental Justice	Installation contributes to local economic community.	Continued support of local economic community.	Negligible contribution to local construction industry.	Continued development of Buckley AFB would impact local economy and services.	Negligible, short-term stimulation of local economy through use of local laborers and materials during construction.

As presented in Table 4-2, cumulative impacts of the Proposed Action on resources within the ROI include short- and long-term, adverse impacts that range from negligible to minor in intensity. The primary reasons for the limited adverse impacts of the Proposed Action are the relatively small size of the proposed facility, the nature of the proposed facility (e.g., relatively low generation of hazardous wastes), and the location of the Proposed Action in an area that is previously disturbed. As also presented in Table 4-2, the Proposed Action is anticipated to have short- to long-term, negligible to moderate, beneficial impacts on resources such as safety and the local economy.

4.2 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

Geological Resources. Under the Proposed Action, construction activities, such as grading, excavating, and recontouring of the soil, would result in soil disturbance. Implementation of BMPs during construction would limit potential effects resulting from construction activities. Standard erosion-control means would also reduce potential impacts related to these characteristics. Although unavoidable, impacts on soils at the installation are not considered significant.

Hazardous Materials and Wastes. The use of hazardous materials and generation of hazardous wastes are unavoidable conditions associated with the Proposed Action. However, the anticipated increase in the use of hazardous materials and generation of hazardous wastes would not be substantially higher than current usage and generation and, therefore, is not considered significant.

Energy. The use of nonrenewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action, Action Alternatives, or the No Action Alternative.

4.3 COMPATIBILITY OF THE PROPOSED ACTION AND ALTERNATIVES WITH THE OBJECTIVES OF FEDERAL, REGIONAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS

Impacts on the ground surface as a result of the Proposed Action would occur entirely within the boundaries of Buckley AFB. Construction of the new MWD kennel facility would not result in any incompatible land uses on or off installation. The proposed location of the kennel facility was selected according to existing land use zones. Consequently, construction of the new MWD kennel facility would not conflict with installation land use policies or objectives. The Proposed Action would not conflict with any applicable off-installation land use ordinances or designated clear zones.

4.4 RELATIONSHIP BETWEEN THE SHORT-TERM USE OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

Short-term uses of the biophysical components of the human environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of the human environment include those impacts that occur over a period of more than 5 years, including permanent resource loss.

Several kinds of activities could result in short-term resource uses that compromise long-term productivity. Filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The Proposed Action would not result in a significant intensification of land use at Buckley AFB and in the surrounding area. The Proposed Action does not represent a significant loss of open space. Therefore, it is anticipated that the Proposed Action would not result in any cumulative land use or aesthetic impacts. Long-term productivity of this site would be increased by the development of the Proposed Action.

4.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of material, energy, land, biological, and human resources. The use of these resources is considered to be permanent. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources would have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame (e.g., energy and minerals). Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the Proposed Action.

Material Resources. Material resources irretrievably utilized for the Proposed Action include building materials (for construction of the facility), concrete and asphalt (for access road and parking lot), and various material supplies (for infrastructure). Such materials are not in short supply, would not limit other unrelated construction activities, and their irretrievable use would not be considered significant.

Energy Resources. Energy resources utilized for the Proposed Action would be irreversibly lost. These include petroleum-based products (such as gasoline and diesel), natural gas, and electricity. During construction, gasoline and diesel would be used for the operation of construction vehicles. During operation, gasoline would be used for the operation of private and government-owned vehicles. Natural gas and electricity would be used by operational activities. Consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, no significant impacts would be expected.

Biological Resources. The Proposed Action, due to its location on a previously disturbed site, would result in minimal, irretrievable loss of vegetation and wildlife habitat on the proposed construction site.

Human Resources. The use of human resources for construction and operation is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities, and is considered beneficial.

Floodplains. The Proposed Action would have no impact on the 100-year floodplain.

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5. LIST OF PREPARERS

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Buckley AFB, 460 CES/CEV

CPT Amanda Coenen, OIC USAFA VTF, RMDVC, Fort Carson Branch
Floyd Hatch, Natural Resources Manager
Jeff Harder, Ground Safety Manager, 460 SW/SE,
Jeff Lindquist, Attorney-Advisor, 460 SW/JA
Elizabeth Meyer, NEPA Compliance Program Manager
Corwin Oldweiler, Water Program Contractor Support
Elise Sherva, Air/Tanks Program Manager
John Spann, Chief Public Affairs, 460 SW/PA
CPT Daniel Sweeney, OIC BioEnvironmental

6. REFERENCES

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APPENDIX A

AIR FORCE FORM (AF) 813, REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS

REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS

Report Control Symbol RCS: A680

INSTRUCTIONS: *Section I to be completed by Proponent; Sections II and III to be completed by Environmental Planning Function. Continue on separate sheets as necessary. Reference appropriate item number(s).*

SECTION I - PROPONENT INFORMATION

1. TO *(Environmental Planning Function)*	2. FROM *(Proponent organization and functional address symbol)*	2a. TELEPHONE NO.
460CES/CEVP	460CES/CEC	7-9261

3. TITLE OF PROPOSED ACTION

Construct Military Working Dog Kennel

4. PURPOSE AND NEED FOR ACTION *(Identify decision to be made and need date)*

Relocate MWD Kennel from Building 210 to the east side of Building 1520 within the ground of the old army training area. The current MWD Kennel is adjacent to the New family housing and youth ballfields and must be moved.

5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES *(DOPAA) (Provide sufficient details for evaluation of the total action.)*

See attached 1391.

6. PROPONENT APPROVAL *(Name and Grade)*	6a. SIGNATURE	6b. DATE
Richard B. Thoms	Richard B Thoms	5/24/06

SECTION II - PRELIMINARY ENVIRONMENTAL SURVEY.

(Check appropriate box and describe potential environmental effects including cumulative effects.) (+ = positive effect; 0 = no effect; - = adverse effect; U= unknown effect)

	+	0	-	U
7. AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE *(Noise, accident potential, encroachment, etc.)*	☐	☑	☐	☐
8. AIR QUALITY *(Emissions, attainment status, state implementation plan, etc.)*	☐	☑	☐	☐
9. WATER RESOURCES *(Quality, quantity, source, etc.)*	☐	☑	☐	☐
10. SAFETY AND OCCUPATIONAL HEALTH *(Asbestos/radiation/chemical exposure, explosives safety quantity-distance, bird/wildlife aircraft hazard, etc.)*	☐	☑	☐	☐
11. HAZARDOUS MATERIALS/WASTE *(Use/storage/generation, solid waste, etc.)*	☐	☑	☐	☐
12. BIOLOGICAL RESOURCES *(Wetlands/floodplains, threatened or endangered species, etc.)* loss of habitat	☐	☐	☑	☐
13. CULTURAL RESOURCES *(Native American burial sites, archaeological, historical, etc.)*	☐	☑	☐	☐
14. GEOLOGY AND SOILS *(Topography, minerals, geothermal, Installation Restoration Program, seismicity, etc.)*	☐	☑	☐	☐
15. SOCIOECONOMIC *(Employment/population projections, school and local fiscal impacts, etc.)*	☑	☐	☐	☐
16. OTHER *(Potential impacts not addressed above.)*	☐	☐	☐	☐

SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION

17. ☐ PROPOSED ACTION QUALIFIES FOR CATEGORICAL EXCLUSION (CATEX) # _____ ; OR

☒ PROPOSED ACTION DOES NOT QUALIFY FOR A CATEX; FURTHER ENVIRONMENTAL ANALYSIS IS REQUIRED.

18. REMARKS

19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION *(Name and Grade)*	19a. SIGNATURE	19b. DATE
Janet L. Wade GS-13	Janet L Wade	24 May 06

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APPENDIX B

NOTICE OF AVAILABILITY AND AFFIDAVIT OF PUBLICATION

Notice of Availability for Relocation and Construction of a Military Working Dog Kennel at Buckley AFB

Interested parties are hereby notified that Buckley Air Force Base (AFB) has prepared a Draft Environmental Assessment (EA) and a Draft Finding of No Significant Impact (FONSI) for the proposed relocation and construction of a Military Working Dog (MWD) Kennel.

Statutory Authority. This notice is being issued to interested parties in accordance with the National Environmental Policy Act (Public Law [P.L.] 91-190, 42 United States Code 4321 et seq.) as amended in 1975 by P.L. 94-52 and P.L. 94-83.

Purpose. The purpose of and need for the Proposed Action is to construct a new MWD kennel in a compatible land use environment to promote the safety and mission of the MWDs while protecting the safety of base personnel and visitors.

Proposed Action. Under the Proposed Action, the new MWD Kennel would be constructed on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel would include a 4,306-square foot (sq.ft.) kennel building, a 900-sq.ft. garage, a 323-sq.ft. warehouse, and a 26,256-sq.ft. MWD training/obedience area. Total land disturbance for construction is estimated at 1.48 acres.

Alternatives. There are two alternative locations for the new MWD kennel; near the future small arms range and in the vicinity of the fire training area. The footprint of the kennel would be the same under either the Proposed Action or the two alternatives.
Under the No Action Alternative, the MWD kennel would remain in its current location.

Comments. Comments on the Draft EA and Draft FONSI should be directed to Elizabeth Meyer, 460 CES/CEVP, 660 S. Aspen Street (Stop 86), Bldg. 1005, Room 178, Buckley AFB, Colorado 80011-9551; 720-847-7245. The comment period is open for 15 days following the publication of this notice in a general circulation newspaper. Copies of the Draft EA and Draft FONSI are available for review by the public at the Aurora Central Library, 14949 E. Alameda Parkway, Aurora, Colorado 80012; Denver Public Library, Government Documents Section, 10 West 14th Avenue, Denver, Colorado 80204; and the Boulder Public Library, 1000 Canyon Blvd., Boulder, Colorado 80302. Copies can also be obtained by writing to Buckley AFB at the address provided above.

THE Denver Newspaper Agency
DENVER, CO

PUBLISHER'S AFFIDAVIT

City and County of Denver,
STATE OF COLORADO, SS.

Mary Coulter

..... **being of lawful age and being first duly sworn upon oath, deposes and says:**

Legal Advertising Reviewer

That he/she is the .....

Of The Denver Newspaper Agency, publisher of the Denver Post and Rocky Mountain News, daily newspapers of general Circulation published and printed in whole or in part in Denver, in the County of Denver and State of Colorado, and that said newspaper was Prior to and during all the time hereinafter mentioned duly qualified For the publication of legal notices and advertisements within the Meaning of an Act of the General Assembly of the State of Colorado, Approved April 7, 1921, as amended and approved March 30, 1923; And as amended and approved March 5, 1935, entitled "An Act Concerning Legal Notices, Advertisements and Publications and the Fees of printers and publishers thereof, and to repeal all acts and parts Of acts in conflict with the provision of this Act" and amendments Thereto:

That the notice, of which the annexed is a true copy, was published in The said newspaper to wit: (dates of publication)

November 5, 2006

Mary Coulter

Signature

Subscribed and sworn to before me this 6 **day**

Of . . . November . . . A.D. 2006.

Susan Sloan

Notary Public.

My commission expires 8/15/10

SUSAN SLOAN NOTARY PUBLIC STATE OF COLORADO

Notice of Availability for Relocation and Construction of a Military Working Dog Kennel at Buckley AFB

Interested parties are hereby notified that Buckley Air Force Base (AFB) has prepared a Draft Environmental Assessment (EA) and a Draft Finding of No Significant Impact (FONSI) for the proposed relocation and construction of a Military Working Dog (MWD) Kennel.

Statutory Authority. This notice is being issued to interested parties in accordance with the National Environmental Policy Act (Public Law (P.L.) 91-190, 42 United States Code 4321 et seq.) as amended in 1975 by P.L. 94-52 and P.L. 94-83.

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Comments. Comments on the Draft EA and Draft FONSI should be directed to Elizabeth Meyer, 460 CES/CEVP, 660 S. Aspen Street (Stop 86), Bldg. 1005, Room 178, Buckley AFB, Colorado 80011-9551; 720-847-7245. The comment period is open for 15 days following the publication of this notice in a general circulation newspaper. Copies of the Draft EA and Draft FONSI are available for review by the public at the Aurora Central Library, 14949 E. Alameda Parkway, Aurora, Colorado 80012; Denver Public Library, Government Documents Section, 10 West 14th Avenue, Denver, Colorado 80204; and the Boulder Public Library, 1000 Canyon Blvd., Boulder, Colorado 80302. Copies can also be obtained by writing to Buckley AFB at the address provided above.

AURORA SENTINEL
PROOF OF PUBLICATION

STATE OF COLORADO
COUNTY OF ARAPAHOE)ss.

I HARRISON COCHRAN, do solemnly swear that I am the PUBLISHER of the AURORA SENTINEL; that the same is a weekly newspaper published in the County of Arapahoe, State of Colorado and has a general circulation therein; that said newspaper has been published continuously and uninterruptedly in said County of Arapahoe for a period of more than fifty-two consecutive weeks prior to the first publication of the annexed legal notice or advertisement; that said newspaper has been admitted to the United States mails as second-class matter under the provisions of the Act of March 30, 1923, entitled "Legal Notices and Advertisements", or any amendments thereof, and that said newspaper is a weekly newspaper duly qualified for publishing legal notices and advertisements within the meaning of the laws of the State of Colorado.

That the annexed legal notice or advertisement was published in the regular and entire issue of every number of said weekly newspaper for the period of 1 consecutive insertions; and that the first publication of said notice was in the issue of said newspaper dated November 9 A.D. 2006 and that the last publication of said notice was in the issue of said newspaper dated November 9 A.D. 2006.

In witness whereof I have hereunto set my hand this 9 day of November.

H. Harrison Cochran

Subscribed and sworn before me, a notary public in the County of Arapahoe, State of Colorado, this 9th day of November A.D. 2006.

NOTARY PUBLIC STATE OF COLORADO

Notary Public
My Commission expires November 26 2009

Notice of Availability for Relocation and Construction of a Military Working Dog Kennel at Buckley AFB

Interested parties are hereby notified that Buckley Air Force Base (AFB) has prepared a Draft Environmental Assessment (EA) and a Draft Finding of No Significant Impact (FONSI) for the proposed relocation and construction of a Military Working Dog (MWD) kennel.

Statutory Authority. This notice is being issued to interested parties in accordance with the National Environmental Policy Act (Public Law (PL) 91-190, 42 United States Code 4321 et seq.) as amended in 1975 by P.L. 94-52 and P.L. 94-83.

Purpose. The purpose of and need for the Proposed Action is to construct a new MWD kenne) in a compatible land use environment to promote the safety and mission of the MWDs while protecting the safety of base personnel and visitors.

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Comments. Comments on the Draft EA and Draft FONSI should be directed to Elizabeth Meyer, 460 CES/CEVP, 660 S. Aspen Street (Stop 86), Bldg. 1005, Room 178, Buckley AFB, Colorado 80011-9551; 720-847-7245. The comment period is open for 15 days following the publication of this notice in a general circulation newspaper. Copies of the Draft EA and Draft FONSI are available for review by the public at the Aurora Central Library, 14949 E. Alameda Parkway, Aurora, Colorado 80012; Denver Public Library, Government Documents Section, 10 West 14th Avenue, Denver, Colorado 80204; and the Boulder Public Library, 1000 Canyon Blvd., Boulder, Colorado 80302. Copies can also be obtained by writing to Buckley AFB at the address provided above.

Publication: November 9, 2006
Aurora Sentinel

APPENDIX C

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP) MATERIALS

DISTRIBUTION LIST AND AGENCIES AND INDIVIDUALS CONTACTED

Mr. Dan Beley
Colorado Dept. of Public Health & Environment
Water Quality Control Division
WQCD-OQ-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Mr. Brent Bibles
Wildlife Researcher
Colorado Division of Wildlife
Wildlife Research Center
317 W. Prospect Road
Fort Collins, CO 80526

Mr. Mac Callison
City of Aurora
Planning, Traffic Division
1515 E. Alameda
Aurora, CO 80012

Ms. Nancy Chick
Colorado Dept. of Public Health & Environment
Air Pollution Control Division
APCD-TS-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Ms. Georgianna Contiguglia
State Historic Preservation Officer
Colorado History Museum
1300 Broadway
Denver, CO 80203-2137

Mr. John Fernandez
City of Aurora
Planning, Environmental Division
15151 E. Alameda
Aurora, CO 80012

Ms. Jane Hann
Environmental Project Manager
Colorado Dept. of Transportation
4201 East Arkansas Avenue
Denver, CO 80222

Ms. Cynthia Holdeman
Government Publications
Denver Public Library
10 W. Fourteenth Ave. Pkwy.
Denver, CO 80204-2731

Mr. Eugene Jansak
Industrial Waste Specialist
Metro Wastewater Reclamation Dist.
6450 York Street
Denver, CO 80229-7499

Mr. Ed LaRock
Colorado Dept. of Public Health & Environment
Federal Facilities
HMWM 2800
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Ms. Patricia Mehlhop
US Fish & Wildlife Service
134 Union Blvd., Suite 645
Lakewood, CO 80228-1807

Ms. Eliza Moore
Wildlife Manager
Colorado Division of Wildlife
6060 South Broadway
Denver, CO 80216

Mr. Jim Paulmeno
Manager, Environmental Planning
Colorado Dept. of Transportation
4201 East Arkansas Avenue
Denver, CO 80222

Mr. David Rathke
US Environmental Protection Agency
Region 8
999 18th Street, Suite 500
Denver, CO 80202

Mr. Bruce Rosenlund
Colorado Field Supervisor
US Fish & Wildlife Service
134 Union Blvd., Suite 675
Lakewood, CO 80228-1807

Ms. Gina Sciosca
Boulder Public Library
1000 Canyon Blvd.
Boulder, CO 80302

Mr. Larry Svoboda
NEPA Unit Chief
US Environmental Protection Agency
Region 8
999 18th Street, Suite 500
Denver, CO 80202

Mr. Robert Watkins
Director of Planning
City of Aurora
15151 E. Alameda
Aurora, CO 80012

Ms. Bette Yager
Central Library Reference Supervisor
Aurora Public Library
Administrative Offices
14949 E. Alameda Pkwy.
Aurora, CO 80012

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OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Bette Yager
Central Library Reference Supervisor
Aurora Public Library
Administrative Offices
14949 E. Alameda Pkwy
Aurora, CO 80012

Dear Ms. Yager,

The Air Force is pleased to provide the Aurora Public Library a review copy of the Draft Environmental Assessment of the Relocation and Construction of a Military Working Dog (MWD) Kennel, Buckley Air Force Base, Colorado. We appreciate the Aurora Public Library's contribution in making this document available to the public for review and comment.

Public reviewers are asked to submit written comments (referencing Section, page and line numbers to which comments apply) to the following address:

Ms. Elizabeth Meyer
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80011-9551
e-mail: Elizabeth.meyer@buckley.af.mil.

The public comment period for this EA is 15 days. Public reviewers are asked to submit any written comments by 5pm on Friday, 25 November 2006.

If you have any questions please feel free to contact me at 720-847-7245, or via e-mail: Bruce.James@buckley.af.mil.

BRUCE JAMES
Chief, Environmental Planning & Conservation

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

OCT 31 2006

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Gina Sciosca
Boulder Public Library
1000 Canyon Blvd.
Boulder, CO 80302

Dear Ms. Sciosca,

The Air Force is pleased to provide the Boulder Public Library a review copy of the Draft Environmental Assessment of the Relocation and Construction of a Military Working Dog (MWD) Kennel, Buckley Air Force Base, Colorado. We appreciate the Boulder Public Library's contribution in making this document available to the public for review and comment.

Public reviewers are asked to submit written comments (referencing Section, page and line numbers to which comments apply) to the following address:

Ms. Elizabeth Meyer
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80011-9551
e-mail: Elizabeth.meyer@buckley.af.mil.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

OCT 3 1 2006

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Cynthia Holdeman
Government Publications
Denver Public Library
10 W. Fourteenth Ave. Pkwy.
Denver, CO 80204-2731

Dear Ms. Holdeman,

The Air Force is pleased to provide the Denver Public Library a review copy of the Draft Environmental Assessment of the Relocation and Construction of a Military Working Dog (MWD) Kennel, Buckley Air Force Base, Colorado. We appreciate the Denver Public Library's contribution in making this document available to the public for review and comment.

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Building 1005, Room 178
Buckley AFB, CO 80011-9551
e-mail: Elizabeth.meyer@buckley.af.mil.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. David Rathke
US Environmental Protection Agency
Region 8
999 18th Street, Suite 500
Denver, CO 80202

Dear Mr. Rathke,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

The public comment period for this EA is 15 days. Please provide any written comments by 5pm on Friday, 25 November 2006 to:

Ms. Elizabeth Meyer
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80011-9551
e-mail: Elizabeth.meyer@buckley.af.mil.

If you have any questions please feel free to contact me at 720-847-7245, or via e-mail: Bruce.James@buckley.af.mil.

BRUCE JAMES
Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Larry Svoboda
NEPA Unit Chief
US Environmental Protection Agency
Region 8
999 18th Street, Suite 500
Denver, CO 80202

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The public comment period for this EA is 15 days. Please provide any written comments by 5pm on Friday, 25 November 2006 to:

Ms. Elizabeth Meyer
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80011-9551
e-mail: Elizabeth.meyer@buckley.af.mil.

If you have any questions please feel free to contact me at 720-847-7245, or via e-mail: Bruce.James@buckley.af.mil.

BRUCE JAMES
Chief, Environmental Planning & Conservation

NOV 2 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Patricia Mehlhop
US Fish and Wildlife Service
134 Union Blvd., Suite 645
Lakewood, CO 80228-1807

Dear Ms. Mehlhop,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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BRUCE JAMES
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DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

NOV 2 2006

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Bruce Rosenlund
Colorado Field Supervisor
US Fish and Wildlife Service
134 Union Blvd., Suite 675
Lakewood, CO 80228-1807

Dear Mr. Rosenlund,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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Bruce R James

BRUCE JAMES
Chief, Environmental Planning & Conservation

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

OCT 31 2006

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Bruce Rosenlund
Colorado Field Supervisor
US Fish and Wildlife Service
134 Union Blvd., Suite 675
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The Air Force is requesting the initiation of Section 7 consultation per the Endangered Species of Act for the Environmental Assessment of the MWD Kennel construction project. We have assessed the potential effects of the proposed projects on federally listed and candidate species and determined that the proposed actions are not likely to adversely affect federally listed and candidate species.

If you have any questions please feel free to contact Floyd Hatch at 720-847-6937/ floyd.hatch@buckley.af.mil, Virginia Lightsey-Ceehorne at 720-847-6158/ virginia.lightsey@buckley.af.mil, or Bruce James at 720-847-7245/Bruce.James@buckley.af.mil.

Bruce R. James

BRUCE JAMES
Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Eugene Jansak
Industrial Waste Specialist
Metro Wastewater Reclamation District
6450 York Street
Denver, CO 80229-7499

Dear Mr. Jansak,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Brent Bibles
Colorado Division of Wildlife
Wildlife Research Center
317 W. Prospect Road
Fort Collins, CO 80246-1530

Dear Mr. Bibles,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

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DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Jim Paulmeno
Environmental Planning
Colorado Department of Transportation
4201 East Arkansas Avenue
Denver, CO 80222

Dear Mr. Paulmeno,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Eliza Moore
Colorado Division of Wildlife
6060 South Broadway
Denver, CO 80216

Dear Ms. Moore,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Dan Beley
Colorado Department of Public Health and Environment
Water Quality Control Division
4300 Cherry Creek Drive, South
WQCD-OA-B2
Denver, CO 80246-1530

Dear Mr. Beley,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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e-mail: Elizabeth.meyer@buckley.af.mil.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Nancy Chick
Colorado Department of Public Health and Environment
Air Pollution Control Division
APCD-TS-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Dear Ms. Chick,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Ed LaRock
Colorado Department of Public Health and Environment
Federal Facilities - HMWM 2800
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Dear Mr. LaRock,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Mac Callison
City of Aurora
Planning, Traffic Division
15151 E. Alameda
Aurora, CO 80012

Dear Mr. Callison,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. John Fernandez
City of Aurora
Planning, Environmental Division
15151 E. Alameda
Aurora, CO 80012

Dear Mr. Fernandez,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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OCT 3 1 2006

DEPARTMENT OF THE AIR FORCE

460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Robert Watkins
Director of Planning
City of Aurora
15151 E. Alameda
Aurora, CO 80012

Dear Mr. Watkins,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

NOV 2 2006

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Georgianna Contiguglia
State Historic Preservation Officer
Colorado History Museum
1300 Broadway
Denver, CO 80203-2137

Dear Ms. Contiguglia,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the relocation and construction of a new Military Working Dog (MWD) Kennel at Buckley Air Force Base (AFB), Colorado. The Proposed Action is to construct a new MWD kennel facility on the south side of Sunlight Way, in the area of the former Army obstacle training course. The new MWD kennel facility would include kennels for a minimum of ten dogs, four administrative offices for handlers, and adequate storage and facility support (e.g., mechanical) space, and occupy approximately 4,306 square feet (sq.ft.). Support structures external to the kennel would include a 26,156-sq.ft. training/obedience yard and canine break area, a driveway and parking lot for 10 vehicles occupying approximately 4,835 sq.ft., a 900-sq.ft. vehicle garage, and a separate 323-sq.ft. storage building for MWD training gear. The footprint of the new facility would be approximately 1.5 acres. Design of the kennel and support facilities would comply with Army Regulation (AR) 190-12 and Air Force Instruction 31-202. The Proposed Action is needed to promote compatible land uses on the installation and to support the MWD mission.

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Bruce R James

BRUCE JAMES
Chief, Environmental Planning & Conservation

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

OCT 31 2006

Mr. Bruce James
Environmental Flight
460th Civil Engineer Squadron
660 South Aspen Street, Stop 86
Buckley AFB CO 80011-9551

Georgianna Contiguglia
State Historic Preservation Officer
Colorado History Museum
1300 Broadway
Denver CO 80203-2137

Dear Ms. Contiguglia

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In compliance with Section 106 of the National Historic Preservation Act, Buckley Air Force Base has determined that the area of potential effect for the proposed action, and alternatives would not include any known cultural resources and the project would not have an adverse affect on historic properties. Building information, with the Colorado Resource number and dates of construction in parenthesis, are outlined below.

Proposed Action Location:

- Buildings 1000 (1990) is not eligible for inclusion on the National Register of Historic Places as it is less than 50 years old.

- Building 1500 (5AH2324) (1977), 1501 (5AH2325) (1977), 1502 (5AH2326) (1977), 1503 (5AH2327) are not eligible for inclusion on the National Register of Historic Places as they are less than 50 years old.

- Buildings 1504 (1994), 1505 (temporary trailer), 1510 (2006), 1520 (1994) and 1530 (2005) were constructed or in place after 1990. Therefore, they are not eligible for inclusion on the National Register of Historic Places.

Alternative Locations:

Both alternative locations for the Military Working Dog Kennels which were evaluated for use are on the far east side of Buckley AFB and their APE's do not include any presently existing buildings.

If you have any questions please feel free to contact myself or Mr. Floyd Hatch, Cultural Resources Manager at 720-847-6937, email floyd.hatch@buckley.af.mil.

Sincerely

BRUCE JAMES
Chief, Environmental Planning & Conservation

Attachment
Location figure

Proposed Location of the Military Working Dog Kennels

MN
9°52'E
State Plane Grid and 2005 Magnetic North

GeoBase Map viewer
Buckley AFB
460 Wing GIO
460 CES/CEOG

All of the information in this map is in the Colorado State Plane HARN projection with a NAD 83 datum, the associated units are in feet and this map layout is not drawn to a specific scale. Not all layers in the map will appear on the map legend. If you need a map with additional customizations or if you notice data in the map viewer that needs to be updated please contact the Buckley AFB GIO (Geographic Information Office). Do not redistribute this data beyond the DOD and DOD contractual support communities.

- Fences
- Existing Structures
- Airfield
- Paved Areas
- Sidewalks
- Installation Boundary

City of Aurora

Planning Department
15151 E. Alameda Parkway
Aurora, Colorado 80012
Phone: 303-739-7250
Fax: 303-739-7268
www.auroragov.org

November 22, 2006

Ms. Elizabeth Meyer
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80111-9551

Subject: Environmental Assessment of the Relocation and Construction of a Military Working Dog (MWD) Kennel, Buckley Air Force Base, Colorado

Dear Ms. Meyer:

Thank you for the opportunity to comment on this document. The city has prepared the following comment relative to the Proposed Action to relocate and construct the new MWD kennel facility:

> Although the Proposed Action sites the MWD kennel facility approximately 2000 feet from the nearest Aurora residence, there is some potential for significant noise during the nighttime hours. Buckley AFB has identified day-night level contours for airport noise at 55 dB, A-weighted, at the location of the nearest residence.
>
> To prevent Aurora residences from being negatively affected by both airport noise and MWD kennel noise, please provide assurances that kennel facilities incorporate noise mitigation in the construction to achieve an exterior noise level reduction of 55 dB, A weighted, at the nearest residence.

Please contact Karen Hancock of my staff at (303) 739-7107 with any questions about this comment.

Sincerely,

John M. Fernandez
Manager of Comprehensive Planning

COLORADO
HISTORICAL
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

November 14, 2006

Mr. Bruce James
Environmental Flight
460th Civil Engineer Squadron
660 South Aspen Street, Stop 86
Buckley AFB CO 80011-9551

Re: Section 106 of the National Historic Preservation Act Review for the Draft Environmental Assessment of the Relocation and Construction of a Military Working Dog (MWD) Kennel, Buckley AFB, CO. (CHS #49060)

Dear Mr. James:

Thank you for your correspondences dated November 2, 2006 and received by our office on November 3, 2006 regarding the above-mentioned projects. After review of the provided information, we concur with the finding of *no adverse effect* under Section 106 of the National Historic Preservation Act for the proposed undertaking.

If unidentified archaeological resources are discovered during construction, work must be interrupted until the resources have been evaluated in terms of the National Register criteria, 36 CRF 60.4, in consultation with this office.

We request being involved in the consultation process with the local government, which as stipulated in 36 CFR 800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings.

Please note that our compliance letter does not end the 30-day review period provided to other consulting parties.

If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Coordinator, at (303) 866-4678.

Sincerely,

Georgianna Contiguglia
State Historic Preservation Officer

cc: Floyd Hatch/Buckley AFB

STATE OF COLORADO

Bill Owens, Governor
Dennis E. Ellis, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
TDD Line (303) 691-7700
Located in Glendale, Colorado

http://www.cdphe.state.co.us

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

November 9, 2006

Ms. Elizabeth Meyer
460 CES/EVP
660 South Aspen Street, Stop 86
Buckley AFB, CO 80011-9551

Dear Ms. Meyer:

RE: Draft Environmental Assessment of the Relocation and Construction of a Military Working Dog Kennel, Buckley Air Force Base, Colorado dated November 2006

The Colorado Department of Public Health and Environment (CDPHE), Hazardous Materials and Waste Management Division (the Division) has reviewed the above referenced document received November 3, 2006. The Division has the following comments on the Draft Environmental Assessment (EA):

Page 3-20 – Please update the status of ERP Site 3. Supplemental Characterization work has recently been completed at Site 3. Part of the area of the proposed action contains a former landfill without the required two feet of soil cover. A remedial decision will be made in the future for ERP site 3 that will require proper soil cover of 2 feet and this needs to be considered in the EA.

The EA states on page 3-22 that "No effect on asbestos-containing material (ACM) is expected" and bases this on samples collected in the area (page 3-20). These sample results have not been provided for the Division's review. Regardless, the CDPHE has promulgated new asbestos regulations under our Solid Waste Regulations at 6 CCR 1007-2, Part 1, Section 5.5, which would have to be followed in the event asbestos is discovered during construction. Since EPA policy, the CAA, and CDPHE air pollutant regulations are cited on page 3-20, this new regulation needs to be cited as well.

Appendix C – While copies of distribution letters to other agencies are provided many, including those to CDPHE, are not. This Appendix should be complete and consistent.

Thank you for the opportunity to comment. Please contact me at 303-692-3324 or ed.larock@state.co.us if there are any questions.

Sincerely,

Ed LaRock, P.G.
Environmental Protection Specialist
Hazardous Materials and Waste
Management Division

cc: Richard Lotz, AGO
Mark Spangler, Buckley Air Force Base
David Rathke, EPA Region 8
File RD003-1.1

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

DEC 1 2006

Bruce James
Environmental Flight, 460th Civil Engineer Squadron
660 S. Aspen St., Stop 86
Buckley AFB, CO 80011-9551

Ed LaRock
Hazardous Materials and Waste Mngt. Division
Colorado Dept. of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Mr. LaRock

Thank you for your letter, dated 14 November 2006, on the Military Working Dog Kennel Environmental Assessment (EA) and Finding of No Significant Impact (FONSI).

The ERP site 3 comments will be incorporated into the Final EA. I have enclosed a copy of the sample results for asbestos-containing material (ACM) for the proposed site. We appreciate your comments regarding the new asbestos regulations under the Solid Waste Regulations at 6 CCR 1007-2. The Final EA will state in the ACM section on page 3-20, "Buckley AFB will comply with all applicable Federal, state, and local laws and regulations." All of the transmittal letters for the draft EA review have been included in Appendix C in the Final EA.

Please contact Ms. Elizabeth Meyer, NEPA Program Manager, at 720-847-7159 or elizabeth.meyer@buckley.af.mil, if you have any questions or require further information.

Sincerely

BRUCE JAMES, GS-12
Chief, Planning and Conservation

Atch:
Findings & Recommendations Report – New Military Working Dog Kennel Survey, 5 May 2006

Mark Spangler-Recommended Edits to
Draft EA of the Relocation and Construction of a MWD Kennel, BAFB, Nov 2006
In Response to First Review Comment by Mr. Ed LaRock, CDPHE

1. Page 3-20

Replace the second paragraph (beginning with line 7) under *Environmental Restoration Program* with the following:

"The Proposed Action is situated within a region designated as ERP site LF 003, the former base landfill that was in operation from 1942 through 1982. Municipal refuse, construction debris, solvents, paints, and pesticides were reportedly disposed of in the landfill (BAFB 2002b). Construction debris includes scrap from demolished buildings which likely contained asbestos. Field work to support a supplemental characterization study was completed in July 2006, and the draft version of the report is currently under review. The study is intended to delineate the extent of the landfill and assess the adequacy of existing landfill cover. Figure [X], taken from the draft study report, illustrates the extent of buried waste in the vicinity of the Proposed Action and the thickness of existing cover. The Air Force will likely make a future remedial decision to ensure all buried landfill waste is covered with at least two feet of soil. Thus, the landfill area immediately adjacent to the Proposed Action, which is currently insufficiently covered, will experience a future earth moving remedial action."

2. Page 3-22

Edit *ERP* paragraph (beginning with line 19) as follows:

"No effect on the ERP is expected, as long as construction activities do not overlap the area of landfill buried waste (ERP site LF 003) illustrated in Figure [X]. A Findings and Recommendations Report indicated …."

3. Add Figure X (number appropriately) to the document. Mark Spangler will provide the file.

Comment Response Matrix ***Draft Environmental Assessment (EA), Finding of No Significant Impact (FONSI), and Cover Sheet for Relocation and Construction of a Military Working Dog (MWD) Kennel, Buckley Air Force Base, CO***							
#	**Location**				**Comment**	**Reviewer**	**Response**
	Doc.	**Section**	**Page**	**Line**			
1	EA		3-20		"Please update the status of ERP Site 3. Supplemental Characterization work has recently been completed at Site 3. Part of the area of the proposed action contains a former landfill without the required two feet of soil cover. A remedial decision will be made in the future for ERP site 3 that will require proper soil cover of 2 feet and this needs to be considered in the EA." (excerpt from CDPHE letter dated November 9, 2006)	CDPHE	Status of ERP Site is updated and statement addressing potential future remedial action inserted. Please see p. 3-20 of EA, and response letter (Appendix C)
2	EA		3-22		"The EA states on page 3-22 that "No effect on asbestos-containing material (ACM) is expected" and bases this on samples collected in the area (page 3-20). These sample results have not been provided for the Division's review. Regardless, the CDPHE has promulgated new asbestos regulations under our Solid Waster Regulations at 6 CCR 1007-2, Part 1, Section 5.5, which would have to be followed in the event	CDPHE	"Buckley AFB will comply with all applicable Federal, state and local laws and regulations." inserted on page 3-20. Please see response letter in Appendix C.

					asbestos is discovered during construction. Since EPA policy, the CAA, and CDPHE air pollutant regulations are cited on page 3-20, this new regulation needs to be cited as well." (excerpt from CDPHE letter dated November 9, 2006)		
3	EA	App. C			"While copies of distribution letters to other agencies are provided many, including those to CDPHE, are not. This Appendix should be complete and consistent." (excerpt from CDPHE letter dated November 9, 2006)	CDPHE	All letters included in Final.
4	EA	3.4			"Although the Proposed Action sites the MWD kennel facility approximately 2000 feet from the nearest Aurora residence, there is some potential for significant noise during the nighttime hours. Buckley AFB has identified day-night level contours for airport noise at 55 dB, A-weighted, at the location of the nearest residence. To prevent Aurora residences from being negatively affected by both airport noise and MWD kennel noise, please provide assurances that kennel facilities incorporate noise mitigation in the construction to achieve an exterior noise level		Following inserted in section 3.4.2: "According to the studies done for this EA, the noise contours should not be changed by the Proposed Action."

					reduction of 55 dB, A weighted, at the nearest residence." (excerpt from City of Aurora letter dated November 22, 2006)		
5	EA	All			"After review of the provided information, we concur with the finding of *no adverse effect* under Section 106 of the National Historic Preservation Action for the proposed undertaking." (excerpt from SHPO letter dated November 14, 2006)		No response required.

APPENDIX D

GENERAL CONFORMITY AIR QUALITY EMISSIONS ESTIMATES

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions
Stationary Equipment	Estimates the total emissions from operation of the a natural gas furnance.
AQCR Tier Report	Summarizes total emissions for the Metropolitan Denver Intrastate AQCR Tier Reports for 2001, to be used to compare project to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	0.104	0.076	0.120	0.003	0.004
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	1.841
	Stationary Equipment	0.094	0.006	0.040	0.001	0.008
	TOTAL CY2007	0.198	0.081	0.160	0.004	1.852

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Metropolitan Denver Intrastate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	113,946	101,293	816,914	39,750	72,846

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 2 November 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	113,946	101,293	816,914	39,750	72,846
2007 Emissions	0.198	0.081	0.160	0.004	1.852
Proposed Action %	**0.0002%**	**0.00008%**	**0.00002%**	**0.00001%**	**0.0025%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

1	100% of Construct Dog Kennels Facility (4,306 ft^2)	4,306	ft^2	0.10	acres
2	100% Construct Vehicle Parking Garage (900 ft^2)	900	ft^2	0.02	acres
3	100% Construct Storage Facility (323 ft^2)	323	ft^2	0.01	acres
4	100% of Grade Footprint for Dog Kennel Training Area (65,340 ft^2)	65,340	ft^2	1.50	acres
5	100% of Construct Asphalt parking lot (4,385 ft^2)	4,385	ft^2	0.10	acres

Assumptions:
Concrete curbs and gutters are 6 inches wide and 12,000 linear feet long.
Asphalt parking lots are 6 inches thick.

Total Building Construction Area:	5,529	ft^2	(1-3)
Total Demolished Area:	0	ft^2	(None)
Total Paved Area:	4,385	ft^2	(5)
Total Disturbed Area:	65,340	ft^2	(4)
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	9.077	1.353	10.604	0.182	0.305
Paving Equipment	1	0.130	0.022	0.191	0.003	0.004
Demolition Equipment	1	0.000	0.000	0.000	0.000	0.000
Building Construction	1	0.852	0.127	0.990	0.026	0.029
Air Compressor for Architectural Coating	1	0.087	0.011	0.074	0.002	0.003
Architectural Coating**			6.060			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	65,340	1.50	1	(from "CY2007 Grading" worksheet)
Paving:	4,385	0.10	1	
Demolition:	0	0.00	60	
Building Construction:	5,529	0.13	230	
Architectural Coating	5,529	0.13	20	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	9.08	1.35	10.60	0.18	0.30
Paving	0.13	0.02	0.19	0.00	0.00
Demolition	-	-	-	-	-
Building Construction	196.06	29.14	227.80	5.90	6.63
Architectural Coatings	1.73	121.42	1.48	0.03	0.07
Total Emissions (lbs):	**207.00**	**151.93**	**240.07**	**6.12**	**7.00**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	207.00	151.93	240.07	6.12	7.00
Total Project Emissions (tons)	0.10	0.08	0.12	0.00	0.00

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	1.50	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	0.84	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	25	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	16	%	Ave. of wind speed at Boulder, CO (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/colorado/boulder)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.21 lbs/hr	4.5 hr/acre	0.90 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 6 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.6 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.90 lbs/acre	1.50	NA	1	0.001
Grading	0.80 lbs/acre	1.50	NA	1	0.001
Vehicle Traffic	22.30 lbs/acre	1.50	NA	33	0.017
Erosion of Soil Piles	0.60 lbs/acre/day	1.50	90	81	0.041
Erosion of Graded Surface	26.40 lbs/acre/day	1.50	90	3,564	1.782
TOTAL				3,681	1.84

Soil Disturbance EF: 24.00 lbs/acre
Wind Erosion EF: 27 lbs/acre/day

Back calculate to get EF: 2,929.07 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 1.50 acres/yr (from "CY2007 Combustion" Worksheet)
Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	1.50	0.19
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	1.50	0.73
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	0.75	0.76
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	0.75	0.31
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	1.50	0.53
TOTAL								2.51

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 2.51
Qty Equipment: 3.00
Grading days/yr: 0.84

Emissions from Stationary Equipment (Natural Gas Residential Furnace)

Assumptions (Reference: ACAM):

Equipment Type: Residential Furnace (<0.3 MMBtu/Hr), Natural Gas External Combustion Engine

Fuel Type: Natural Gas

Control Type: Uncontrolled

Estimated Yearly Throughput (2007): 2,000,000 10^6 ft^3/yr

Criteria Air Pollutant Emission Factors

	NO_x lb/10^6 ft^3	**VOC lb/10^6 ft^3**	**CO lb/10^6 ft^3**	**SO2 lb/10^6 ft^3**	**PM (total) lb/10^6 ft^3**	**Reference**
Residential Furnaces (Natural Gas)	94	5.5	40	0.6	7.6	AP-42 Tables 1.4-1 and 1.4-2, dated July 1998

Criteria Pollutants	Emissions (Uncontrolled)
NO_x	0.094 tpy
VOC	0.006 tpy
CO	0.040 tpy
SO_2	0.001 tpy
PM (total)	0.008 tpy

Example: (Estimated Throughput/10^6 ft^3)*(Emission Factor)/2000

NO_x = (2,000,000/10^6 ft^3)*(94 lb/10^6 ft^3)/(2000 lb/ton) = 0.094 tons

Metropolitan Denver Intrastate Air Quality Region

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	CO	Adams Co	102,726	12,331	11,107	2,656	792	11,707	2,355	13,552	2,890	2,224	21,172	4,969
2	CO	Arapahoe Co	174,656	16,873	13,437	3,291	1,073	17,414	597	733	549	281	69	2,331
3	CO	Boulder Co	80,483	8,480	10,239	2,611	571	10,032	550	4,371	1,143	608	5,235	2,045
4	CO	Clear Creek Co	12,930	1,470	1,915	419	62.6	995	78.6	56.8	79.1	53.5	4.9	40.3
5	CO	Denver Co	191,353	21,761	6,554	2,367	1,581	20,033	1,064	6,367	740	552	4,734	3,434
6	CO	Douglas Co	69,361	7,664	9,672	2,105	475	5,636	149	51.6	248	126	89	424
7	CO	Gilpin Co	2,062	442	828	196	34.1	336	0	0	0	0	0	0
8	CO	Jefferson Co	177,730	17,156	12,763	2,914	975	18,532	819	2,638	682	489	2,882	3,365
Grand Total			811,301	86,177	66,515	16,559	5,564	84,685	5,613	27,769	6,331	4,334	34,186	16,608

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 2 November 2006

Metropolitan Denver Intrastate AQCR : Adams Co, Arapahoe Co, Boulder Co, Clear Creek Co, Denver Co, Douglas Co, Gilpin Co, and Jefferson Co (40 CFR 81.16).

APPENDIX E

SUMMARY TABLES FOR CUMULATIVE IMPACTS CALCULATIONS

INTRODUCTION TO APPENDIX E

The tables on the following pages are from an Excel spreadsheet that was developed for the CIP EA (BAFB 2006c) and is now maintained by 460 CES/CEV with frequent updates as construction projects enter the system. A note at the bottom of each table on the following pages indicates the corresponding table in the spreadsheet. All calculations are based on the Proposed Action inputs provided in the table below.
The data presented in these tables are current as of the publication of this EA.

Construction Project Ground Disturbance Details

Project	Project Ground Disturbance Duration (days)	Maximum Building Area (ft^2)	Total Building Land Disturbance[1] (ft^2)	Roadway/ Parking Lot Land Disturbance[2] (ft^2)	Landscaping Land Disturbance[3] (ft^2)	Length Sidewalk/ Walkways Land Disturbance[4] (linear ft)	Sidewalk/ Walkway Land Disturbance[4] (ft^2)	Length Utility Main Connection Land Disturbance[5] (linear ft)	Utilities Trenching Land Disturbance[5] (ft^2)	Total Land Disturbance (ft^2)	Total Land Disturbance (acres)
MWD Kennel[7]	135	4,306	25,836	3,000	861		0		0	28,836	0.66
MWD Garage[7]	135	900	5,400	1,350	180		0		0	6,930	0.16
MWD Storage [7]	120	323	1,938	485	65		0		0	2,487	0.06
MWD training/ obedience area[7]	120	0	26,156	0	0		0		0	26,156	0.60

(1) Total Building Land Disturbance is estimated at six-times the Building Area, providing contingency for contractor lay-down and preparation areas.

(2) Parking Lot size is estimated on 300 ft2 per parking space, including turning areas. Total Land Disturbance is estimated at 1.5-times the Parking Lot Areas, providing contingency for contractor lay-down and preparation areas.

(3) Land Disturbance for Landscaping Areas is estimated at 20% of the Building Area, and provides contingency for contractor lay-down and preparation areas.

(4) Walkway and Sidewalks lengths were measured from maps included in the Buckley Air Force Base General Plan (Preliminary Submittal; 460 Air Base Wing, Buckley AFB, Colorado; Prepared By HB&A; Colorado Springs, CO; June 2002).

(5) Utility connection lengths were measured from maps included in the Buckley Air Force Base General Plan (see above). Lenghts were measured to closest major roadway, where utilities are assumed to exist.

(6) Freight Transfer facility 5 GOV's and 11-13 POVs, loaders/tractor trailers and pallet storage area. Assumption is loaders etc. are 6 times the size of a normal vehicle (conservative estimate). 18 vehicles *300 plus 7 * 6 * 300 for other vehicles/equipment.

(7) Military Working Dog Kennel and associated buildings. Dog training area has no "facility and/or parking construction". Parking for the kennel was determined to be 300 sf per parking space and parking for the garage and storage assumed to be 1.5 times the size of the building since these facilities still require access/temporary parking.

Table E-1: Annual Breakdown of Construction and Demolition Activities 2002 to 2010+

Year	Days of De	Demolition Area (ft^2)	Construction Demolition Days of Ground Distrubance	Ground Disturbance					
				Construction Acres/year	Construction % of total	Demolition Acres/year	Demolition % of total	Total Acres/year	Construction and Demolition % of total
2002	0	0	572	30.34	4.59%	0.00	0.00%	30.34	4.39%
2003	24	12,000	1,509	75.07	11.36%	0.55	1.84%	75.62	10.95%
2004	80	20,378	1,887	110.74	16.76%	2.85	9.52%	113.59	16.45%
2005	230	50,099	2,967	156.96	23.76%	7.17	23.94%	164.13	23.76%
2006	297	23,709	2,266	45.82	6.94%	7.13	23.82%	52.95	7.67%
2007	0	0	1,663	44.28	6.70%	0.00	0.00%	44.28	6.41%
2008	141	40,803	1,136	27.77	4.20%	1.90	6.33%	29.66	4.29%
2009	570	23,905	3,170	85.07	12.88%	1.11	3.72%	86.18	12.48%
2010	243	105,000	1,413	27.47	4.16%	7.28	24.33%	34.76	5.03%
Beyond 2010	370	42,447	1,942	57.20	8.66%	1.95	6.51%	59.15	8.56%
Totals	1,954	318,341	18,524	661	100.00%	29.94	100.00%	690.67	100.00%

Updated from CIP EA Ground Disturbance Spreadsheet

Buckley AFB Expansion Estimates - Impervious Surfaces

Table E-2: Increased Impervious Surface Calculations			
Year	Increased Impervious Surfaces Due to Construction (Acres)	Decreased Impervious Surfaces Due to Demolition (Acres)	Net Increased Impervious Surfaces (Acres)
2002	15.06	0.00	15.06
2003	38.29	0.28	38.02
2004	56.83	2.03	54.80
2005	45.14	2.07	43.07
2006	13.36	2.91	10.44
2007	5.46	0.00	5.46
2008	7.43	0.94	6.49
2009	49.84	0.55	49.29
2010	3.00	4.30	(1.30)
Beyond 2010	22.54	0.97	21.57
Totals	**256.96**	**14.05**	**242.90**

Updated from CIP EA Table 4.27

Table E-3: Cumulative Increased Impervious Surface Calculations			
Year	Buckley AFB Increased Impervious Surfaces (Acres)	City of Aurora Increased Impervious Surfaces (Acres)	Cumulative Increased Impervious Surfaces (Acres)
2002	15	452	468
2003	38	1,121	1,159
2004	55	1,681	1,736
2005	43	2,242	2,285
2006	10	2,802	2,813
2007	5	3,363	3,368
2008	6	3,923	3,929
2009	49	4,483	4,533
2010	-1	5,044	5,042
Beyond 2010	22	5,604	5,626
Totals	**243**	**30,715**	**30,958**

Updated from CIP EA Table 4.28

Table E-4: Cumulative Increased Stormwater Loading Calculations			
Year	Buckley AFB Increased Stormwater Loading (Million Gallons)	City of Aurora Increased Stormwater Loading (Million Gallons)	Cumulative Increase in Increased Stormwater
2002	6	187	193
2003	16	464	480
2004	23	696	718
2005	18	928	945
2006	4	1,160	1,164
2007	2	1,391	1,394
2008	3	1,623	1,626
2009	20	1,855	1,876
2010	-1	2,087	2,087
2011	9	2,319	2,328
Totals	**101**	**12,710**	**12,811**

Updated from CIP EA Table 4.29

Cumulative Utilities Calculations

Table E-5: Cumulative Electrical Demand Increases			
Year	**Buckley AFB Electrical Demand Increase (kWh)**	**City of Aurora Construction Electrical Demand Increase (kWh)**	**Total Cumulative Electrical Demand Increase (kWh)**
2002	4,820,960	612,846,000	617,666,960
2003	11,928,054	1,471,284,000	1,483,212,054
2004	17,596,182	2,206,926,000	2,224,522,182
2005	24,939,855	2,942,568,000	2,967,507,855
2006	7,280,839	3,678,210,000	3,685,490,839
2007	7,035,665	4,413,852,000	4,420,887,665
2008	4,411,997	5,149,494,000	5,153,905,997
2009	13,516,767	5,885,136,000	5,898,652,767
2010	4,365,370	6,620,778,000	6,625,143,370
Beyond 2010	9,088,382	7,356,420,000	7,365,508,382
Totals	**104,984,071**	**40,337,514,000**	**40,442,498,071**

Updated from CIP EA Table 4.18

Table E-6: Cumulative Natural Gas Demand Increases			
Year	**Buckley AFB Natural Gas Demand Increase (kWh)**	**Construction Natural Gas Demand Increase (kWh)**	**Total Cumulative Natural Gas Demand Increase (kWh)**
2002	7	681	688
2003	18	1,635	1,652
2004	26	2,452	2,478
2005	37	3,270	3,306
2006	11	4,087	4,098
2007	10	4,904	4,915
2008	7	5,722	5,728
2009	20	6,539	6,559
2010	6	7,356	7,363
Beyond 2010	13	8,174	8,187
Totals	**155**	**44,819**	**44,974**

Updated from CIP EA Table 4.19

Table E-7: Heating and Hot Water Unit Air Emissions

Year	Emissions Generated from Operation of Heating, Hot Water and Air Conditioning Units (Tons/Year)									
	Hydrocarbons		NOx		SO_2		CO		PM_{10}	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
2002	0.02	0.02	0.36	0.36	0.00	0.00	0.30	0.30	0.03	0.03
2003	0.05	0.07	0.88	1.24	0.01	0.01	0.74	1.04	0.07	0.09
2004	0.07	0.14	1.30	2.54	0.01	0.02	1.09	2.13	0.10	0.19
2005	0.10	0.24	1.84	4.38	0.01	0.03	1.55	3.68	0.14	0.33
2006	0.03	0.27	0.54	4.91	0.00	0.03	0.45	4.13	0.04	0.37
2007	0.03	0.30	0.52	5.43	0.00	0.03	0.44	4.56	0.04	0.41
2008	0.02	0.32	0.33	5.76	0.00	0.03	0.27	4.84	0.02	0.44
2009	0.05	0.37	1.00	6.76	0.01	0.04	0.84	5.67	0.08	0.51
2010	0.02	0.39	0.32	7.08	0.00	0.04	0.27	5.95	0.02	0.54
TBD[3]	0.04	0.43	0.67	7.75	0.00	0.05	0.56	6.51	0.05	0.59
Cumulative Totals	0.43	0.43	7.75	7.75	0.05	0.05	6.51	6.51	0.59	0.59

Updated from CIP EA Table 4.3

Water Use

Table E-8: Construction and Demolition Water Suppression Consumption			
Year	Water Required for Construction Projects (Gallons)	Water Required for Demolition Projects (Gallons)	Total (Gallons)
2002	2,952,859	0	2,952,859
2003	9,887,995	6,612	9,894,607
2004	8,255,257	18,539	8,273,796
2005	27,841,580	61,466	27,903,046
2006	4,011,846	17,263	4,029,109
2007	2,189,857	0	2,189,857
2008	5,819,875	37,980	5,857,855
2009	9,470,806	28,567	9,499,373
2010	3,612,687	506,198	4,118,886
Beyond 2010	3,713,713	102,618	3,816,331
Totals	**77,756,475**	**779,243**	**78,535,717**

Updated from CIP EA Table 4.12

Table E-9: Finished Building Operational Water Consumption		
	Water Required for Human Consumption (Million Gallons)	
Year	Annual	Cumulative
2002	1.042	1.042
2003	2.578	3.620
2004	3.803	7.422
2005	5.390	12.812
2006	1.573	14.385
2007	1.520	15.906
2008	0.953	16.859
2009	2.921	19.781
2010	0.943	20.724
Beyond 2010	1.964	22.688
Totals	**22.688**	**22.688**

Updated from CIP EA Table 4.13

Water Use (cont.)

Table E-10: Irrigation Water Consumption			
Year	**Area Requiring Irrigation**	**Annual Water Required for Irrigation (Million Gallons)**	**Cummulative Water Required for Irrigation (Million Gallons)**
2002	0.464	0.498	0.498
2003	4.775	5.119	5.616
2004	1.016	1.089	6.706
2005	12.263	13.144	19.850
2006	5.734	6.146	25.996
2007	0.260	0.279	26.275
2008	2.631	2.820	29.095
2009	0.457	0.490	29.584
2010	7.631	8.179	37.764
Beyond 2010	15.366	16.470	54.234
Totals	**50.598**	**54.234**	**54.234**

Updated from CIP EA Table 4.14

Table E-11: Cummulative Water Consumption			
Year	**Buckley AFB Cumulative Water Increase (Million Gallons)**	**City of Aurora Construction Water Increase (Million Gallons)**	**Total Cumulative Water Increase (Million Gallons)**
2002	4	842	846
2003	18	1,743	1,760
2004	13	2,614	2,628
2005	46	3,486	3,532
2006	13	4,357	4,370
2007	4	5,229	5,233
2008	10	6,100	6,110
2009	13	6,972	6,984
2010	13	7,843	7,856
Beyond 2010	22	8,714	8,737
Totals	**157**	**47,900**	**48,057**

Updated from CIP EA Table 4.16

Solid Waste

Table E-12: Construction and Demolition Waste Generation - Proposed Action		
Year	**Construction and Demolition Solid Waste Generation (Tons)**	**Percent of Total Waste Received by Denver-Arapahoe Disposal Site Landfill**
2002	143	0.01%
2003	20,065	0.88%
2004	11,734	0.51%
2005	47,771	2.10%
2006	57,281	2.51%
2007	416	0.02%
2008	34,389	1.51%
2009	126,731	5.56%
2010	174,316	7.65%
Beyond 2010	69,839	3.06%
Totals	**542,684**	**23.80%**

Updated from CIP EA Table 4.15

Table E-13: Cummulative Solid Waste Generation			
Year	**Buckley AFB Cumulative Solid Waste Generation Increase (Tons)**	**City of Aurora Construction Solid Waste Generation Increase (Tons)**	**Total Cumulative Solid Waste Generation Increase (Tons)**
2002	1,761	110,632	112,394
2003	21,683	261,105	282,788
2004	13,353	391,657	405,010
2005	49,389	522,210	571,599
2006	58,899	652,762	711,662
2007	2,034	783,315	785,349
2008	36,007	913,867	949,875
2009	128,349	1,044,420	1,172,769
2010	175,935	1,174,972	1,350,907
Beyond 2010	71,457	1,305,525	1,376,982

Updated from CIP EA Table 4.17

Table E-14: Construction/Demolition Debris Handling Traffic - Proposed Action			
Year	**Weight of Debris Generated (tons)**	**Volume of Debris Generated (yd3)**	**Number of Truck Trips Required**
2002	143	80	4
2003	20,065	11,093	504
2004	11,734	5,318	242
2005	47,771	26,445	1,202
2006	57,281	29,079	1,322
2007	416	233	11
2008	34,389	19,010	864
2009	126,731	61,038	2,774
2010	174,316	89,762	4,080
Beyond 2010	69,839	38,625	1,756
Totals	**542,684**	**280,683**	**12,758**

Updated from CIP EA Table 4.23

Cumulative Traffic and Emissions

Table E-15: Construction and Demolition Vehicles Entering the South Gate - Proposed Action			
Year	Construction and Demolition Contractor Employee Traffic (Vehicles/Day)	Construction and Demolition Delivery Traffic (Vehicles/Day)	Total (Vehicles/Day)
2002	8	32	40
2003	18	72	90
2004	28	112	140
2005	28	112	140
2006	38	152	190
2007	8	32	40
2008	6	24	30
2009	38	152	190
2010	10	40	50
Beyond 2010	28	112	140
Totals	**182**	**728**	**910**

Updated from CIP EA Table 5.25

Table E-16: New Personal Vehicle Pollutant Emissions						
	Emissions Generated from New Personal Vehicles (Tons/Year)					
	Hydrocarbons		NOx		CO	
Year	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
2002	0.14	0.14	0.14	0.14	2.89	2.89
2003	0.34	0.48	0.34	0.48	7.15	10.03
2004	0.50	0.98	0.50	0.98	10.54	20.58
2005	0.71	1.69	0.71	1.69	14.94	35.52
2006	0.21	1.90	0.21	1.90	4.36	39.88
2007	0.20	2.10	0.20	2.10	4.22	44.10
2008	0.13	2.23	0.13	2.23	2.64	46.74
2009	0.39	2.61	0.39	2.61	8.10	54.84
2010	0.12	2.74	0.12	2.74	2.62	57.45
TBD[(3)]	0.26	3.00	0.26	3.00	5.45	62.90
Cumulative Totals	3.00	3.00	3.00	3.00	62.90	62.90

Updated from CIPE EA Table 4.4

Table E-17: Construction and Demolition Project Emissions					
Year	Emissions Generated from Construction and Demolition Site Disturbance Activities (Tons/Year)				
	VOC	NOx	SO_2	CO	PM_{10}
2002	1	4	0	10	13
2003	5	26	3	73	40
2004	11	37	4	112	32
2005	20	57	6	156	139
2006	11	39	4	114	32
2007	6	31	3	82	43
2008	10	50	5	144	26
2009	6	30	3	82	60
2010	3	15	1	36	8
TBD*	1	9	0	13	26
Cumulative Totals	74	298	29	822	419

Updated from CIPE EA Table 4.2

Table E-18: Proposed Action Air Emission Totals										
Year	Emissions (Tons/Year)									
	Hydrocarbons		NOx		SO_2		CO		PM_{10}	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
2002	1.16	1.16	4.49	4.49	0.00	0.00	13.19	13.19	13.03	13.03
2003	5.39	6.55	27.22	31.71	3.01	3.01	80.89	94.07	40.07	53.09
2004	11.57	18.12	38.80	70.51	4.01	7.02	123.63	217.71	32.10	85.19
2005	20.81	38.93	59.55	130.07	6.01	13.03	172.49	390.20	139.14	224.33
2006	11.24	50.17	39.75	169.81	4.00	17.03	118.81	509.01	32.04	256.37
2007	6.23	56.40	31.72	201.53	3.00	20.03	86.65	595.66	43.04	299.41
2008	10.14	66.54	50.45	251.98	5.00	25.03	146.92	742.58	26.02	325.44
2009	6.44	72.98	31.38	283.37	3.01	28.04	90.94	833.51	60.08	385.51
2010	3.14	76.13	15.45	298.81	1.00	29.04	38.89	872.40	8.02	393.54
TBD[3]	1.30	77.42	9.93	308.74	0.00	29.05	19.01	891.41	26.05	419.59
Cumulative Totals	77.42	464.39	308.74	1,751.04	29.05	171.28	891.41	5,159.73	419.59	2,455.51

Updated from CIP EA Table 4.5

APPENDIX F

GEOTECHNICAL REPORT

FINDINGS & RECOMMENDATIONS REPORT

NEW MILITARY WORKING DOG KENNEL SURVEY

Contract No.: FA2543-03-D-0002
Project No.: CRWU 07-3005

Buckley AFB, Colorado

PREPARED BY:
MERRICK & COMPANY
Engineers & Architects
AURORA, COLORADO

PREPARED FOR:
460th CIVIL ENGINEER SQUADRON

5 May 2006

NEW MILITARY WORKING DOG KENNEL SURVEY
BUCKLEY AIR FORCE BASE, COLORADO
PROJECT NO. CRWU 07-3005
FINDINGS & RECOMMENDATIONS REPORT

TABLE OF CONTENTS

NEW MILITARY WORKING DOG KENNEL SURVEY
BUCKLEY AIR FORCE BASE, COLORADO
PROJECT NO. CRWU 07-3005
FINDINGS & RECOMMENDATIONS REPORT

1. SCOPE ANALYSIS

The Scope of Work for this project is to provide a geotechnical site assessment and concept civil plan for a new Military Working Dog (MWD) Kennel at Buckley Air Force Base in a location determined by 460 CES. The Statement of Work required a geotechnical survey, a topographic site survey and a civil design showing probable utility extensions to serve the Kennel. This report includes a summary of the geotechnical findings, and discusses various site factors which affect the location of MWD Kennel.

2. FINDINGS

2.1. GEOTECHNICAL - The designated site is located within a former Army obstacle training course, and areas outside of the training course were identified by 460 CES in the Statement of Work as mapped IRP sites. The Geotechnical Report (Appendix I) defines the soil type and extent at twelve bore holes that were located as directed by 460 CES. Upper level soils were classified as sandy lean clays and clayey sands with low to moderate swell potential and good bearing strength. Lower level sandstone and claystone bedrock with high swell potential was reported in some locations. Ground water was measured at a depth of 18 feet in only one boring location. Visual observation of the boring materials did not indicate trash or buried debris at the locations noted. A visual screening of soils from three borings did not show any visual evidence of asbestos materials.

2.2. SURVEY - A topographic survey was completed for the designated site showing existing site features, utilities and grading. The proposed site has all necessary utilities within reasonable distances from the new building site. Due to the site elevation, a small lift station will be necessary to reach the nearest sewer manhole.

2.3. GRADING - Existing grading of the defined site has a steep (20%) section adjacent to Sunlight Way, that transitions down to approximately 5% about 100 feet from the road. A small drainage swale crosses the western portion of the designated site, and a 200 foot long berm extends from north to south across the site.

2.4. SITE PLANNING - Kennel design guidelines in DA Pam 190-12 and FM 3-19.17 recommend locating MWD kennel facilities away from built-up busy areas of the installation. Additional recommendations include locating the kennels away from aircraft runways, weapons ranges and motor pool operations to keep noise to a minimum, and avoiding areas that may present an environmental or health hazard to the dogs or handlers. This site is about one-half mile west of the active runway and about 500 feet south of the helicopter parking pads at AASF, both of which can be sources of significant noise.

3. RECOMMENDATIONS

3.1. GEOTECHNICAL - The geotechnical report indicates that the building can be founded on spread footings, if they are a minimum of ten feet above expansive bedrock. The building should be a slab-on-grade construction with three feet of recompacted subgrade below the slab. Pavements should be seven inch full-depth asphalt or seven inch concrete pavement.

3.2. UTILITIES - A six-inch water main extension with new fire hydrant and water service to the building should be extended from the west of the designated site. Sanitary sewer service will consist of a new dual-pump lift station and force main to the nearest manhole in the northwest corner of the site. Gas service will tap into the existing main on the south side of Sunlight Way. Electric service will be obtained from an existing manhole to the northeast corner of the site, and communications will extend from an existing telephone pedestal on the north side of Sunlight Way.

3.3. GRADING - Due to the steep cross-section of the site, some fill will be needed to create a reasonably level pad for the building and parking lot. Grades can be designed to slope gently down from Sunlight Way to the parking lot adjacent to the building. The drainage crossing the site should be routed around the new facility.

3.4. SITE PLANNING - The design basis facility sketch provided by 460 CES shows the building entrance facing northeast, a parking lot on the east side and the training yard to the southwest. That arrangement has been situated on the site in the flatter area away from Sunlight Way, with the site perimeter against the existing berm. We believe an improved layout would be a mirror of the Government suggested layout – with the outdoor exercise and training area closer to the large berm. That arrangement would provide improved noise protection from the active runway which is about one-half mile east of the kennel site. The alternate layout would also screen the kennel and training area from vehicle noise and headlights shining off the curve on Sunlight Way.

Vehicle parking and the building entrance would be readily evident to visitors approaching the site.

4. ENVIRONMENTAL CONSTRAINTS

4.1. FLORA AND FAUNA - Buckley Air Force Base is known to have prairie dog colonies that often house Burrowing Owls during their nesting season, and are attractive to raptors – some of which may be Threatened or Endangered Species. Both the prairie dogs and raptors may require special handling or construction limitations to comply with environmental protection regulations. It does not appear that there are any observable plant species that should be of environmental concern, since the site had been disturbed in the past to build and operate the obstacle course.

4.2. SEDIMENT CONTROL - Environmental controls shall be implemented during construction to reduce erosion and sediment runoff from the site. Since the proposed construction site is greater than one acre in size, the Colorado General Permit for Construction Activities at Federal Installations will be in effect, as modified by the Buckley Environmental Flight.

4.3. CONTAMINANTS - The Task Order Statement of Work noted that areas surrounding the old Army obstacle course where the Kennel is to be built are shown on Base mapping as IRP sites. The Geotechnical Report did not find any trash or visual contaminants in the boring holes. However, those findings are limited to the specific boring and not necessarily representative of the entire proposed Kennel construction site. Outside of the proposed Kennel site, there are signs of waste material dumping that were observed during the site visit. It is recommended that the construction specifications include provisions for notification and handling suspected contaminants and trash if found during excavations on the site. The proposed building elevation and driveway grading will require imported fill, and that should minimize excavation for the proposed facility.

5. CONCLUSIONS

5.1. SITE SUITABILITY

- Location of new MWD Kennel at the former obstacle course site meets the MWD design guidelines for separation from developed areas
- Location could be affected by noise from active runway and rotary wing aircraft nearby – provide mitigation to reduce noise
- All necessary utilities are within reasonable distance from the proposed facility location
- Existing site grades present design challenges due to steep, but manageable slopes
- Buckley Environmental Flight should address any wildlife concerns (i.e prairie dogs and burrowing owls)
- Erosion Control measures will need to be addressed by contractor or 460 CES

5.2. GEOTECHNICAL RECOMMENDATIONS

- Site is suitable for spread footings and slab-on-grade construction
- High swell potential bedrock requires importing of fill material
- Borings and laboratory testing did not indicate presence of trash or contaminants at the defined facility location

5.3. CONCEPT CIVIL PLAN

- Recommend locating the kennel and exercise yard to the east where berm can help mitigate noise from active runway
- Recommend locating access drive and parking lot on the west side of building with front entrance to the west
- Grading concept and utilities will be shown on the 35% Civil Site Plan

APPENDIX

I. GEOTECHNICAL REPORT

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GEOTECHNICAL ENGINEERING STUDY
NEW MILITARY WORKING DOG KENNEL
BUCKLEY AIR FORCE BASE, COLORADO
PROJECT NO. CRWU 07-3005

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Project No. 06-1-250

April 28, 2006

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SUMMARY

1. Subsurface conditions encountered in the borings generally consisted of very stiff to hard sandy lean clays and medium dense to dense clayey sands underlain at various depths by medium dense to dense silty sands and poorly-graded sands with silt. The sandy lean clays and clayey sands were encountered to depths generally ranging from about 3 to 11 feet below ground surface, with deeper zones of clayey sands and sandy lean clays encountered in several borings. The borings typically encountered medium hard to very hard sandstone or claystone bedrock at depths ranging from about 7 to 31 feet. Stabilized ground water levels were measured in one boring 4 days after drilling at a depth of about 18 feet.

   The on-site natural sandy clay and clayey sand soils, and the claystone bedrock, possess low to moderate swell potential based on testing performed for this study. Shallow foundations bearing directly on the sandy clay and clayey sand soils would have some risk of movement if the soils were exposed to moisture increases. Claystone bedrock with high to very high swell potential has been encountered on Buckley AFB and may be present at the site.

   Based on visual examination of the samples obtained from the borings and conditions observed during drilling, the borings did not encounter trash, debris, or other suspect materials, including visual evidence of asbestos materials.

2. The planned building can be supported on shallow spread footings provided the footings are underlain by at least 3 feet of properly compacted structural fill extending to properly prepared natural soils. The footings should be designed for an allowable soil bearing pressure of 2,500 psf.

3. Based on the low to moderate swelling characteristics of the materials encountered, we believe slab-on-grade construction may be used, provided the risk of distress resulting from slab movement is accepted by the owner. To mitigate against slab movements caused by swelling of the potentially expansive subgrade soils, we recommend that the subgrade soils to a depth of 3 feet beneath the slab be excavated, moisture-conditioned and recompacted.

4. Shallow claystone bedrock was encountered in the western portion of the site. If the facility is located in an area of shallow claystone bedrock, site grade should be raised so that the base of spread footings are at least 10 feet above the top of the claystone. Alternatively, drilled pier foundations extending into the bedrock may be considered for structures located over shallow claystone bedrock.

5. Areas of paving restricted to automobile parking only should be constructed with 6 inches of full-depth asphalt. Drive and fire lanes should have a minimum of 7 inches of full-depth asphalt. Concrete slabs used in delivery or trash collection areas should be 7 inches in thickness.

PURPOSE AND SCOPE OF WORK

This report presents the results of a geotechnical engineering study for the new Military Working Dog (MWD) Kennel to be located at Buckley Air Force Base (AFB), Colorado. The general project site is shown on Fig. 1.

The study was conducted for the purpose of developing recommendations for building foundations and support of floor slabs. The study was conducted in accordance with the scope of work outlined in our proposal No. P-06-248 to Merrick & Company, dated March 22, 2006. Facility siting considerations were presented in a letter dated April 20, 2006, and revised April 26, 2006.

A field exploration program consisting of exploratory borings was conducted to obtain information on subsurface conditions. Samples of the soils and bedrock obtained during the field exploration program were tested in the laboratory to determine their classification and engineering characteristics. The results of the field exploration and laboratory testing programs were analyzed to develop geotechnical engineering recommendations for use in design and construction of the proposed building and associated pavements.

This report has been prepared to summarize the data obtained during this study and to present our conclusions and recommendations based on the proposed construction and the subsurface conditions encountered. Design parameters and a discussion of geotechnical engineering considerations related to construction of the proposed building and pavements are included in the report.

PROPOSED CONSTRUCTION

We understand the proposed MWD kennel will consist of a 3,500 square foot, prefabricated, structural steel building. We assume the building will be an at-grade structure with no basement level. Although the exact location of the kennel within the study area has not been selected, we understand the preferred location is in the vicinity of our Boring 9, located east of the existing soil berm. We assume the facility will include a paved driveway and parking area, and unpaved yard areas and dog runs.

Site grading information was not available at the time of this report. Based on existing site topography as shown on Fig. 1, we anticipate site grading for the facility will require minor cuts and/or fills to construct the building pad and establish grades for associated facilities.

If the proposed construction varies significantly from that described above or depicted in this report, we should be notified to reevaluate the recommendations provided herein.

SITE CONDITIONS

The site is located south of South Aspen Way in the south-central portion of Buckley AFB. The site was previously used as an Army obstacle training course, and some obstacles are still located at the site. A three-story parachute tower and a small one-story building are located at the west end of the site, and an asphalt paved road rings the study area. We understand that the existing structures and obstacles will be demolished prior to construction of the site improvements.

Based on the topography indicated on Fig. 1, the site generally slopes gradually downward to the south with a maximum overall grade change of 28 feet. Slopes are steeper along the south side of South Aspen Way, and a drainage gully crosses the western portion of the site in a north-south direction. A soil berm ranging up to about 12 feet in height bisects the site in the north-south direction. The berm side slopes range from about 3H:1V (horizontal:vertical) to 4H:1V. Site vegetation at the time of drilling consisted of sparse grasses.

SUBSURFACE CONDITIONS

The subsurface conditions at the site were explored by drilling 12 widely-spaced exploratory borings to depths ranging from about 20 to 35 feet. The approximate locations of the exploratory borings and existing site features are shown on Fig. 1. Graphic logs of the borings are presented on Figs. 2 through 4, and a legend and notes describing the soils encountered are also presented on Fig. 4.

Subsurface Conditions: The borings generally encountered natural overburden soils generally underlain within the depths explored by sandstone or claystone bedrock. The overburden soils consist primarily of sandy lean clays and clayey sands underlain at various depths by silty sands to poorly-graded sands with silt. The natural soils encountered at Boring 3 were overlain by approximately 1½ feet of fill consisting of brown, slightly moist, sandy lean clay. Several borings encountered a few inches of topsoil. The presumed soil fill material comprising the existing berm was not explored.

Sandy lean clays and clayey sands were encountered at the boring locations to depths generally ranging from about 3 to 11 feet below ground surface. Deeper zones of clayey sands and sandy lean clays were encountered in several borings, including an approximately 12-foot thick zone in Boring 1 that extended to bedrock at a depth of about 20 feet. The sandy lean clays and clayey sands contained varying amounts of gravel, ranged from calcareous to very calcareous, and were interbedded and silty in places. The sandy lean clays ranged from very stiff to hard, were slightly moist to moist, and were generally brown with red-brown zones. Surficial clays encountered in the northeast portion of the site contained lower percentages of sand than clays encountered elsewhere across the site, and included a zone of white, apparently calcite-rich clay at Boring 9. The clayey sands were fine- to coarse-grained, medium dense to dense, slightly moist to moist, and brown to tan-brown.

The surficial sandy lean clays and clayey sands were generally underlain by silty sands and poorly-graded sands containing varying amounts of silt. These sands generally extended to bedrock or to the full depths explored of 25 feet in Boring 2 and 20 feet in Boring 9. The silty and poorly-graded sands were typically fine- to coarse-grained with varying amounts of gravel, medium dense to dense, slightly moist to moist, and tan-brown.

With the exception of Borings 2, 9, and 11, the borings encountered sandstone and claystone bedrock, and isolated interbedded sandstone and claystone bedrock, at depths ranging from about 7 to 31 feet. Claystone bedrock was encountered at depths as shallow as about 9 feet in Borings 4 and 6. The sandstone bedrock was fine- to coarse-grained, hard to very hard, weakly cemented, slightly moist to moist, and brown-orange to red-brown. The claystone bedrock was shale in places, medium hard to very hard, moist, and orange-gray to gray-brown.

Based on visual examination of the samples obtained from the borings and conditions observed during drilling, the borings did not encounter trash, debris, or other suspect materials, including visual evidence of asbestos materials.

Ground Water Conditions: Ground water was not encountered during drilling. A stabilized ground water level of about 18 feet below ground surface was measured four days after drilling in Boring 10.

LABORATORY TESTING

Laboratory testing was performed on selected soil samples obtained from the borings to determine in-situ soil moisture content and dry density, Atterberg limits, swell-consolidation characteristics, gradation, and concentration of water soluble sulfates. The results of the laboratory tests are shown to the right of the logs on Figs. 2 through 4 and summarized in Table I. The results of specific tests are graphically plotted on Figs. 5 through 12. The testing was conducted in general accordance with recognized test procedures, primarily those of the American Society for Testing of Materials (ASTM). In addition, three near-surface soil samples were submitted to an outside laboratory for asbestos screening.

Swell-Consolidation: Swell-consolidation tests were conducted on 10 samples of clayey overburden soils, including three samples of clayey sand, and claystone bedrock in order to determine their compressibility and swell characteristics under loading and when submerged in water. Each sample was prepared and placed in a confining ring between porous discs, subjected to a surcharge pressure of 1,000 psf, and allowed to consolidate before being submerged. The sample height was monitored until deformation practically ceased under each load increment.

Results of the swell-consolidation tests are plotted as a curve of the final strain at each increment of pressure against the log of the pressure. The swell-consolidation test results are presented on Figs. 5 through 9. Based on the results of laboratory swell-consolidation testing, two samples of clayey sand and two samples of sandy lean clay exhibited a slight tendency for additional compression upon wetting. Based on the insitu dry densities of the tested samples, the additional compression exhibited by most of those samples is considered to be primarily due to sample disturbance. The tested sample obtained in Boring 9 at a depth of 4 feet was calcite-

rich; the additional compression exhibited by that sample is consistent with our experience with similar calcite-rich materials.

Five samples of the near-surface sandy clays and clayey sands exhibited low to moderate swell potential upon wetting. A sample of the claystone bedrock exhibited low swell potential upon wetting; however, claystone bedrock with high to very high swell potential has been encountered at other locations at Buckley AFB and may be present at the site.

Index Properties: Samples were classified into categories of similar engineering properties in general accordance with the Unified Soil Classification System. This system is based on index properties, including liquid limit and plasticity index and grain size distribution. Values for moisture content, dry density, liquid limit and plasticity index, and the percent of soil passing the U.S. No. 4 and No. 200 sieves are presented in Table I and adjacent to the corresponding sample on the boring logs. Grain size distribution curves are presented on Figs. 10 through 12.

Asbestos Screening: At the request of Buckley AFB, three near-surface soil samples obtained from borings in the eastern portion of the site were screened for asbestos materials using polarized light microscopy (PLM). The tested samples were obtained at depths of 1 foot in Borings 9 and 12, and 4 feet in Boring 11. Based on the results of the PLM testing, asbestos was not detected in the submitted samples. The asbestos screening laboratory data report is included in Appendix A.

SHALLOW SPREAD FOOTING FOUNDATION RECOMMENDATIONS

The existing natural clayey sand and sandy clay soils possess low to moderate swell potential based on testing performed for this study. Shallow foundations bearing directly on these soils would have some risk of movement if the soils were exposed to moisture increases. However, we believe shallow spread footings will provide acceptable performance provided the footings are underlain by at layer of properly compacted structural fill.

Bedrock, including shallow claystone bedrock, was encountered at depths ranging from about 7 to 10 feet in four borings drilled in the western portion of the site near the former parachute towers. Use of spread footing foundations in that portion of the site should be considered only if site grades are raised sufficiently to provide a 10 foot separation between the bedrock surface

and the bottom of the footings. If site grades are generally unaltered or lowered, drilled pier foundations should be considered for buildings constructed in that portion of the site.

The design and construction criteria presented below should be observed for a spread footing foundation system. The construction details should be considered when preparing project documents.

1. Shallow spread footings should be underlain by at least 3 feet of properly compacted structural fill extending to properly prepared natural soils. Footings should not be underlain by existing fills or improperly placed fills. Structural fill should consist of properly moisture-conditioned, on-site natural sand soils, exclusive of organics and other deleterious materials. Structural fill materials should exhibit a swell potential of not more than ½% when wetted under a surcharge pressure of 200 psf. Structural fill beneath footings should be placed and compacted to 98% of the standard Proctor (ASTM D698) maximum dry density at a moisture content ranging from 0 to 3 percentage points above the optimum moisture content.

2. Spread footings bearing on at least three feet of properly compacted structural fill extending to properly prepared natural soils should be designed for an allowable bearing pressure of 2,500 psf.

3. Spread footings placed on properly compacted structural fill should have a minimum footing width of 18 inches for continuous footings and 24 inches for isolated pads.

4. Based on experience, we estimate total settlement for spread footings designed and constructed as discussed in this section will be approximately 1 inch or less. Differential settlements between adjacent, similarly loaded spread footings are estimated to be approximately ½ to ¾ of the total settlement

5. The footings should be provided with adequate soil cover above their bearing elevation for frost protection. Placement of foundations at least 36 inches below the exterior grade is recommended for this area.

6. The lateral resistance of a spread footing placed on properly compacted structural fill material will be a combination of the sliding resistance of the footing on the foundation materials and passive earth pressure against the side of the footing. Resistance to sliding at the bottoms of the footings can be calculated based on a coefficient of friction of 0.3. Passive pressure against the sides of the footings can be calculated using an equivalent fluid unit weight of 175 pcf. These lateral resistance values are working values.

7. Structural fill placed against the sides of the footings to resist lateral loads should consist of on-site or imported structural fill material compacted to at least 95% of the standard Proctor (ASTM D 698) maximum dry density at a moisture content within 0 to 3 percentage points above the optimum moisture content.

8. Care should be taken when excavating for the foundations to avoid disturbing the supporting materials. Materials that are disturbed should be removed and replaced with properly compacted structural fill. Excessive wetting or drying of the foundation excavations should be avoided during construction.

9. Care should be taken to provide adequate surface drainage during the excavation of footings, and the contractor should have equipment available for removing water from excavations following precipitation, if needed. Footing excavations that are inundated as a result of uncontrolled surface runoff may soften, requiring the implementation of mitigation measures discussed in Item 8, above.

10. A representative of the geotechnical engineer should observe all footing excavations prior to concrete placement.

FLOOR SLABS

Floor slabs present a difficult problem where expansive materials are present near floor slab elevation. Expansive materials are a concern because sufficient dead load cannot be imposed on them to resist the uplift pressure generated when the materials are wetted and expand. Based on the low to moderate swelling characteristics of the materials encountered, we believe slab-on-grade construction may be used for the building floor slab, provided the precautions

presented below are taken and the risk of distress resulting from slab movement is accepted by the owner.

The following measures should be taken to mitigate or reduce slab movements, and reduce the potential for damage which could result from movement should the underslab materials be subjected to moisture changes.

1. The subgrade soils beneath the floor slab should be over-excavated to a depth of at least 3 feet. The upper 12 inches of the subgrade soils at the base of the 3-foot over-excavation should be scarified, moisture conditioned, and recompacted to at least 95% of the standard Proctor (ASTM D 698) maximum dry density at a moisture content within 0 to 3 percentage points above optimum. Excavated material removed from the excavation, exclusive of any deleterious materials, should then be moisture-conditioned, placed back in the excavation, and compacted using the dry density and moisture content requirements presented above for the scarified excavation subgrade.

2. Existing fill, if encountered beneath the slab subgrade, should be completely excavated and replaced with properly compacted on-site material.

3. Floor slabs should be separated from all bearing walls and columns with expansion joints which allow unrestrained vertical movement.

4. Non-bearing partitions resting on floor slabs should be provided with slip joints so that, if the slabs move, the movement cannot be transmitted to the upper structure. This detail is also important for wallboards and door frames. Slip joints that will allow at least 2 inches of vertical movement are recommended.

   If wood or metal stud partition walls are used, the slip joints should preferably be placed at the bottoms of the walls so differential slab movement won't damage the partition wall. If slab bearing masonry block partitions are constructed, the slip joints will have to be placed at the tops of the walls. If slip joints are provided at the tops of walls and the floors move, it is likely the partition walls will show signs of distress, such as cracking. An alternative, if masonry block walls or other walls without slip joints at the bottoms are required, is to found them on grade beams and piers and to construct the slabs

independently of the foundation. If slab bearing partition walls are required, distress may be reduced by connecting the partition walls to the exterior walls using slip channels.

Floor slabs should not extend beneath exterior doors or over foundation grade beams, unless saw cut at the beam after construction

5. Floor slab control joints should be used to reduce damage due to shrinkage cracking. Joint spacing is dependent on slab thickness, concrete aggregate size, and slump, and should be consistent with recognized guidelines such as those of the Portland Cement Association (PCA) or American Concrete Institute (ACI). The joint spacing and slab reinforcement should be established by the designer based on experience and the intended slab use.

6. Although not required for subsurface drainage (assuming there are no below-grade floor levels), a minimum 4-inch layer of free-draining gravel may be placed beneath slab-on-grade floor slabs. The gravel layer should help mitigate capillary water rise, ease construction, and reduce slab curling due to differential cure. If used, this material should consist of minus 2-inch aggregate with less than 30% passing the No. 4 sieve and less than 5% passing the No. 200 sieve.

7. If moisture-sensitive floor coverings will be used, additional mitigation of moisture penetration into the slabs, such as by use of a vapor barrier, may be required. If an impervious vapor barrier membrane is used, special precautions will be required to prevent differential curing problems which could cause the slabs to warp. American Concrete Institute (ACI) 302.1R addresses this topic.

8. All plumbing lines should be tested before operation. Where plumbing lines enter through the floor, a positive bond break should be provided. Flexible connections should be provided for slab-bearing mechanical equipment.

The precautions and recommendations itemized above will not prevent the movement of floor slabs if the underlying materials are subjected to alternate wetting and drying cycles. However, the precautions should reduce the damage if such movement occurs.

SITE SEISMIC CRITERIA

Based on the 1997 Uniform Building Code (UBC), the site is located in Seismic Zone 1. The soil profile generally consists of natural relatively stiff clays and relatively dense sands, underlain at depths of between 7 and 31 feet by sandstone and claystone bedrock. The overburden soil generally classifies as UBC Soil Profile Type S_D or International Building Code (IBC) Site Class D, and the underlying bedrock generally classifies as UBC Soil Profile Type S_B or S_C, or IBC Site Class B or C. Both UBC and IBC limit the use of Soil Profile Type S_B, or IBC Site Class B, to profiles where the overburden thickness between the base of the foundations and the rock surface is 10 feet or less. We recommend a design soil profile for the site of UBC Soil Profile Type S_D or IBC Site Class C. Based on the subsurface profile, site seismicity, and the anticipated depth of ground water, liquefaction is not a design consideration.

WATER SOLUBLE SULFATES

Concentrations of water-soluble sulfates measured in samples of on-site natural clays ranged from less than 0.02% to 0.03%. These concentrations of water soluble sulfates represent a negligible degree of sulfate attack on concrete exposed to these materials. The degree of attack is based on a range of negligible, positive, severe and very severe as presented in the U.S. Bureau of Reclamation Concrete Manual. Based on the laboratory test results, we believe special sulfate resistant cement will generally not be required for concrete exposed to on-site natural soils.

SURFACE DRAINAGE

Proper surface drainage is very important for acceptable performance of the building during construction and after the construction has been completed. Drainage recommendations provided by local, state and national entities should be followed based on the intended use of the building. The following recommendations should be used as guidelines and changes should be made only after consultation with the geotechnical engineer.

1. Excessive wetting or drying of the underslab areas should be avoided during construction.

2. Unless otherwise recommended herein, exterior backfill should be adjusted to near optimum moisture and compacted to at least 95% of the maximum standard Proctor density.

3. The ground surface surrounding the exterior of the building should be sloped to drain away from the foundation in all directions. We recommend a minimum slope of 12 inches in the first 10 feet in unpaved areas and a minimum slope of 3 inches in the first 10 feet in paved areas. Site drainage beyond the 10-foot zone should be designed to promote runoff and reduce infiltration. These slopes may be changed as required for handicap access points in accordance with the Americans with Disabilities Act.

4. The upper 1 to 2 feet of the backfill should be relatively impervious material compacted as above to limit infiltration of surface runoff.

5. Ponding of water should not be allowed in backfill material or in a zone within 10 feet of the foundation walls, whichever is greater.

6. Roof downspouts and drains should discharge well beyond the limits of all backfill.

7. Excessive landscape irrigation should be avoided within 10 feet of the foundation walls.

8. Plastic membranes should not be used to cover the ground surface adjacent to foundation walls.

EXCAVATION AND GRADING CONSIDERATIONS

We assume that the site excavations will be constructed by generally over-excavating the side slopes to a stable configuration where enough space is available. All excavations should be constructed in accordance with OSHA requirements, as well as state, local and other applicable requirements. The natural sandy clay soils generally classify as OSHA Type B soils, and the natural sand soils generally classify as OSHA Type C soils.

Excavated slopes in natural clay materials may soften due to construction traffic and erode from surface runoff. Measures to keep surface runoff from excavation slopes, including diversion berms, should be considered.

PAVEMENT THICKNESS DESIGN

A pavement section is a layered system designed to distribute concentrated traffic loads to the subgrade. Performance of the pavement structure is directly related to the physical properties of the subgrade soils and traffic loadings. Pavements should be underlain by properly prepared natural soils or structural fill extending to undisturbed natural soils.

The pavement sections recommended herein should be considered preliminary. However, the sections are not expected to change if the traffic loads do not vary from those assumed herein.

Subgrade Materials: Based on the results of the field and laboratory programs, tested samples of the near-surface subgrade materials across the site generally classify as A-6 with group indices ranging from 4 to 11 in accordance with the American Association of State Highway and Transportation Officials (AASHTO) classification. One sample classified as A-7-6 with a group index of 24. These materials would generally be considered to provide poor subgrade support. A resilient modulus of 3,025 psi was chosen to represent the subgrade soils.

Design Traffic: We have not been provided with site specific traffic numbers for the planned pavement areas. For pavement thickness design calculations we have assumed an equivalent 18-kip daily load application (EDLA) of 3 for automobile parking areas and 10 for access drives and/or fire lanes.

Pavement Sections: Pavement sections were determined in accordance with the 1993 AASHTO pavement design procedure. Areas of paving restricted to automobile parking only should be constructed with 6 inches of full-depth asphalt. Drive and fire lanes should have a minimum of 7 inches of full-depth. Concrete slabs used in delivery or trash collection areas should be 7 inches in thickness.

Subgrade Preparation: Prior to placing the pavement section, the entire subgrade area should be scarified to a depth of 12 inches, adjusted to a moisture content near optimum and compacted to 95% of the standard Proctor (ASTM D 698) maximum dry density. The pavement subgrade should be proofrolled with a heavily loaded pneumatic-tired vehicle. Pavement design procedures assume a stable subgrade. Areas that deform excessively under heavy wheel loads are not stable and should be removed and replaced to achieve a stable subgrade prior to

paving.

Drainage: The collection and diversion of surface drainage away from paved areas is extremely important to the satisfactory performance of pavement. Drainage design should provide for the removal of water from paved areas and prevent the wetting of the subgrade soils.

DESIGN AND CONSTRUCTION SUPPORT SERVICES

Kumar & Associates, Inc. should be retained to review the project plans and specifications for conformance with the recommendations provided in our report. We are also available to assist the design team in preparing specifications for geotechnical aspects of the project, and performing additional studies if necessary to accommodate possible changes in the proposed construction.

We recommend that Kumar & Associates, Inc. be retained to provide observation and testing services to document that the intent of this report and the requirements of the plans and specifications are being followed during construction, and to identify possible variations in subsurface conditions from those encountered in this study so that we can re-evaluate our recommendations, if needed.

LIMITATIONS

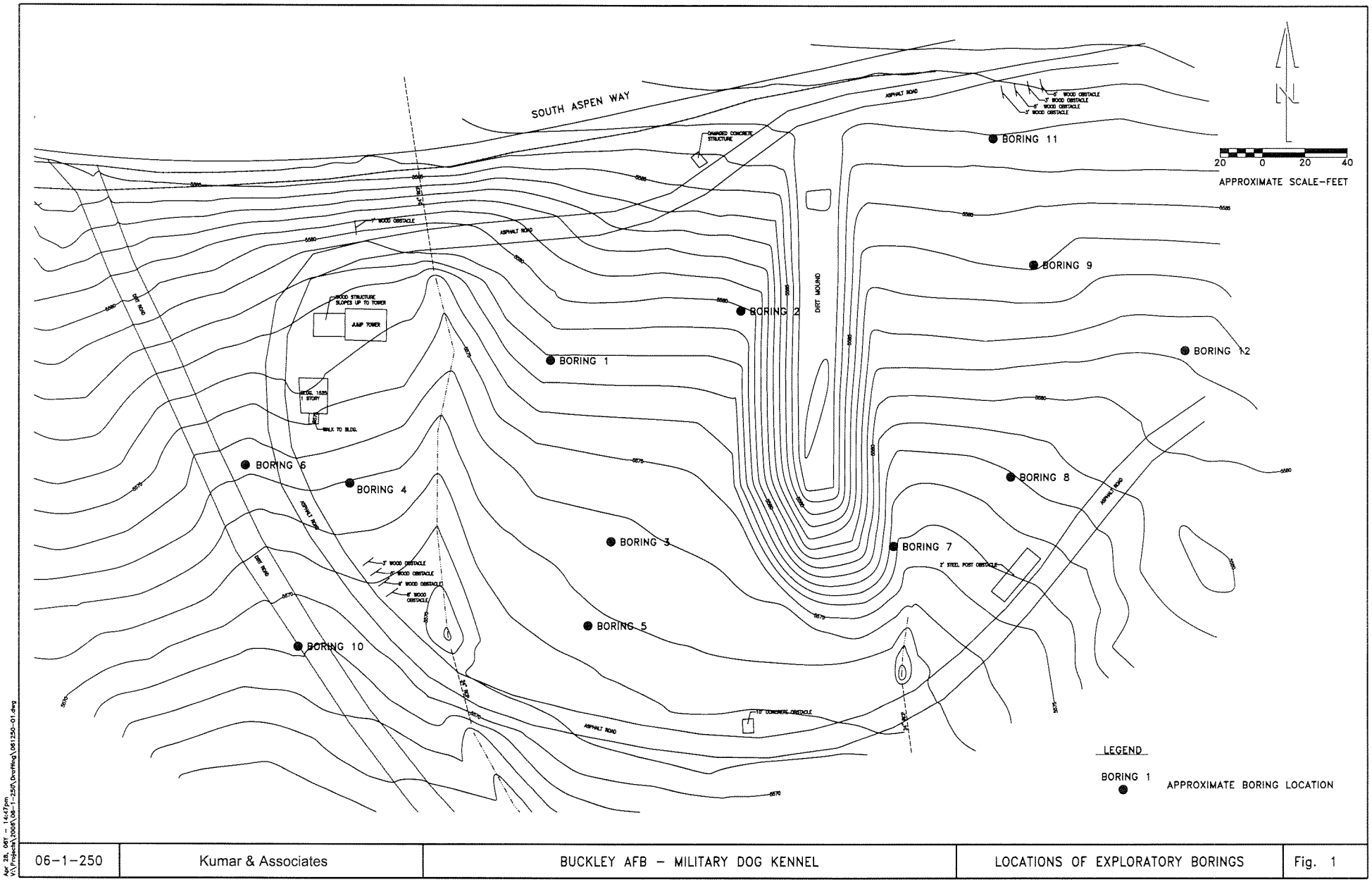
This study has been conducted in accordance with generally accepted geotechnical engineering practices in this area for exclusive use by the client for design purposes. The conclusions and recommendations submitted in this report are based upon data obtained from the exploratory borings at the locations indicated on Fig. 1, and the proposed construction. This report may not reflect subsurface variations that occur between the explorations, and the nature and extent of variations across the site may not become evident until site grading and excavations are performed. If during construction, fill, soil, rock or water conditions appear to be different from those described herein, Kumar & Associates, Inc. should be advised at once so that a re-evaluation of the recommendations presented in this report can be made. Kumar & Associates, Inc. is not responsible for liability associated with interpretation of subsurface data by others.

Other than the requested asbestos screening, the scope of services for this project does not include any environmental assessment of the site or identification of contaminated or hazardous

materials or conditions. If the Buckley AFB is concerned about the potential for such contamination, other studies should be undertaken.

JWG/mj

cc: file, book



06-1-250	Kumar & Associates	BUCKLEY AFB – MILITARY DOG KENNEL	LOCATIONS OF EXPLORATORY BORINGS	Fig. 1

Apr 28, 06 - 1:47pm
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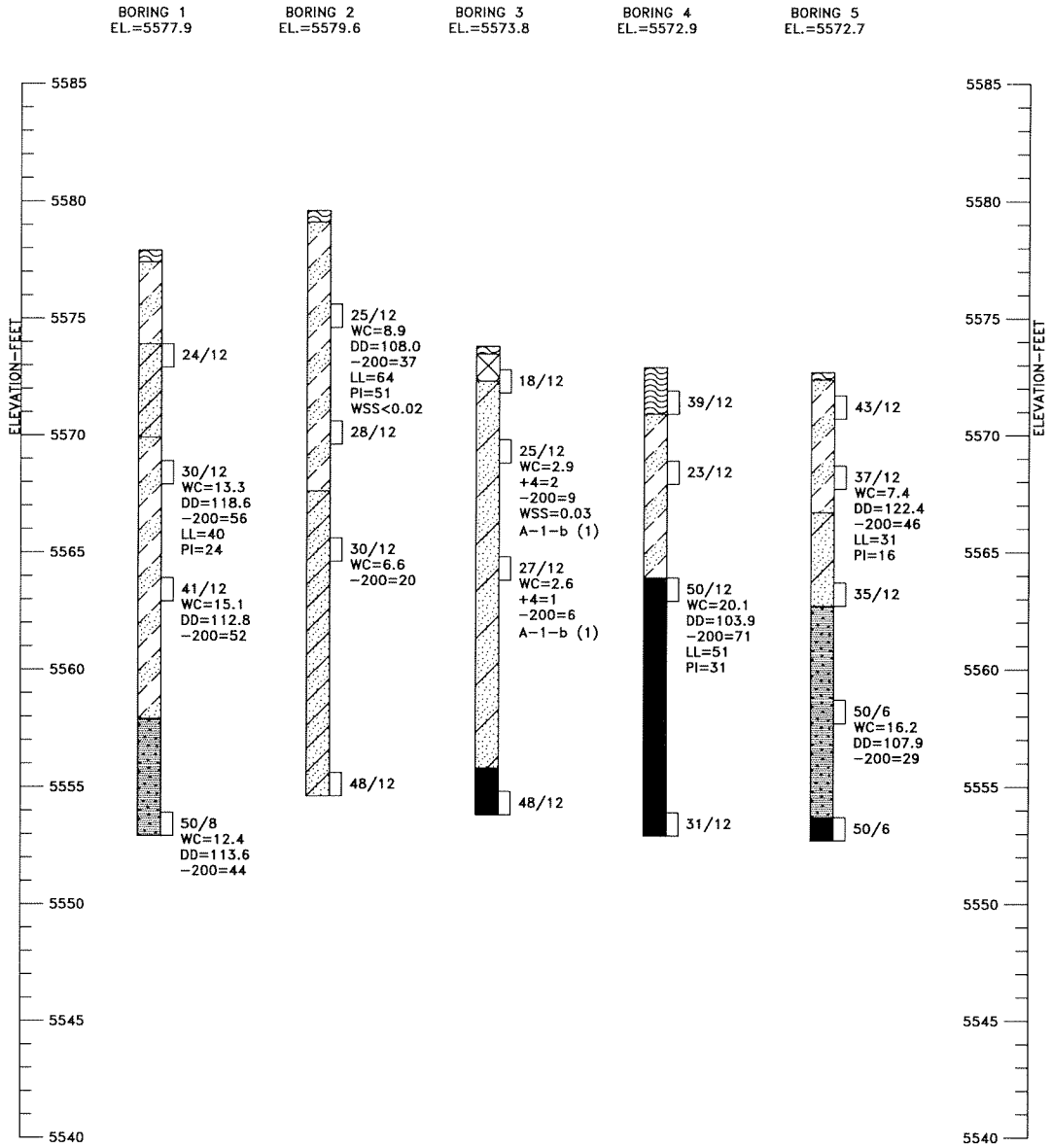

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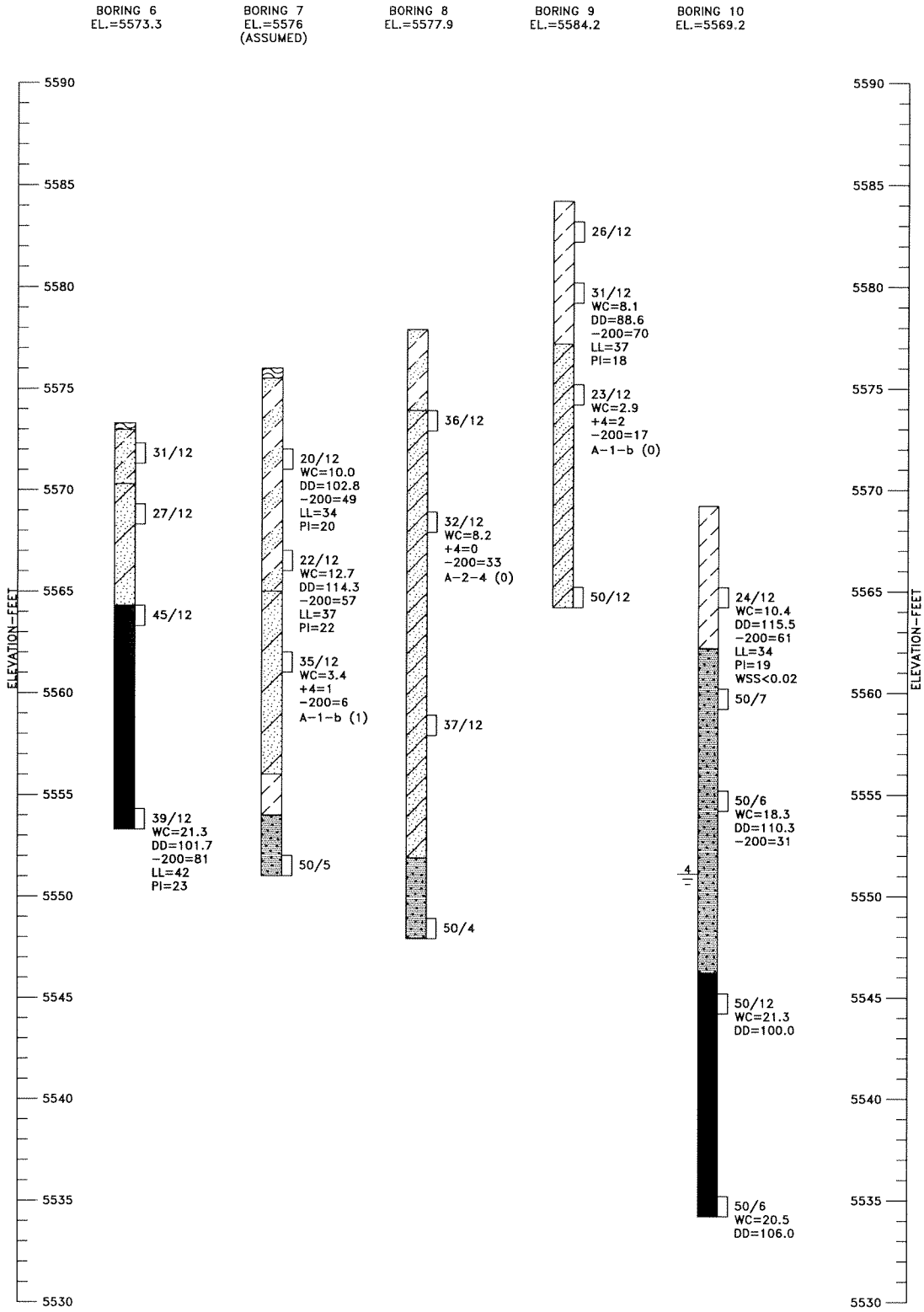
06-1-250

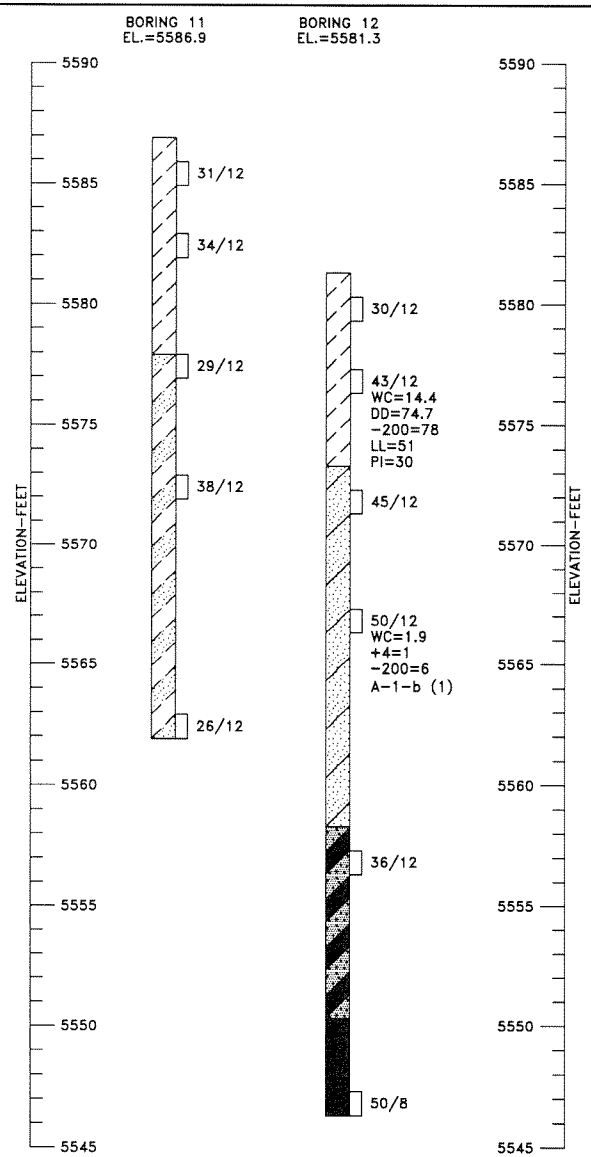
Kumar & Associates

BUCKLEY AFB - MILITARY DOG KENNEL

LOGS OF EXPLORATORY BORINGS

Fig. 3





LEGEND

- TOPSOIL WITH VEGETATION ROOTED IN SANDY LEAN CLAY OR CLAYEY SAND, BROWN.
- FILL: SANDY LEAN CLAY (CL), SLIGHTLY MOIST, BROWN.
- SANDY LEAN CLAY (CL) WITH GRAVEL, ISOLATED SANDY FAT CLAY (CH) AND CALCITE-RICH ZONES, SCATTERED ORGANICS IN UPPER 1-1/2' TO 2-1/2' IN PLACES, CALCAREOUS TO VERY CALCAREOUS, VERY STIFF TO HARD, SLIGHTLY MOIST, BROWN WITH RED-BROWN ZONES AND WHITE CALCITE-RICH ZONES.
- CLAYEY SAND (SC) TO SANDY LEAN CLAY (CL) WITH SCATTERED GRAVEL IN PLACES, INTERBEDDED AND SILTY IN PLACES, FINE TO COARSE GRAINED SAND, MEDIUM DENSE TO DENSE, VERY STIFF TO HARD, SLIGHTLY MOIST TO MOIST, BROWN AND TAN-BROWN, CALCAREOUS TO VERY CALCAREOUS.
- CLAYEY SAND (SC) WITH SCATTERED GRAVEL, FINE TO COARSE GRAINED, DENSE, SLIGHTLY MOIST, BROWN.
- SILTY SAND (SM) WITH GRAVEL, FINE TO COARSE GRAINED, MEDIUM DENSE TO DENSE, SLIGHTLY MOIST, TAN-BROWN.
- POORLY-GRADED SAND WITH SILT (SP-SM) AND GRAVEL, FINE TO COARSE GRAINED, MEDIUM DENSE, SLIGHTLY MOIST TO MOIST, TAN-BROWN.
- SANDSTONE BEDROCK, FINE TO COARSE GRAINED, HARD TO VERY HARD, WEAKLY CEMENTED, SLIGHTLY MOIST TO MOIST, BROWN-ORANGE TO RED-BROWN.
- CLAYSTONE BEDROCK, SHALY IN PLACES, MEDIUM HARD TO VERY HARD, MOIST, ORANGE-GRAY TO GRAY-BROWN.
- INTERLENSED SANDSTONE AND CLAYSTONE BEDROCK, MEDIUM HARD, MOIST, YELLOW-BROWN AND GRAY-BROWN.
- DRIVE SAMPLE, 2-INCH I.D. CALIFORNIA LINER SAMPLE.

24/12 DRIVE SAMPLE BLOW COUNT. INDICATES THAT 24 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE THE SAMPLER 12 INCHES.

4 DEPTH TO WATER LEVEL AND NUMBER OF DAYS AFTER DRILLING MEASUREMENT WAS MADE.

NOTES

1. THE EXPLORATORY BORINGS WERE DRILLED ON APRIL 7 AND 10, 2006 WITH A 4-INCH DIAMETER CONTINUOUS FLIGHT POWER AUGER.
2. THE LOCATIONS OF THE EXPLORATORY BORINGS WERE MEASURED BY INSTRUMENT SURVEY.
3. THE ELEVATIONS OF THE EXPLORATORY BORINGS WERE MEASURED BY INSTRUMENT LEVEL.
4. THE EXPLORATORY BORING LOCATIONS AND ELEVATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
5. THE LINES BETWEEN MATERIALS SHOWN ON THE EXPLORATORY BORING LOGS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES AND THE TRANSITIONS MAY BE GRADUAL.
6. GROUND WATER LEVELS SHOWN ON THE LOGS WERE MEASURED AT THE TIME AND UNDER CONDITIONS INDICATED. FLUCTUATIONS IN THE WATER LEVEL MAY OCCUR WITH TIME.
7. LABORATORY TEST RESULTS:
   WC = WATER CONTENT (%) (ASTM D 2216);
   DD = DRY DENSITY (pcf) (ASTM D 2216);
   +4 = PERCENTAGE RETAINED ON NO. 4 SIEVE (ASTM D 422);
   +10 = PERCENTAGE RETAINED ON NO. 10 SIEVE (AASHTO T 88);
   -200 = PERCENTAGE PASSING NO. 200 SIEVE (ASTM D 1140);
   LL = LIQUID LIMIT (ASTM D 4318);
   PI = PLASTICITY INDEX (ASTM D 4318);
   NP = NON-PLASTIC (ASTM D 4318);
   NV = NO LIQUID LIMIT VALUE (ASTM D 4318);
   WSS = WATER SOLUBLE SULFATES (%) (AASHTO T 290);
   A-1-b (1) = AASHTO CLASSIFICATION (GROUP INDEX) (AASHTO M 145).

06-1-250	Kumar & Associates	BUCKLEY AFB - MILITARY DOG KENNEL	LOGS OF EXPLORATORY BORINGS	Fig. 4

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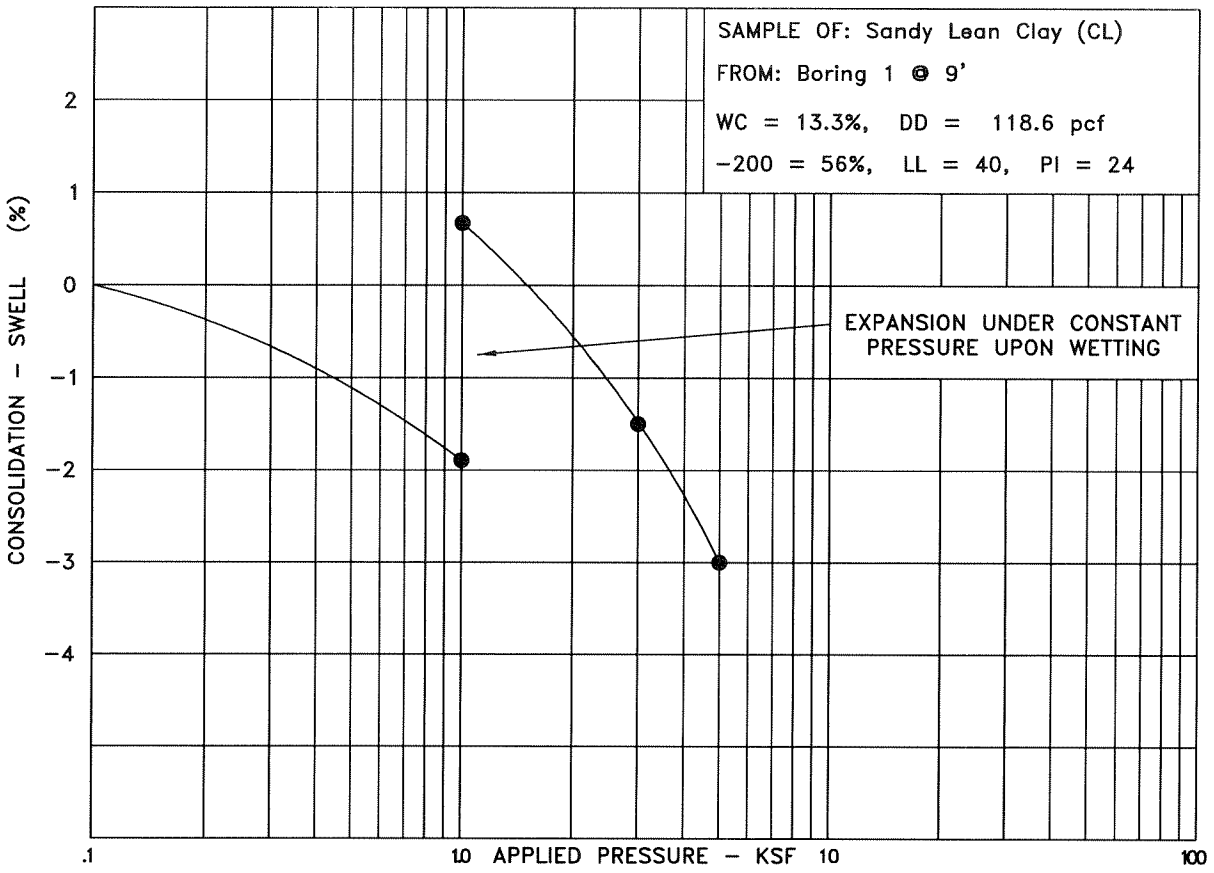

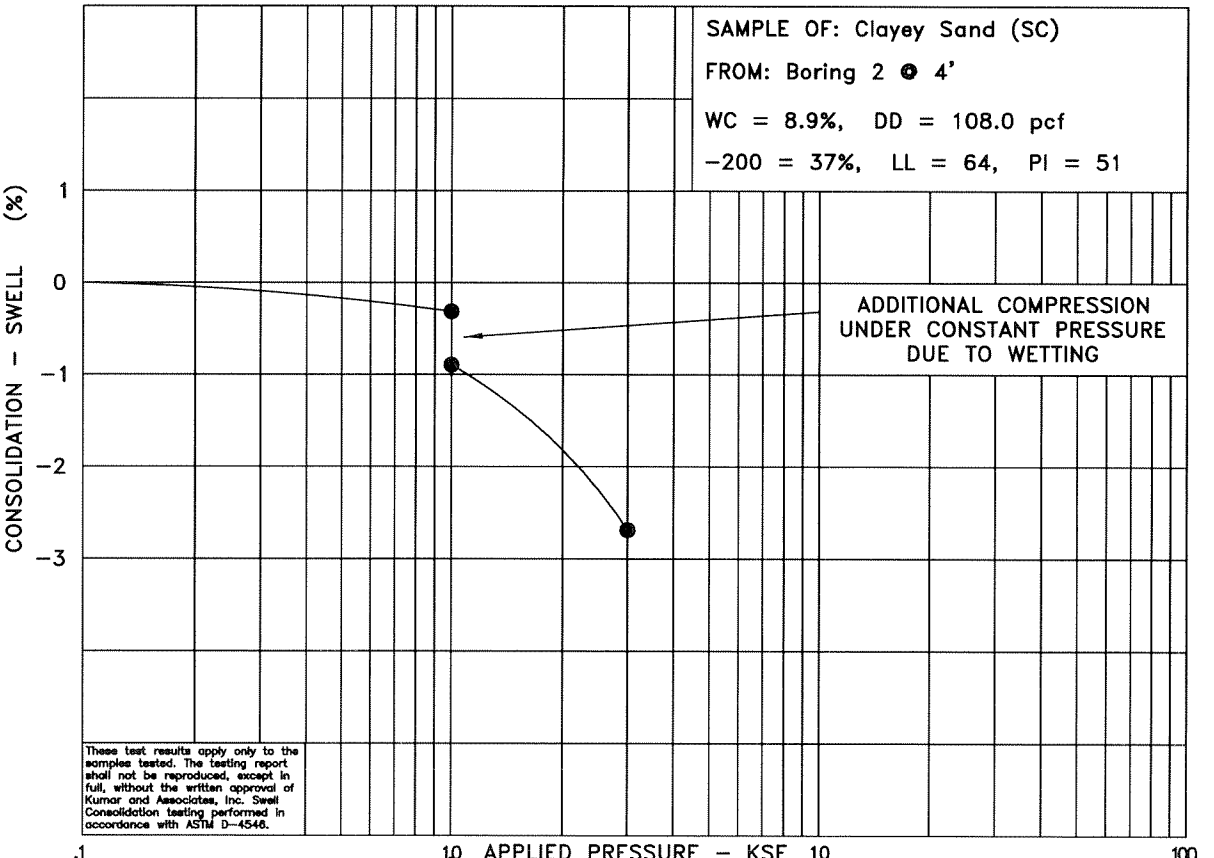

These test results apply only to the samples tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar and Associates, Inc. Swell Consolidation testing performed in accordance with ASTM D-4546.

06-1-250	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULTS	Fig. 5

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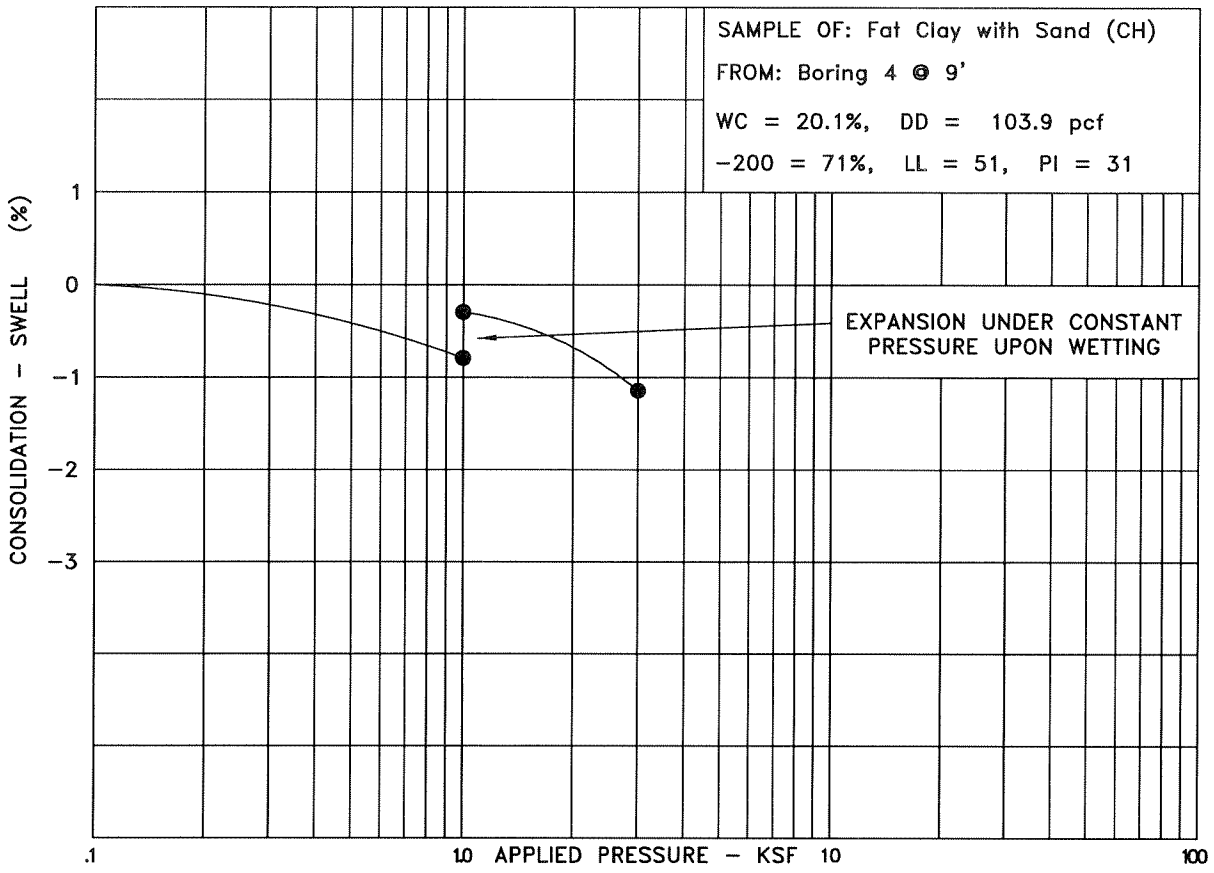
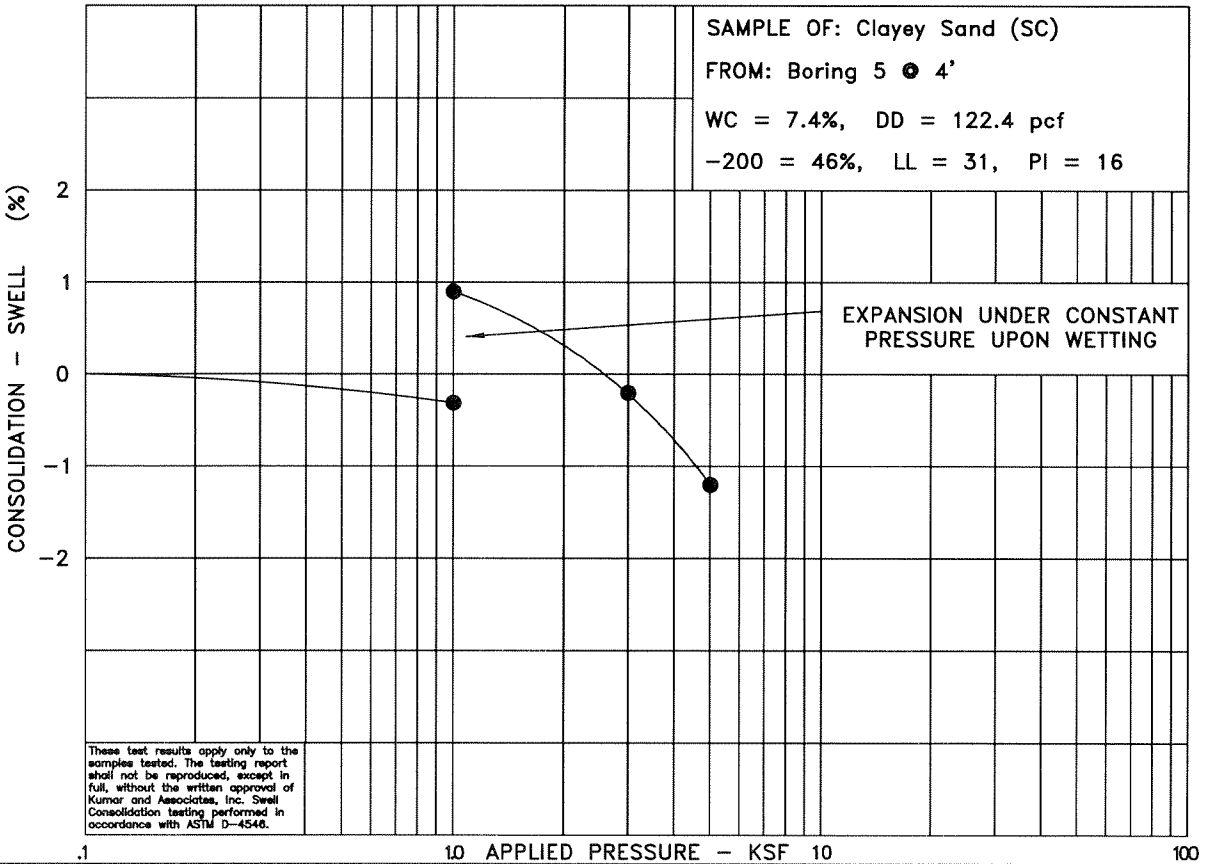
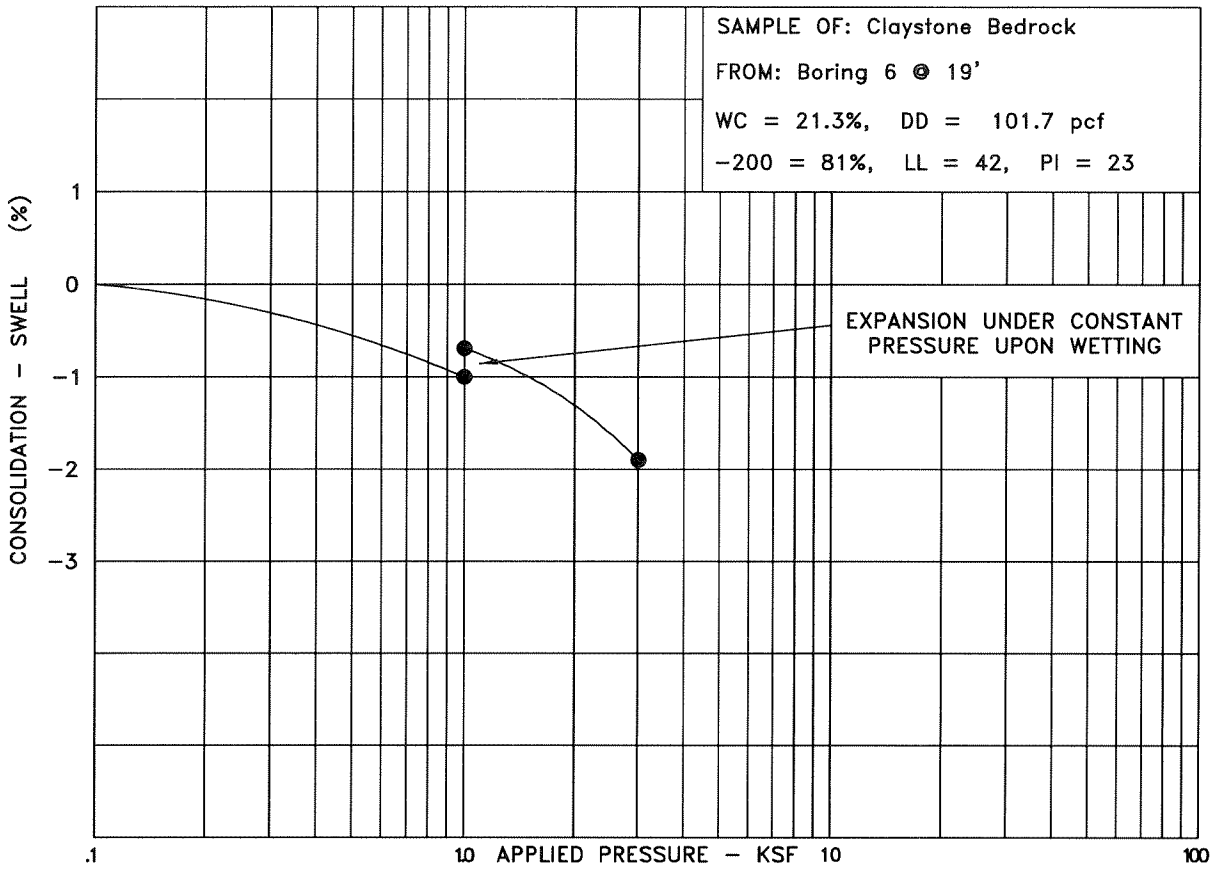
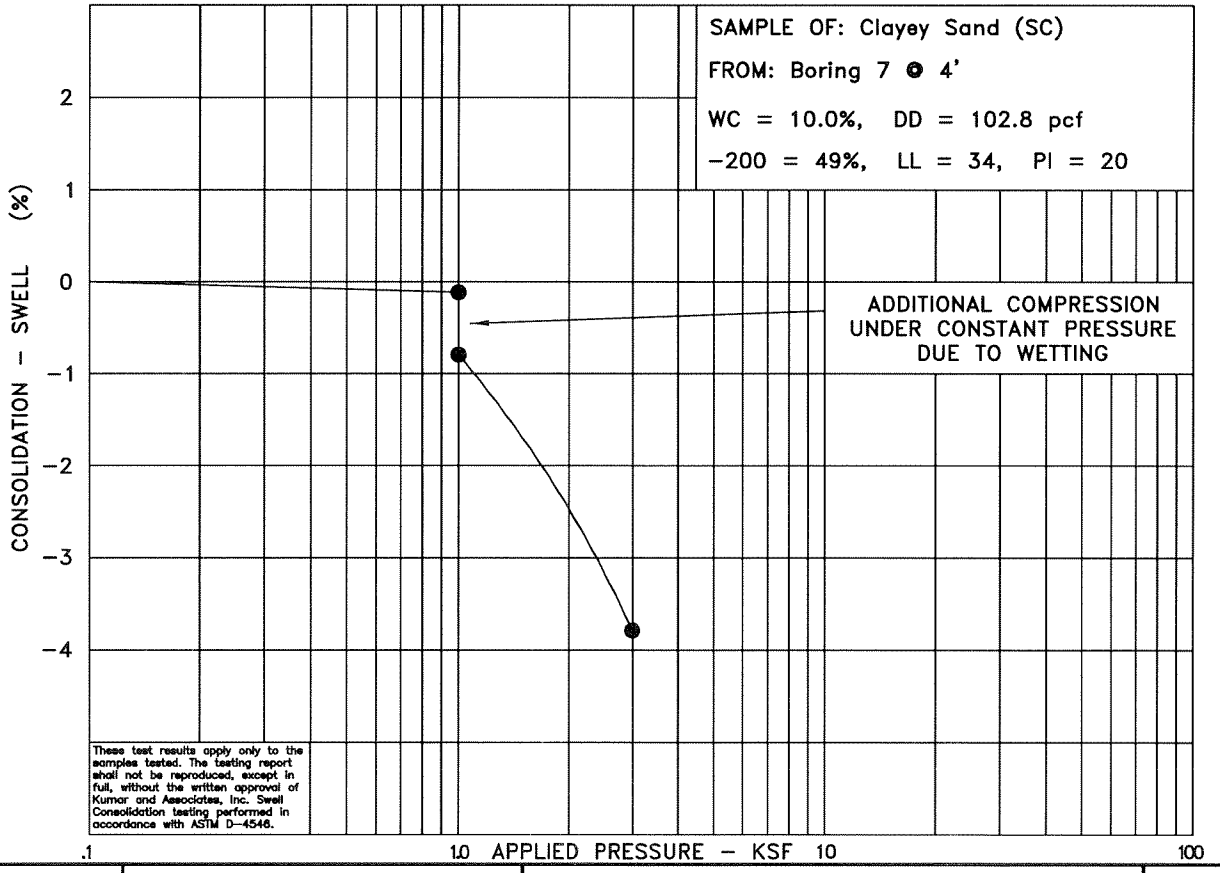




06-1-250	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULTS	Fig. 6





These test results apply only to the samples tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar and Associates, Inc. Swell Consolidation testing performed in accordance with ASTM D-4546.

06-1-250	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULTS	Fig. 7

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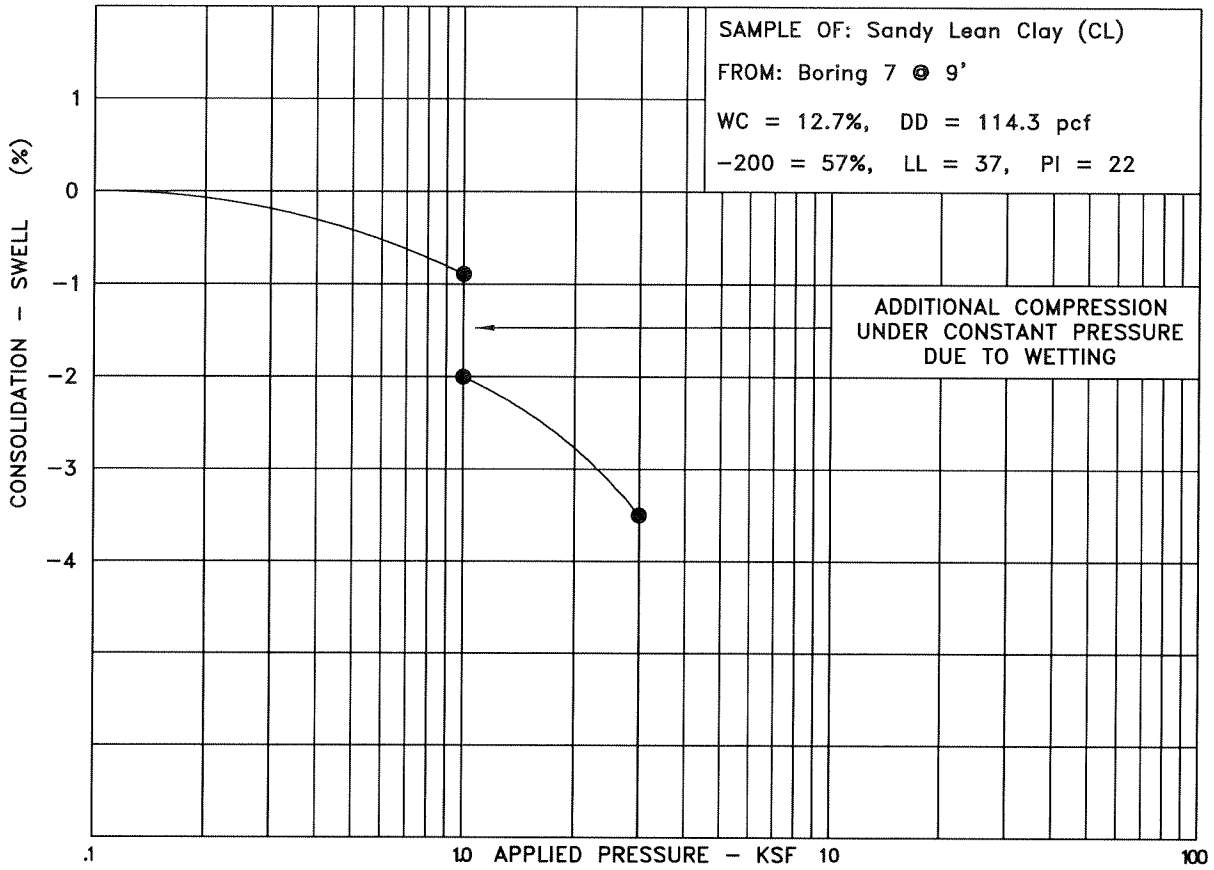

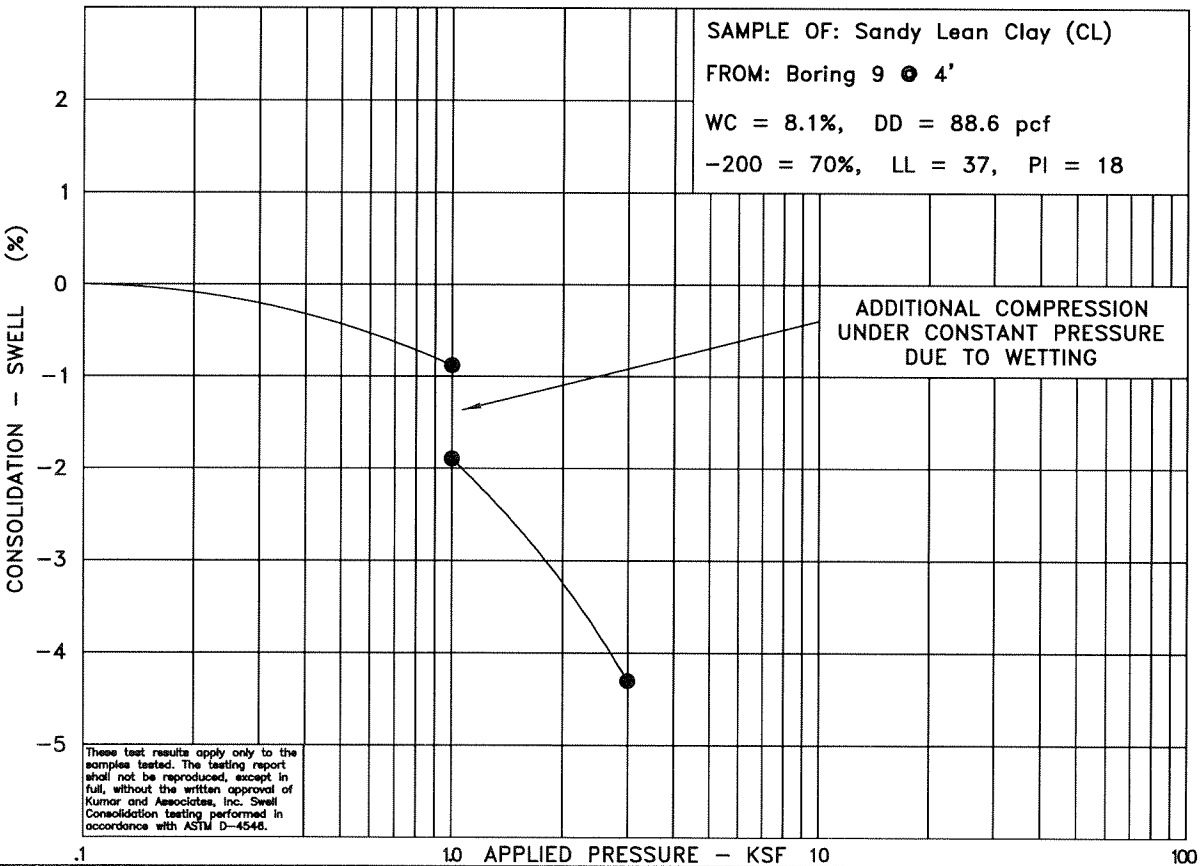

These test results apply only to the samples tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar and Associates, Inc. Swell Consolidation testing performed in accordance with ASTM D--4546.

06-1-250	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULTS	Fig. 8

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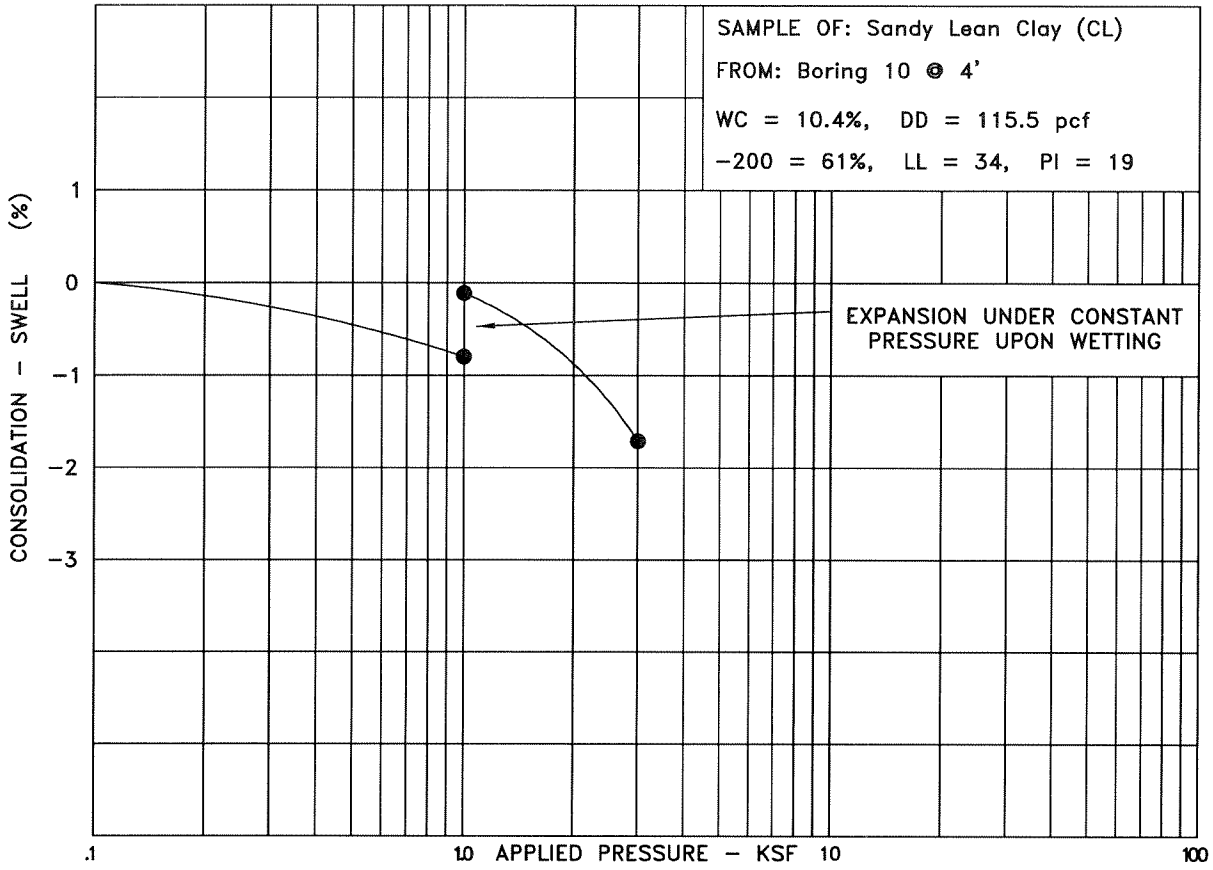

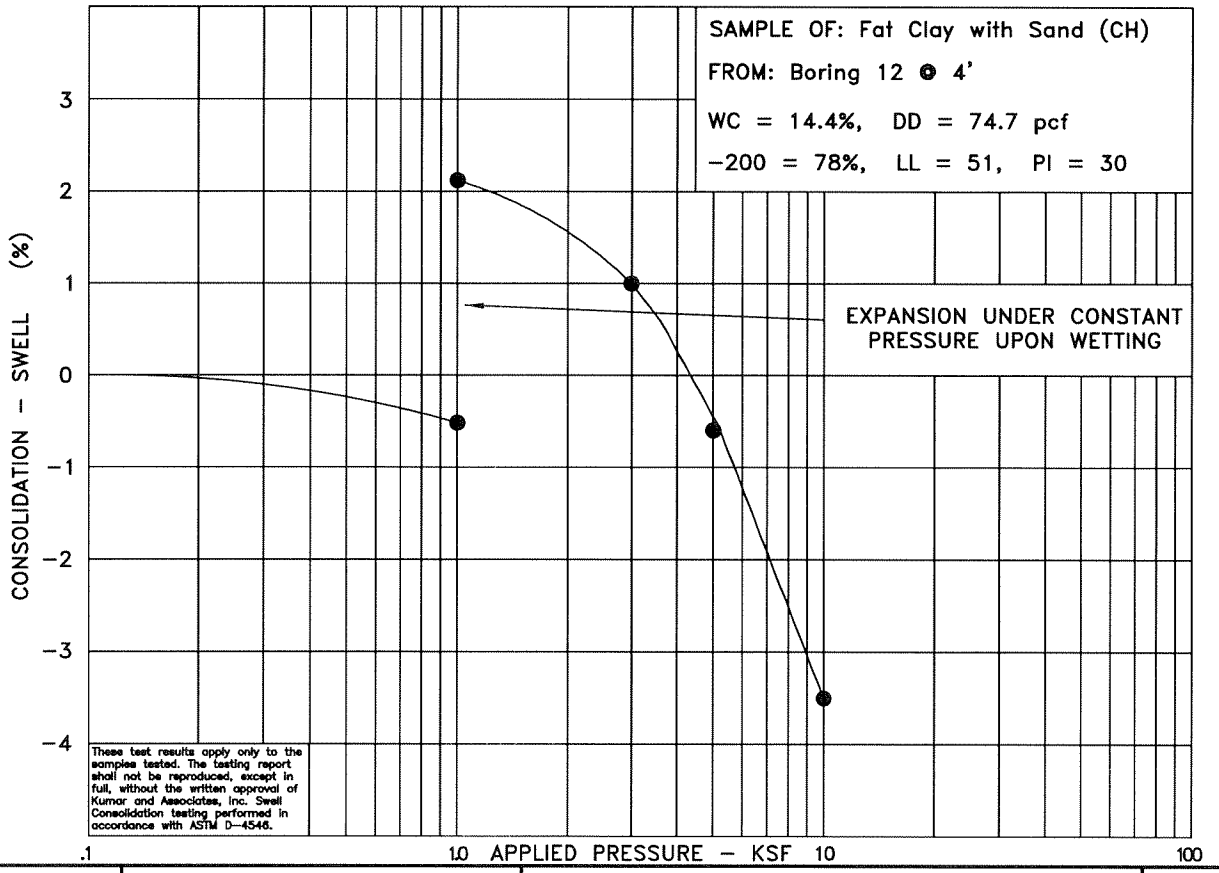

These test results apply only to the samples tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar and Associates, Inc. Swell Consolidation testing performed in accordance with ASTM D-4546.

06-1-250	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULTS	Fig. 9

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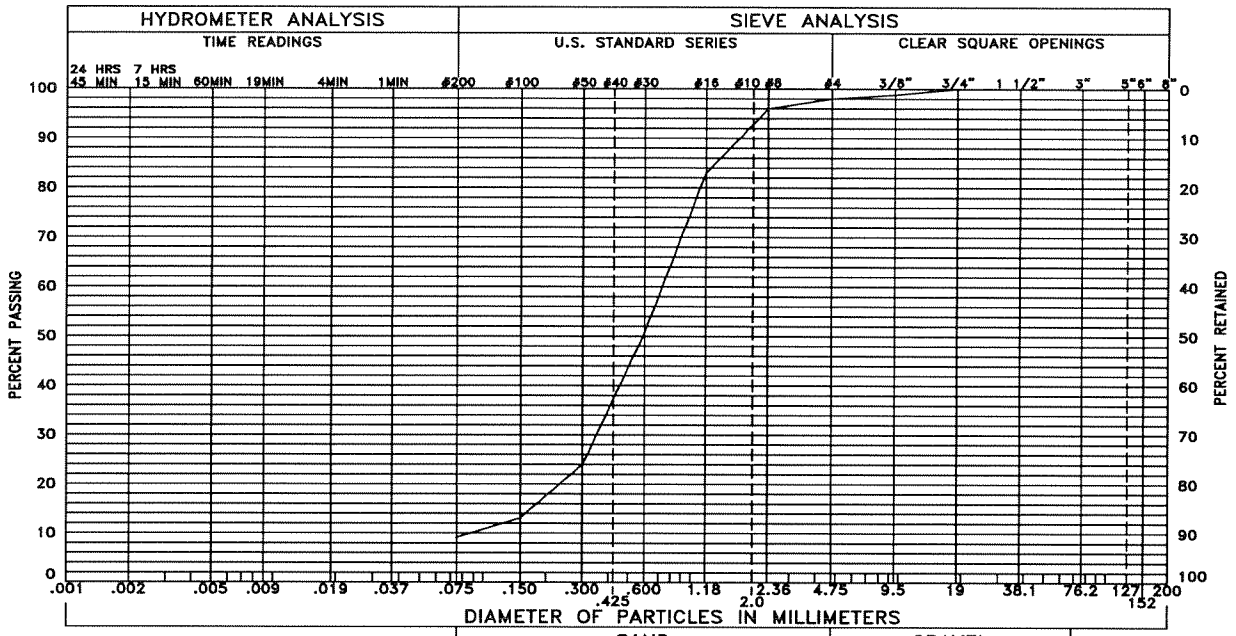
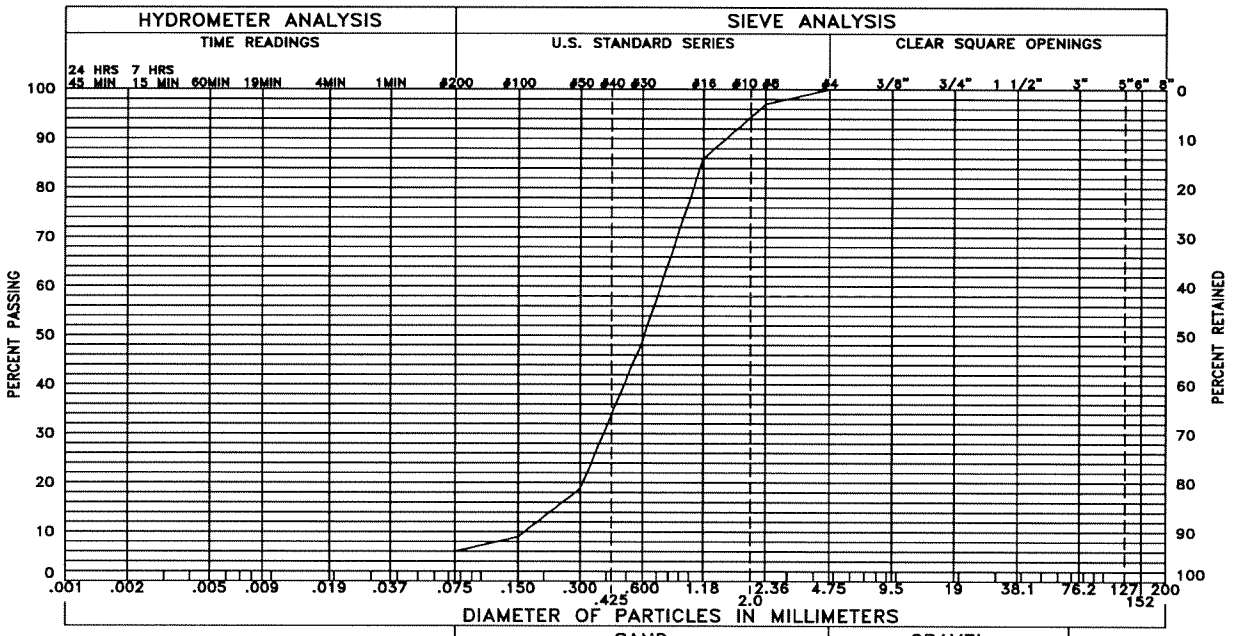


GRAVEL 2% SAND 89% SILT AND CLAY 9%

LIQUID LIMIT PLASTICITY INDEX

SAMPLE OF: Poorly-Graded Sand with Silt (SP-SM) FROM: Boring 3 @ 4'

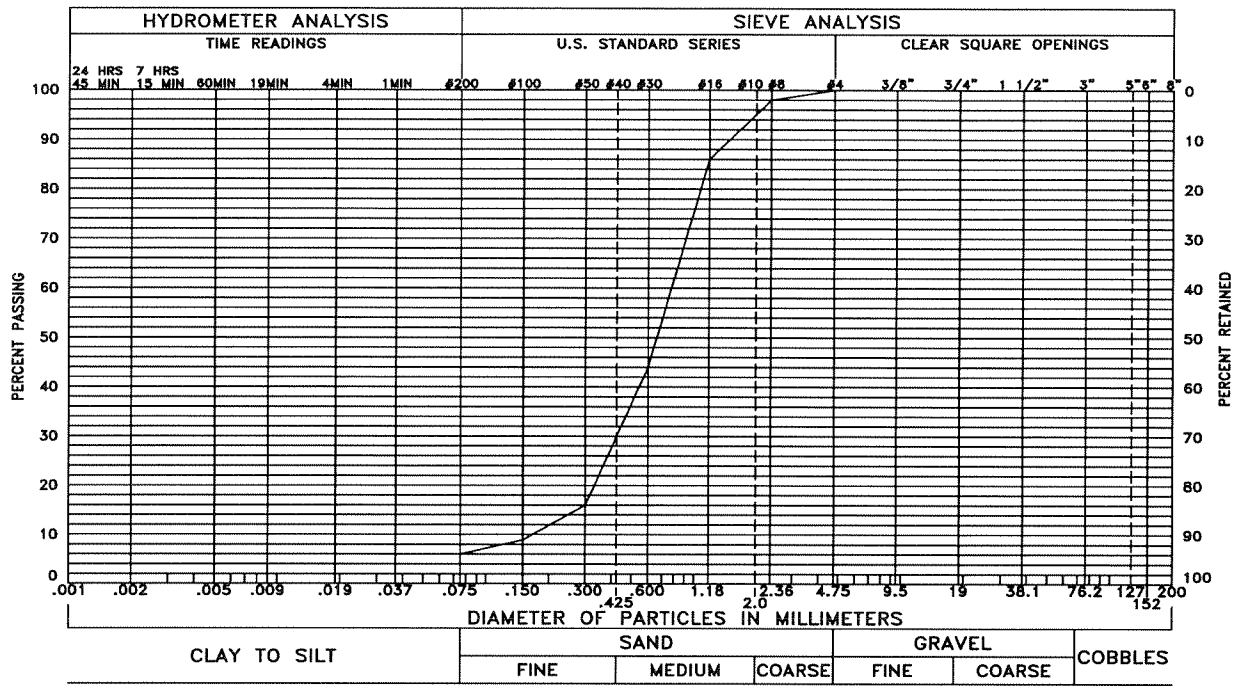


GRAVEL 1% SAND 93% SILT AND CLAY 6%

LIQUID LIMIT PLASTICITY INDEX

SAMPLE OF: Poorly-Graded Sand with Silt (SP-SM) FROM: Boring 3 @ 9'

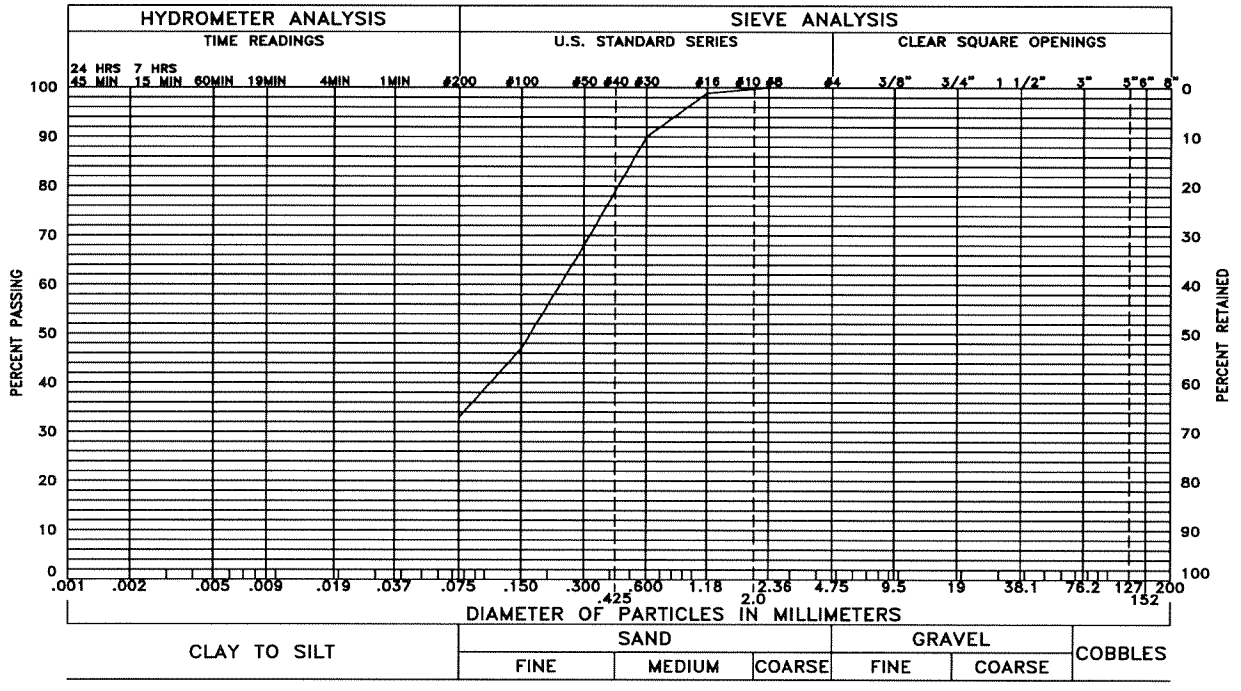
06-1-250	Kumar & Associates	GRADATION TEST RESULTS	Fig. 10



GRAVEL 1% SAND 93% SILT AND CLAY 6%

LIQUID LIMIT PLASTICITY INDEX

SAMPLE OF: Poorly-Graded Sand with Silt (SP-SM) FROM: Boring 7 @ 14'



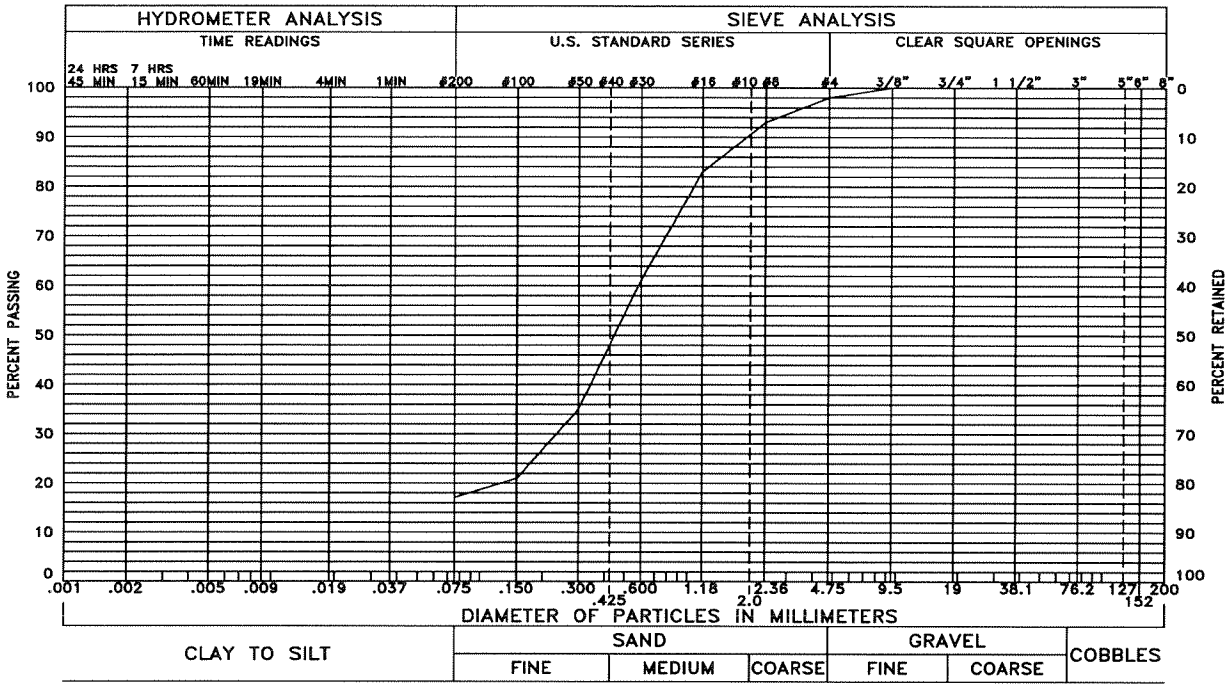
GRAVEL 0% SAND 67% SILT AND CLAY 33%

LIQUID LIMIT PLASTICITY INDEX

SAMPLE OF: Silty Sand (SM) FROM: Boring 8 @ 9'

These test results apply only to the samples which were tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar & Associates, Inc. Sieve analysis testing is performed in accordance with ASTM D422, ASTM C136 and/or ASTM D1140.

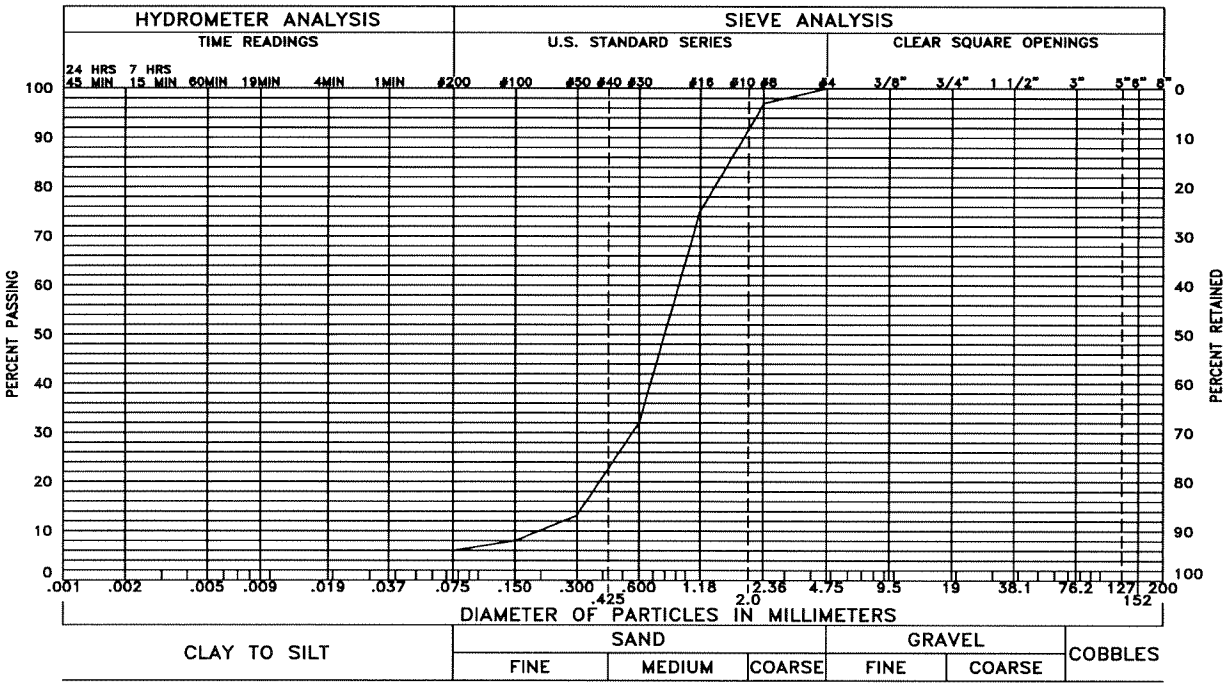
06-1-250	Kumar & Associates	GRADATION TEST RESULTS	Fig. 11



GRAVEL 2% SAND 81% SILT AND CLAY 17%

LIQUID LIMIT PLASTICITY INDEX

SAMPLE OF: Silty Sand (SM) FROM: Boring 9 @ 9'



GRAVEL 1% SAND 93% SILT AND CLAY 6%

LIQUID LIMIT PLASTICITY INDEX

SAMPLE OF: Poorly-Graded Sand with Silt (SP-SM) FROM: Boring 12 @ 14'

06-1-250	Kumar & Associates	GRADATION TEST RESULTS	Fig. 12

TABLE I
SUMMARY OF LABORATORY TEST RESULTS

PROJECT NO.: 06-1-250
PROJECT NAME: Military Dog Kennel, BAFB
DATE SAMPLED: 4-7-06 and 4-10-06
DATE RECEIVED: 4-14-06

SAMPLE LOCATION		DATE TESTED	NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	GRADATION		PERCENT PASSING NO. 200 SIEVE	ATTERBERG LIMITS		WATER SOLUBLE SULFATES (%)	AASHTO CLASSIFICATION (group index)	SOIL OR BEDROCK TYPE
BORING	DEPTH (feet)				GRAVEL (%)	SAND (%)		LIQUID LIMIT (%)	PLASTICITY INDEX (%)			
1	9	4-17-06	13.3	118.6			56	40	24			Sandy Lean Clay (CL)
1	14	4-17-06	15.1	112.8			52					Sandy Lean Clay (CL)
1	24	4-17-06	12.4	113.6			44					Sandstone Bedrock
2	4	4-17-06	8.9	108.0			37	64	51	<0.02		Clayey Sand (SC)
2	14	4-17-06	6.6				20					Silty Sand (SM)
3	4	4-17-06	2.9		2	89	9			0.03	A-1-b (1)	Poorly-Graded Sand with Silt (SP-SM)
3	9	4-17-06	2.6		1	93	6				A-1-b (1)	Poorly-Graded Sand with Silt (SP-SM)
4	9	4-17-06	20.1	103.9			71	51	31			Fat Clay with Sand (CH)
5	4	4-17-06	7.4	122.4			46	31	16			Clayey Sand (SC)
5	14	4-17-06	16.2	107.9			29					Sandstone Bedrock
6	19	4-17-06	21.3	101.7			81	42	23			Claystone Bedrock
7	4	4-17-06	10.0	102.8			49	34	20			Clayey Sand (SC)
7	9	4-17-06	12.7	114.3			57	37	22			Sandy Lean Clay (CL)
7	14	4-17-06	3.4		1	93	6				A-1-b (1)	Poorly-Graded Sand with Silt (SP-SM)
8	9	4-17-06	8.2		0	67	33				A-2-4 (0)	Silty Sand (SM)
9	4	4-17-06	8.1	88.6			70	37	18			Sandy Lean Clay (CL)
9	9	4-17-06	2.9				17				A-1-b (0)	Silty Sand (SM)
10	4	4-17-06	10.4	115.5			61	34	19	<0.02		Sandy Lean Clay (CL)
10	14	4-17-06	18.3	110.3			31					Sandstone Bedrock
10	24	4-17-06	21.3	100.0								Claystone Bedrock
10	34	4-17-06	20.5	106.0								Claystone Bedrock
12	4	4-17-06	14.4	74.7			78	51	30			Fat Clay with Sand (CH)
12	14	4-17-06	1.9		1	93	6				A-1-b (1)	Poorly-Graded Sand with Silt (SP-SM)

APPENDIX A

ASBESTOS SCREENING LABORATORY DATA

Reservoirs Environmental, Inc.
2059 Bryant St. Denver, CO 80211
(303) 964-1986 Fax (303) 477-4275 Toll Free (866) RESI-ENV

April 25, 2006

Laboratory Code: **RES**
Subcontract Number: **NA**
Laboratory Report: **RES 126568-1**
Project Description: **06-1-250 Buckley**
None Given

Andy Brummer
Kumar & Associates, Inc.
2390 South Lipan Street
Denver CO 80223

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code # 101896 and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 126568-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

Jeanne Spencer Orr
President

Analyst(s): _____
Paul D. LoScalzo Wenlong Liu
Paul F. Knappe Rich Wegrzyn
Michael Scales

RESERVOIRS ENVIRONMENTAL, INC.

NVLAP Accredited Laboratory # 101896

TDH Licensed Laboratory # 30-0136

TABLE PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 126568-1**
Client: **Kumar & Associates, Inc.**
Client Project Number / P.O.: **06-1-250 Buckley**
Client Project Description: **None Given**
Date Samples Received: **April 24, 2006**
Analysis Type: **PLM, Short Report**
Turnaround: **24 Hour**
Date Analyzed: **April 25, 2006**

Analyst: RSW

Client Sample Number	Lab ID Number	Layer	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibers Components (%)	Non-Fibrous Components (%)
B-9@1'	EM 630797	A	Brown soil	100		**ND**	TR	100
B-11@4'	EM 630798	A	Brown soil	100		**ND**	TR	100
B-12@1'	EM 630799	A	Brown soil	100		**ND**	TR	100

ND = None Detected
TR = Trace, < 1% Visual Estimate

Trem-Act = Tremolite-Actinolite

Data QA

Due Date: 4/25/06

Due Time: 1003AM

Reservoirs Environmental, Inc.

2059 Bryant St. Denver, CO 80211
(303) 964-1986 Fax (303) 477-4275 Toll Free (866) RESI-ENV

RES 126568

Page 1 of 1

SAMPLES SUBMITTED BY:	INVOICE TO: (IF DIFFERENT)	CONTACT INFORMATION:
Company: Kumar & Associates	Company:	Contact: A. Brummel
Address:	Address:	Phone:
		Fax:
		Cell/pager:
Project Number and/or P.O. #: 06-1-250 Buckley		Final Data Deliverable Email Address:
Project Description/Location:		

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm; Saturday: 8am -5pm

PCM/PLM/TEM ___ RUSH X 24 hr. ___3-5 day (Rush PCM/PLM = 2hr, TEM - 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s)	___ RUSH ___ 24 hr. ___3-5 Day	**Prior notification is required for RUSH turnarounds.**
RCRA 8/Metals Scan	___ RUSH ___ 5 day ___ 10 day	
TCLP/ Welding Fume Scan		
Dust	___ RUSH ___ 24 hr. ___3-5 Day	
Organics	___ 24 hr. ___ 3 day ___ 5 Day	

Analysis turnarounds are subject to laboratory sample volume and are not guaranteed. You will be notified if delays are expected.

Special Instructions: _____

REQUESTED ANALYSIS

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Drinking Water = DW	
Waste Water = WW	
Other = O	

ASTM E1792 approved wipe media only

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - BTEX, MTBE, 8260, GRO, DRO	OTHER -	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh:mm a/p	LAB NOTES: / EM Number (Laboratory Use Only)
1 B-9 @ 1'	X								B				630797
2 B-11 @ 4'	X								B				630798
3 B-12 @ 1'	X								B				630799
4													
5													
6													
7													
8													
9													
10													

Number of samples received: 3 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days.

After Hours/Weekend CHARGE: Amount $_____
Authorized by:

Additional fees apply for after hours and holidays for all analysis types. Samples will be analyzed during normal laboratory hours unless otherwise arranged and specified on the chain of custody.

Relinquished By: [signature] 4-24-06 10:05 am Date/Time:

Laboratory Use Only

Received By: [signature] Date/Time: 4/24/06 1003AM Carrier: hand

Sample Condition: On ice Y/N Sealed Y/N Intact Y/N Temp. (F°) _____

Results:	Contact	Page	Phone/Email	Fax	Date	Time	Initials	Contact	Page	Phone	Email	Fax	Date	Time	Initials
	Contact	Page	Phone	Email	Fax	Date	Time	Initials	Contact	Page	Phone	Email	Fax	Date	Time	Initials

II. FACILITY SITING CONSIDERATIONS LETTER, DATED 28 APR 06

Kumar & Associates, Inc.
Geotechnical and Materials Engineers
and Environmental Scientists

ACEC
MEMBER

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April 20, 2006
Revised: April 28, 2006

Mr. James Doak
Merrick & Company
2450 South Peoria Street
Aurora, Colorado 80014

Subject: Facility Siting Considerations, Proposed MWD Kennel, Buckley AFB, Aurora, Colorado

Project No. 06-1-250

Dear Mr. Doak:

Kumar & Associates has completed exploratory drilling and laboratory soil testing for the proposed MWD Kennel at Buckley AFB in Aurora, Colorado. Twelve exploratory borings were drilled at the site to depths ranging from about 20 to 35 feet. Laboratory testing included determination of index parameters and swell-consolidation characteristics. In addition, three near-surface soil samples were submitted to an outside laboratory for asbestos screening.

Based on data from the borings and the results of the laboratory testing program, the borings encountered natural overburden soils generally underlain within the depths explored by bedrock. The overburden soils consist of primarily of sandy lean clays and clayey sands underlain at various depths by silty sands to poorly-graded sands with silt. Surficial clays encountered in the northeast portion of the site contained lower percentages of sand than clays encountered elsewhere across the site, and included a zone of white, apparently calcite-rich clay at one boring location. Bedrock consisted of medium hard to very hard claystone and sandstone. Ground water was not encountered at the time of drilling. Four days after drilling, stabilized ground water was measured at a depth of about 18 feet in one boring drilled at the west end of the project site.

Based on laboratory swell-consolidation testing, samples of the near-surface sandy clays and clayey sands exhibited low to moderate swell potential or a slight tendency for additional compression upon wetting at a surcharge pressure of 1,000 psf. Samples of the claystone bedrock exhibited low swell potential under similar testing conditions; however, claystone bedrock with high to very high swell potential has been encountered at other locations at Buckley AFB and may be present at the site.

In our opinion, spread footing foundations and slab-on-grade construction should be feasible across site with proper subgrade preparation and provided the bottom of footings are at least 10 feet above the top of claystone bedrock. Subgrade preparation across most of the site is expected to include sub-excavating natural soils to limited depths, perhaps on the order of 2 to 4 feet, below footings and slab-on-grade floors and backfilling with compacted structural fill. We expect that the sub-excavated natural soils can generally be reused as structural fills beneath footings and floor slabs provided they are properly moisture-conditioned. Over-excavation and backfilling depths are expected to be greatest for buildings sited in the northeast portion of the site.

Bedrock, including shallow claystone bedrock, was encountered at depths ranging from about 7 to 10 feet in four borings drilled in the western portion of the site near the former parachute towers. Use of spread footing foundations in that portion of the site should be considered only if site grades are raised sufficiently to provide a 10 foot separation between the bedrock surface and the bottom of the footings. If site grades are generally unaltered or lowered, drilled pier foundations should be considered for buildings constructed in that portion of the site.

Based on visual examination of the samples obtained from the borings and conditions observed during drilling, the borings did not encounter trash, debris, or other suspect materials, including visual evidence of asbestos materials. Examination and testing of the samples obtained in the borings was generally limited to evaluation of geotechnical engineering parameters. At the request of Buckley AFB, three soil samples obtained from different borings in the eastern portion of the site at depths of 1 and 4 feet were screened for asbestos materials using polarized light microscopy (PLM). Based on the results of the PLM testing, asbestos was not detected in the submitted samples.

If you have any questions, or if we can be of further assistance, please contact us.

Sincerely,

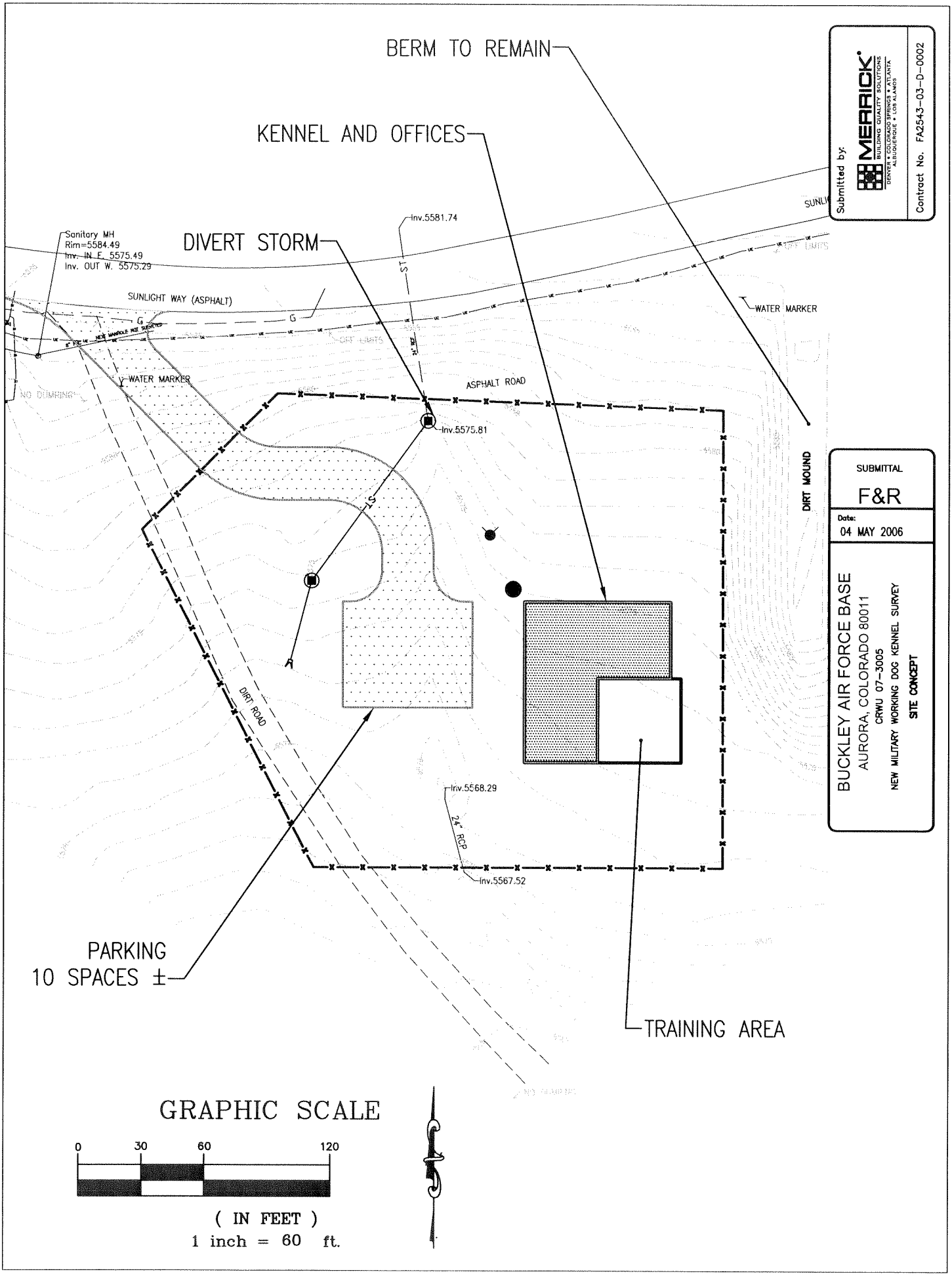
KUMAR & ASSOCIATES, INC.

Wade Gilbert

By_____
Wade Gilbert, P.E.

JWG/mj
Rev. by: AFC
cc: book, file

III. SITE CONCEPT PLAN


BERM TO REMAIN
KENNEL AND OFFICES
DIVERT STORM
Sanitary MH
Rim=5584.49
Inv. IN E. 5575.49
Inv. OUT W. 5575.29
Inv.5581.74
SUNLIGHT WAY (ASPHALT)
WATER MARKER
WATER MARKER
ASPHALT ROAD
Inv.5575.81
DIRT MOUND
DIRT ROAD
Inv.5568.29
24" RCP
Inv.5567.52
PARKING
10 SPACES ±
TRAINING AREA
GRAPHIC SCALE
0
30
60
120
(IN FEET)
1 inch = 60 ft.
Submitted by:
MERRICK
BUILDING QUALITY SOLUTIONS
DENVER • COLORADO SPRINGS • ATLANTA
ALBUQUERQUE • LOS ALAMOS
Contract No. FA2543-03-D-0002
SUBMITTAL
F&R
Date:
04 MAY 2006
BUCKLEY AIR FORCE BASE
AURORA, COLORADO 80011
CRWU 07-3005
NEW MILITARY WORKING DOG KENNEL SURVEY
SITE CONCEPT

INSTRUCTIONS FOR COMPLETING SF 298

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2. REPORT TYPE. State the type of report, such as final, technical, interim, memorandum, master's thesis, progress, quarterly, research, special, group study, etc.

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5a. CONTRACT NUMBER. Enter all contract numbers as they appear in the report, e.g. F33615-86-C-5169.

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8. PERFORMING ORGANIZATION REPORT NUMBER. Enter all unique alphanumeric report numbers assigned by the performing organization, e.g. BRL-1234; AFWL-TR-85-4017-Vol-21-PT-2.

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