Cover Sheet:
Final Environmental Assessment
Military Housing Privatization Initiative
Schriever Air Force Base, Colorado

A. *Responsible Agency*: Department of the Air Force, Schriever Air Force Base (SAFB), Colorado.

B. *Cooperating Agencies*: None.

C. *Proposals and Actions*: This environmental assessment (EA) has been prepared in accordance with the *National Environmental Policy Act* to analyze the potential environmental consequences of the proposed Military Housing Privatization Initiative (MHPI) at SAFB, Colorado. SAFB is located in El Paso County, Colorado, approximately 10 miles east of Colorado Springs, Colorado. No public comments were received on the Draft EA during a 30-day availability period ending June 5, 2006. The attached Finding of No Significant Impact documents the U.S. Air Force's decision to implement the proposed action.

D. *Comments and Inquiries*: Comments or inquiries regarding this document should be directed to Public Affairs Office, 210 Falcon Parkway, Suite 2102, Schriever AFB, CO 80912, (719) 567-5040.

E. *Designation*: Final Environmental Assessment and Finding of No Significant Impact

F. *Abstract*: This EA evaluates the potential for environmental consequences from the proposed action, one alternative action, and the no action alternative for implementing the MHPI at SAFB. SAFB currently has no on-base housing, but has a requirement for military family housing units for 269 families. The proposed action is for the Air Force to lease approximately 150 acres of undeveloped land to a private real estate development and property management company. The Air Force proposes that the Project Owner (PO) would construct a mixture of two-, three-, and four-bedroom single-family units and two-, three- and four-bedroom multiplex units, for a total of 269 units. The PO would own all housing units and related infrastructure, would lease the land from SAFB, and would maintain and manage the housing area for a minimum of 269 military families for 50 years. Under the no action alternative, the Air Force would not implement the MHPI at SAFB and would continue to lack on-base provisions for the family housing needs of its personnel. Under the alternative action, prospective developers can propose an off-base location for developing privatized housing for SAFB under the MHPI; no specific location(s) have been identified at this time. Resources and issues addressed in the EA include air quality; soils, geology, and topography; water resources; biological resources; human health and safety; solid waste and hazardous materials; noise; cultural resources; land use; traffic and transportation; and socioeconomics and environmental justice.

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14. ABSTRACT

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Environmental Assessment:
Schriever AFB
Military Housing Privatization Initiative
El Paso County, Colorado

Prepared for:

U.S. Air Force Center for Environmental Excellence

July 19, 2006

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Finding of No Significant Impact
Military Housing Privatization Initiative
Schriever Air Force Base, Colorado

INTRODUCTION

The United States Air Force proposes to implement a Military Housing Privatization Initiative (MHPI) project at Schriever Air Force Base (SAFB). SAFB currently has no on-base housing, and has a requirement for military family housing units for 269 families. Pursuant to Section 102(2)(C) of the *National Environmental Policy Act* (NEPA) of 1969, the Council on Environmental Quality regulations (40 CFR Sec 1500-1508) implementing procedural provisions of NEPA, and Air Force regulations for the Environmental Impact Analysis Process (32 CFR 989), the Department of Defense (DoD) gives notice that an environmental assessment (EA) has been prepared for the proposed housing privatization initiative at SAFB, attached and incorporated by reference. This document serves as a Finding of No Significant Impact (FONSI).

THE PROPOSED ACTION AND ALTERNATIVE ACTIONS

The following paragraphs describe the Proposed Action, the No Action Alternative, and one Alternative Action.

Proposed Action

The proposed action is for SAFB to lease approximately 150 acres of land to a private developer ("Project Owner") for the purpose of privately financing, constructing, and managing a military housing area. The parcel of land is raw and undeveloped. The Project Owner (PO) will build 269 family housing units and related infrastructure. The land would be leased to the PO for 50 years, and the houses and other improvements would be owned by the PO. The PO would obtain necessary financing; provide required equity; and plan, design, develop, construct, own, operate, maintain, and manage a rental housing development, including all paving and drainage, as well as any utilities conveyed to or constructed by the PO, for a minimum of 269 military families for 50 years.

No Action Alternative

Under the no action alternative, SAFB would not implement the proposed action, and would continue to lack on-base provisions for the family housing needs of its personnel. SAFB personnel would continue to obtain family housing either from other Air Force assets or privately in the Colorado Springs area. Continued reliance on other Air Force assets would be limited, however, since an MHPI project at the U.S. Air Force Academy (USAFA) calls for demolition of surplus family housing over the next six years, and Peterson AFB is planning new construction under the MHPI to meet the needs of its own military members. Additionally, the distance to USAFA is 31 miles (75 minutes), which exceeds the maximum distance (20 miles) and time (60 minutes) for the housing market area as defined by the Office of the Secretary of Defense in the 2005 HRMA Guidance Manual.

Off-Base Privatized Housing

Prospective developers can propose an off-base location for developing privatized housing for SAFB under the MHPI. No specific location(s) have been identified at this time.

ENVIRONMENTAL EFFECTS

The environmental effects of the Proposed Action, No Action Alternative, and Off-Base Privatized Housing Alternative are summarized below.

Summary of Environmental Impact Analysis Results

Resource	Summary of Impact Analysis Results		
	Proposed Action	**No Action**	**Off-Base Privatized Housing**
Air Quality	Temporary increase in criteria pollutants from construction. Fugitive dust permits will be required during construction. Slight increase in long-term emissions from unpermitted sources (residential furnaces). No significant impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action (depending on a specific location, which has not been identified); not significant.
Soils, Geology, and Topography	Temporary soil disturbance, in accordance with permit requirements. No significant impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action (depending on a specific location, which has not been identified), and would likely be managed to an insignificant level as a result of permit requirements. However, site-specific assessment would be required.
Water Resources	Surface water impacts from temporary soil disturbance would be limited by best management practices. No significant impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action (depending on a specific location, which has not been identified), and would likely be managed to an insignificant level as a result of permit requirements. However, site-specific assessment would be required.

Resource	Summary of Impact Analysis Results		
	Proposed Action	**No Action**	**Off-Base Privatized Housing**
Biological Resources	150 acres of undeveloped shortgrass prairie-type vegetation and habitat replaced by suburban-type neighborhood, with adjacent undeveloped areas providing adequate alternative wildlife habitat. Timing of activities will minimize potential impacts to western burrowing owl during nesting season. No significant adverse impacts to western burrowing owl, black-tailed prairie dog, or other biological resources.	No impacts.	Impacts to vegetation and general wildlife are expected to be similar to those of the proposed action (depending on a specific location, which has not been identified); however, site-specific assessment would be required. A clear data gap remains for potential impacts to protected species (a specific location would be required for analysis of this endpoint).
Human Health and Safety	Human health and safety risks associated with area traffic and residential pesticide application would be introduced; however, these risks would be similar to those posed at current housing locations. Human health and safety risks posed by construction activities can be managed and would be short-term. Human health and safety risks typically associated with rural settings would be reduced.	Human health and safety risks typically associated with rural settings would remain.	Impacts are expected to be similar to those of the proposed action; not significant.
Solid Waste and Hazardous Materials	Short-term increase in solid and hazardous waste generation during construction, followed by long-term increase in municipal solid waste generation during residential occupation No significant adverse impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action; not significant.
Noise	Intermittent short-term impacts during construction. Long-term increase in area noise from increased area traffic and residential sources. No significant impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action; not significant.
Cultural Resources	No impacts.	No impacts.	Data gap for this analysis since specific location not identified. Archaeological survey would be required prior to construction.

Resource	Summary of Impact Analysis Results		
	Proposed Action	**No Action**	**Off-Base Privatized Housing**
Land Use	Approximately 3.9% of the base's land use would shift from open space to housing; not a significant adverse impact.	No impacts.	Change in approximately 150 acres (estimated) from undeveloped rural land to subdivision; no significant adverse impact anticipated, but zoning change would likely be required.
Traffic and Transportation	Short-term increase from construction-related traffic. Minor, long-term increase in local community traffic and traffic between SAFB and Colorado Springs (estimated at 0.4% increase from current levels). No significant impact expected.	No impacts to current traffic volumes as SAFB personnel would continue to commute from other areas.	Impacts are expected to be similar to those of the proposed action; not significant.
Socioeconomics and Environmental Justice	Short-term beneficial impact on employment and income during construction. Effects on local public school capacity minimized by RFP requirement for a plan approved by school district. No significant adverse impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action; not significant.
Cumulative Impacts	No significant impacts.	No impacts.	Data gap for this analysis since specific location not identified.

As noted in this summary, there are obvious data gaps for potential impacts to protected species, cultural resources, and for cumulative impacts, from the off-base privatized housing alternative, since a specific location would be required for analysis of these endpoints. Also, although permit requirements would likely limit the potential for any significant impacts to soil and water resources at an off-base location, a site-specific assessment would be required. These data gaps will be addressed when the lease is finalized, with the potential for impacts to these resources able to be assessed at that time, should this alternative become the Air Force's proposed action.

Finding of No Significant Impact

Based on the attached EA, conducted in accordance with the Council on Environmental Quality and Air Force regulations implementing NEPA, an assessment of the identified environmental effects has been prepared for the proposed MHPI at SAFB. No public comments were received on the Draft EA during a 30-day availability period ending June 5, 2006. I find that the action will have no significant impact on the quality of the human environment; thus, an Environmental Impact Statement is not warranted.

JAMES C. HUTTO, JR.
Colonel, USAF
Commander, 50th Space Wing

24 Aug 06
Date

Environmental Assessment:
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Military Housing Privatization Initiative
El Paso County, Colorado

Prepared for:

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Colonel, USAF
Commander, 50th Space Wing

24 Aug 06
Date

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ENVIRONMENTAL ASSESSMENT: MILITARY HOUSING PRIVATIZATION INITIATIVE AT SCHRIEVER AIR FORCE BASE

SECTION 1. PURPOSE AND NEED

1.1 Introduction

The quality of government-owned housing has declined for more than 30 years primarily due to lack of Air Force funding and program priorities. In 1999, the Department of Defense (DoD) estimated that about 200,000 military family housing units are old, lack modern amenities, and require renovation or replacement. DoD estimated that to complete the work using traditional military construction methods would take 30 years and cost about $16 billion (Yim 1999). To improve housing more economically and faster than could be achieved if only traditional military construction funds were used, the Congress enacted legislation at DoD's request authorizing a five-year pilot program, termed the Military Housing Privatization Initiative (MHPI), to allow private sector financing, ownership, operation, and maintenance of military housing. Under the program, which was initially authorized in 1996 under the *National Defense Authorization Act* and has been reauthorized until 2012, DoD can provide direct loans, loan guarantees, and other incentives to encourage private developers to construct and operate housing either on or off military installations. The program takes advantage of the private sector's investment capital and housing construction expertise to provide better quality housing to its service members. DoD believes that the authorities the MHPI provides will contribute significantly to its plan to solve its housing situation by 2007, when combined with traditional funded government construction.

Housing privatization is considered a major Federal action subject to the requirements of the *National Environmental Policy Act* (NEPA) of 1969, as amended, which requires Federal agencies to consider environmental impacts in their decision-making process. This environmental assessment (EA) evaluates the potential for environmental consequences of real property transactions associated with the privatization of housing at SAFB, in accordance with the President's Council on Environmental Quality (CEQ) regulations for implementing NEPA (Title 40 Code of Federal Regulations (CFR) 1500-1508) and Air Force regulations for the Environmental Impact Analysis Process (32 CFR 989). These Federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation, designed to ensure deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. A notice of availability was published in *The Gazette* (Colorado Springs) on May 5 through May 7, 2006, announcing the availability of the Draft EA for a 30-day review period ending June 5, 2006; no public comments were received.

This EA presents the purpose and need for the action (Section 1), describes the proposed action and alternatives (Section 2), identifies the characteristics of the affected environment (Section 3), and summarizes the analysis of the potential for environmental consequences (Section 4). Also included are agencies contacted (Section 5), the list of preparers (Section 6), and references (Section 7). Appendix A presents terms, acronyms and abbreviations used; and Appendix B presents air emissions estimates for the proposed action.

1.2 Project Location

SAFB is situated along the Rocky Mountain Front Range about ten miles east of Colorado Springs and 7.5 miles west of the town of Ellicott (Figure 1). The base consists of an improved restricted area (360 acres) surrounded by a secure, largely unimproved buffer two miles by three miles (total 3,840 acres). SAFB is surrounded by grasslands and ranches in a sparsely populated setting.

SAFB is located on the site of the former Falcon Air Station, which was constructed in 1983. In 1988, it was re-designated as Falcon AFB, and was re-named Schriever AFB in 1998. Today over 6,000 military and civilian employees work at SAFB. It is home to the 50th Space Wing, which is responsible for the command and control of more than 170 satellites. It is also the host base for the Space Innovation and Development Center (formerly the Space Warfare Center), the Missile Defense Agency's Joint National Integration Center, the 310th Space Group, and other tenant organizations.

1.3 Purpose of and Need for Action

Air Force policy establishes a minimum family housing requirement (Floor) for each installation, based on the following four criteria:

- The need for a military community;
- Housing for personnel in key and essential positions;
- Preservation of historic housing; and
- Housing for the personnel whose level of regular military compensation is below 50% of the median family income in the local area.

In the 2005 Housing Requirements and Market Analysis (HRMA) report for nearby Peterson AFB, it was concluded that there is a requirement for housing for 269 families at SAFB (USAF 2004a). Currently, a portion of this requirement is being met at Peterson AFB and using available U.S. Air Force Academy (USAFA) assets (however, the agreement to house SAFB military families at USAFA has been cancelled due to the proposed MHPI at USAFA). USAFA is planning its own housing privatization initiative to reduce its surplus housing, and Peterson AFB is planning to increase its housing to directly meet the needs of its service personnel.

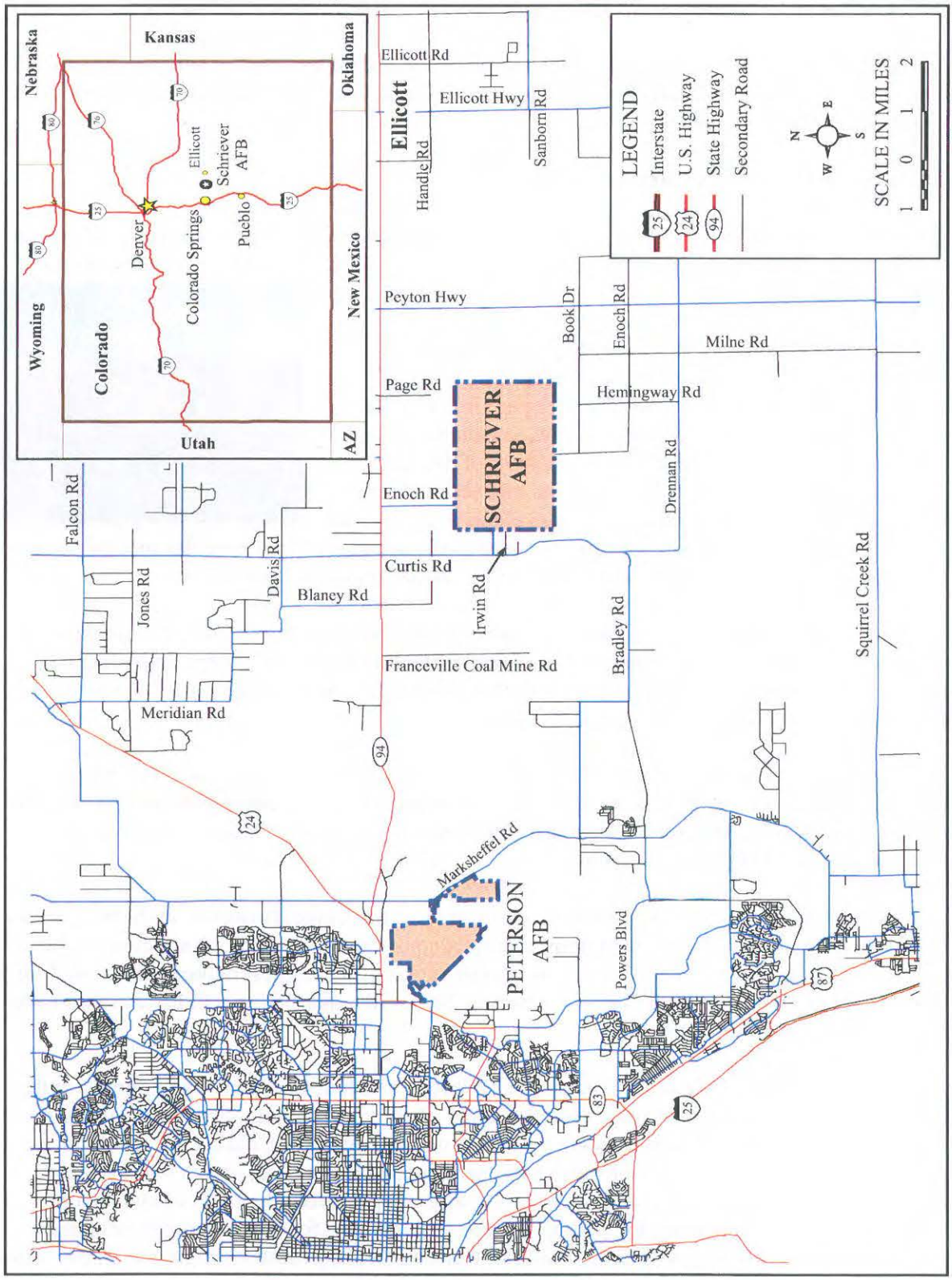

Figure 1. General Location of Schriever AFB

SECTION 2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section presents the proposed action, the no action alternative, and an off-base privatized housing alternative, and briefly describes alternatives that were identified but will not be considered in detail in the EA.

2.1 Alternative 1 – Proposed Action

The MHPI allows SAFB to address housing needs through leasing of a land parcel to a private developer for the purpose of securing privately financed construction and management of a housing area.

The proposed action involves a non-Federal Acquisition Regulation (FAR) real estate transaction with a private developer ("Project Owner") under which the Government will lease approximately 150 acres of raw, undeveloped land. The parcel is located in the northeast quadrant of the base, approximately ¾ mile east of Enoch Road and about 1½ miles south of Highway 94. It is bound by undeveloped, state-owned land to the north and undeveloped on-base land to the south, east, and west. Its specific location is shown on Figure 2. There are no utilities or infrastructure on the parcel.

The PO would obtain necessary financing; provide required equity; and plan, design, develop, construct, own, operate, maintain, and manage a rental housing development, including all paving and drainage, as well as any utilities conveyed to or constructed by the PO, for a minimum of 269 military families for 50 years.

The PO will be the successful offeror in response to a Request for Proposals (RFP) for this activity, and has not yet been identified. The remainder of this subsection presents the detailed design, construction, and environmental requirements from the most recent version of the Statement of Need (January 13, 2006).

Dates regarding the transaction's milestones are subject to change. However, at the time of this EA, the expected timeline for the proposed project consists of release of the solicitation / RFP in Summer 2006, proposals due in Fall 2006, identification of the highest ranked offeror in Winter 2006-2007, and closing the transaction in Spring 2007. All construction will be completed within six years of closing the transaction.

The new units will consist of a mixture of two-, three-, and four-bedroom single-family units; and two-, three- and four-bedroom multiplex units. Desired community features SAFB has requested include the following: secure perimeter wall for aesthetics and security, community center/clubhouse, swimming pool/water park, service road connecting Enoch Road and the leased premises, gated security entrance facility to the leased areas, lighted volleyball courts, combination bicycle/walking/dog path with trash can and bags for dog droppings, drinking fountains along walking paths, lighted softball/baseball fields, pedestrian-activated traffic lights

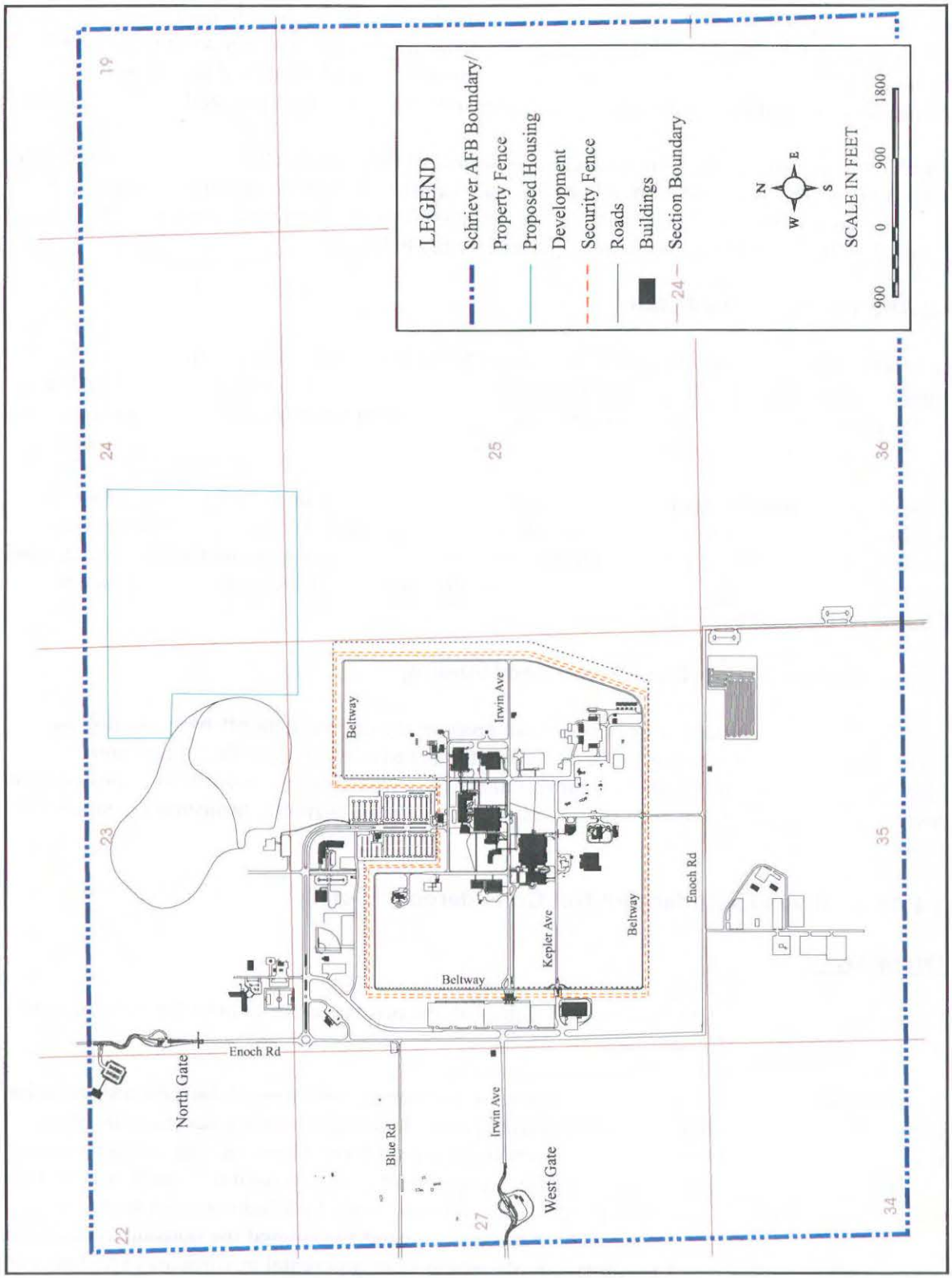

Figure 2. Location of Proposed Housing Area

or street-level marker lights for collector streets, five-foot sidewalks on both sides of the street with five-foot buffer for trees, and additional visitor parking throughout housing area. The service road will be sited along the northern boundary of the base where it will provide access to the housing area entrance; this land is owned by the State of Colorado, and the PO will need to arrange an easement for construction, use, and maintenance of the access road.

The PO will coordinate with the respective providers of the various utility services to determine needs and coordinate installation; all new exterior utilities shall be located underground. All costs to construct utility services shall be the responsibility of the PO and all new utility systems installed by the PO will be owned and operated by the PO.

2.2 Alternative 2 – No Action

Inclusion of the no action alternative is required by CEQ and Air Force regulations for implementing NEPA. Although the no action alternative does not satisfy the purpose and need for the proposed action, it serves as a baseline against which the impacts of the proposed action and alternatives can be evaluated.

Under the no action alternative, SAFB would not implement the proposed action, and would continue to rely upon Peterson AFB and the local housing market to provide residences for its military families. However, the MHPI initiative at USAFA calls for demolition of surplus family housing over the next six years, so the no action alternative would effectively be limited to reliance on the local housing market.

2.3 Alternative 3 – Off-Base Privatized Housing

Under the MHPI, prospective developers can propose the option of an off-base location for developing privatized housing. No specific location(s) have been identified at this time. Identification of specific location(s) for this alternative would not be possible until prospective developers' proposals have been submitted to the Air Force, currently projected for September 2006.

2.4 Alternatives Identified But Not Considered in Detail

Private Sector Reliance

Under this alternative, SAFB would rely solely on the private sector to meet the housing needs of service members.

The alternative is premised, in part, on the view that competitive marketplace forces would lead to the creation of sufficient affordable, quality family housing. There are several intangible benefits to military personnel and their families living on-base. These include camaraderie and esprit de corps among the military personnel, convenient access to military community services, and a sense of "family" among dependents. In addition, in the Colorado Springs area specifically, tremendous growth and high housing demand has limited the housing available to SAFB's service members, with shortages of rental houses and rental apartments expected. The

rental apartment vacancy rate dropped from 12.5% in June 2005 to 8.4% in September 2005, as a result of the arrival of 3,700 soldiers at Fort Carson, soldiers returning from Iraq, and sheltering of Hurricane Katrina evacuees; this trend is expected to continue in 2006 with 5,000 more soldiers returning to Fort Carson from Iraq and more than 10,000 new troops arriving at that base (Colorado Springs *Gazette* 2005). Fort Carson has a requirement for an additional 1,000 housing units and will be building between 400 and 500 additional privatized housing units.

This alternative was determined to be not reasonable and was not evaluated as a specific, separate alternative in this EA. However, under the no action alternative (required to be evaluated in an EA by CEQ and Air Force regulations), SAFB would not implement the proposed action, and would continue to rely upon Peterson AFB and the local housing market to provide residences for its military families. Since the MHPI project at USAFA calls for demolition of surplus family housing over the next six years, no action alternative would effectively be limited to reliance on the local housing market.

Reliance on Family Housing at Other Area Military Bases

Another alternative to maintaining the family housing function at SAFB is to rely on military family housing at Peterson AFB, USAFA, and/or Fort Carson. However, the two Air Force installations are currently evaluating alternatives for improving their own family housing situation (requirements are for significant renovation and new construction at Peterson AFB, and demolition of surplus housing at USAFA). Fort Carson is expecting an influx of up to 10,000 soldiers requiring construction of 650 new family homes, as a result of Defense Base Realignment and Closure Commission decisions in 2005. Peterson AFB is proposing construction of 230 new units to meet the demand for housing its own service members, and SAFB personnel will only be eligible for housing at Peterson AFB under their MHPI initiative if occupancy rates fall below 95%. In addition, (1) the proposed housing privatization at USAFA will have an end-state with significantly fewer houses than are currently at the installation, eliminating the surplus housing where some SAFB service members currently reside; (2) the distance to USAFA is 31 miles (75 minutes), which exceeds the maximum distance (20 miles) and time (60 minutes) for the housing market area as defined by the Office of the Secretary of Defense in the 2005 HRMA Guidance Manual; and (3) the longer commutes required would not be responsive to the Secretary of the Air Force's recent memorandum addressing fuel conservation:

> The President of the United States asked America to conserve fuel to alleviate the temporary fuel shortages caused by the catastrophic effects of hurricane Katrina. To mitigate the impact, the Deputy Secretary of Defense has directed that we take measures that will conserve fuel. All AF organizations shall consider and implement, as operational and mission demands permit, the following actions to conserve fuel: Minimize all non-essential fuel consumption. ... The emphasis should be on reducing consumption of gasoline, the product with the greatest shortages at this time.

This alternative was determined to be not reasonable and was not evaluated further in the EA.

2.5 Summary of Environmental Impacts

Potential impacts resulting from the proposed action and alternatives, based on the analysis details presented in Section 4 of this EA, are summarized in Table 1.

Table 1. Summary of Impact Analysis Results

Resource	Summary of Impact Analysis Results		
	Proposed Action	**No Action**	**Off-Base Privatized Housing**
Air Quality	Temporary increase in criteria pollutants from construction. Fugitive dust permits will be required during construction. Slight increase in long-term emissions from unpermitted sources (residential furnaces). No significant impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action (depending on a specific location, which has not been identified); not significant.
Soils, Geology, and Topography	Temporary soil disturbance, in accordance with permit requirements. No significant impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action (depending on a specific location, which has not been identified), and would likely be managed to an insignificant level as a result of permit requirements. However, site-specific assessment would be required.
Water Resources	Surface water impacts from temporary soil disturbance would be limited by best management practices. No significant impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action (depending on a specific location, which has not been identified), and would likely be managed to an insignificant level as a result of permit requirements. However, site-specific assessment would be required.

Resource	Summary of Impact Analysis Results		
	Proposed Action	**No Action**	**Off-Base Privatized Housing**
Biological Resources	150 acres of undeveloped shortgrass prairie-type vegetation and habitat replaced by suburban-type neighborhood, with adjacent undeveloped areas providing adequate alternative wildlife habitat. Timing of activities will minimize potential impacts to western burrowing owl during nesting season. No significant adverse impacts to western burrowing owl, black-tailed prairie dog, or other biological resources.	No impacts.	Impacts to vegetation and general wildlife are expected to be similar to those of the proposed action (depending on a specific location, which has not been identified); however, site-specific assessment would be required. A clear data gap remains for potential impacts to protected species (a specific location would be required for analysis of this endpoint).
Human Health and Safety	Human health and safety risks associated with area traffic and residential pesticide application would be introduced; however, these risks would be similar to those posed at current housing locations. Human health and safety risks posed by construction activities can be managed and would be short-term. Human health and safety risks typically associated with rural settings would be reduced.	Human health and safety risks typically associated with rural settings would remain.	Impacts are expected to be similar to those of the proposed action; not significant.
Solid Waste and Hazardous Materials	Short-term increase in solid and hazardous waste generation during construction, followed by long-term increase in municipal solid waste generation during residential occupation No significant adverse impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action; not significant.
Noise	Intermittent short-term impacts during construction. Long-term increase in area noise from increased area traffic and residential sources. No significant impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action; not significant.
Cultural Resources	No impacts.	No impacts.	Data gap for this analysis since specific location not identified. Archaeological survey would be required prior to construction.

Resource	Summary of Impact Analysis Results		
	Proposed Action	**No Action**	**Off-Base Privatized Housing**
Land Use	Approximately 3.9% of the base's land use would shift from open space to housing; not a significant adverse impact.	No impacts.	Change in approximately 150 acres (estimated) from undeveloped rural land to subdivision; no significant adverse impact anticipated, but zoning change would likely be required.
Traffic and Transportation	Short-term increase from construction-related traffic. Minor, long-term increase in local community traffic and traffic between SAFB and Colorado Springs (estimated at 0.4% increase from current levels). No significant impact expected.	No impacts to current traffic volumes as SAFB personnel would continue to commute from other areas.	Impacts are expected to be similar to those of the proposed action; not significant.
Socioeconomics and Environmental Justice	Short-term beneficial impact on employment and income during construction. Effects on local public school capacity minimized by RFP requirement for a plan approved by school district. No significant adverse impacts.	No impacts.	Impacts are expected to be similar to those of the proposed action; not significant.
Cumulative Impacts	No significant impacts.	No impacts.	Data gap for this analysis since specific location not identified.

As noted in this summary, there are obvious data gaps for potential impacts to protected species, cultural resources, and for cumulative impacts, from the off-base privatized housing alternative, since a specific location would be required for analysis of these endpoints. Also, although permit requirements would likely limit the potential for any significant impacts to soil and water resources at an off-base location, a site-specific assessment would be required. These data gaps will be addressed when the lease is finalized, with the potential for impacts to these resources able to be assessed at that time, should this alternative become the Air Force's proposed action.

SECTION 3. AFFECTED ENVIRONMENT

This section describes the existing condition of resources at SAFB, laying the groundwork for the discussions in Section 4 of the potential for environmental impacts to each area.

3.1 Air Quality

This section discusses the climate and meteorology of the area, air quality standards, and existing air pollutant sources.

3.1.1 Climate and Meteorology

SAFB is located near the border of the Great Plains and the Front Range of the Rocky Mountains, which results in a moderate semi-arid climate. The average July temperature is 70° F and the average January temperature is 28° F. The area is subject to thunderstorms and heavy rainfall, which primarily occur from May through August. Mean precipitation is about 17.40 inches per year. Most rain occurs from March through September, with peak rainfall occurring in August (NWS 2005a). The most rainfall in a 24-hour period is 3.98 inches on August 4, 1999 (NWS 2005b, NWS 2005c). Total annual potential evaporation is about 25 inches. Relative humidity ranges from about 55% in early morning to 35% in the early afternoon. Prevailing winds are predominantly from the north throughout the year. Wind speeds usually range from seven to ten knots (8 to 12 miles per hour), with the highest speeds occurring in the spring and the lowest in late summer and early fall. The maximum wind gust reported at the Colorado Springs Airport was 78 miles per hour in 1999 (NWS 1997-2005, NCDC 1998).

3.1.2 Air Quality Standards

The National Ambient Air Quality Standards (NAAQS), established by the U.S. Environmental Protection Agency (USEPA) and adopted by the Colorado Department of Public Health and Environment (CDPHE), define the maximum allowable concentrations of pollutants that may be reached but not exceeded within a given time period. These standards were selected to protect human health with a reasonable margin of safety. Section 110 of the *Clean Air Act* (CAA) requires states to develop air pollution regulations and control strategies to ensure that state air quality meets the NAAQS established by USEPA. These ambient standards are established under Section 109 of the CAA, and they currently address six criteria pollutants: carbon monoxide (CO), nitrogen dioxide, ozone, lead, particulate matter, and sulfur dioxide. Particulate matter has been further defined by size. There are standards for particulate matter smaller than 10 microns in diameter (PM_{10}) and smaller than 2.5 microns in diameter ($PM_{2.5}$). Each state must submit these regulations and control strategies for approval and incorporation into a Federally enforceable State Implementation Plan (SIP). Exceeding the concentration levels within a given time period is a violation and constitutes nonattainment of the pollutant standard.

Stationary sources of emissions are categorized as major or minor. A major source emits, or has the potential to emit, 100 tons per year of any air pollutant (40 CFR 52.21, 5 Colorado Code of Regulations (CCR) 1001, Regulation 3, Part A, Section I.B.23.b). A minor source emits or has the potential to emit less than 100 tons per year of any pollutant. Under Title V of the CAA, a

major source must obtain an operating permit. Minor sources do not need an operating permit; however, if they emit two tons per year or more of a pollutant, they are required to obtain an Air Pollutant Emissions Notice (APEN) from the State of Colorado, sometimes referred to as a construction permit.

Hazardous air pollutants (HAP) are regulated under 40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), and 40 CFR 63, NESHAP for Source Categories. A major source, defined as one emitting, or having the potential to emit, 10 tons per year of any single HAP or 25 tons per year total HAPs, requires a permit, and as specified in 40 CFR 63, the implementation of maximum achievable control technology. A minor source is defined as one emitting, or having the potential to emit, less than 10 tons per year of any single HAP or 25 tons per year total HAPs. Minor sources of HAPs whose emissions exceed the threshold defined in CCR 1001, Regulation 3, Appendix A are required to obtain an APEN; this threshold ranges from 50 to 5,000 pounds per year depending on the elevation of the release point above ground level, the distance from the source to the property boundary, the emission point as defined in Section II.B.4 of the regulation (a single point or a composite of multiple points), and the type of HAP (as classified in Appendix B of the regulation).

3.1.3 Air Pollutant Sources

Particulate matter (PM_{10} and $PM_{2.5}$) is generated during ground disturbing activities and during combustion. El Paso County requires an air quality permit for fugitive particulate emissions from disturbed ground of more than one acre in size. The permit includes requirements to limit fugitive dust through best management practices, outlined in the El Paso County Land Development Code, Section 51.

If this ground is disturbed for more than 6 months, and is 25 acres or more in size, a Colorado APEN is also required. The APEN would require specific measures to control fugitive dust to the extent technically feasible and economically reasonable. Specific measures are required for onsite unpaved roads (watering, chemical stabilizers, limiting vehicle speeds, or gravelling), controlling dust from disturbed areas (watering, chemical stabilizers, limiting vehicle speeds, revegetation, furrows, wind breaks, temporary compaction, or synthetic or natural covering, such as netting or mulching), and preventing mud and dirt from being carried out onto paved roads (gravel entryways, washing vehicle wheels, or street cleaning).

Limits for other criteria pollutants apply only to permanent stationary sources installed during construction. These limits are specified for attainment or nonattainment areas (CCR Title 5, Chapter 1001, Regulation 3, Part A, II.B.62.a) and are two tons per year of any pollutant in an attainment area.

3.1.4 Regional Air Quality

SAFB is located in the Colorado Springs Metropolitan Area, which lies within the San Isabel Intrastate Air Quality Control Region (AQCR). The region is currently in attainment for all criteria pollutants, but has only been in attainment for CO since 1990 (CDPHE 2003). As part of the redesignation as an attainment area, the Colorado Springs area is under a maintenance plan

(last revised in 2003) until 2015 to demonstrate compliance with the CO standard. Under this maintenance plan, implemented under a SIP and approved by the USEPA, the Colorado Springs maintenance area has a mobile sources emissions budget of 270 tons per day of CO through 2009 and 531 tons per day from 2010 to 2015 (CDPHE 2003).

According to the latest monitoring and trends report prepared by the Pikes Peak Area Council of Governments (PPACG 2004), emissions of CO have declined since violations of the standard in 1988. Eight-hour average monitoring results are 4 ppm or less (compared to the eight-hour standard of 9.5 ppm). Emissions of other criteria pollutants are also well below standards, with the exception of ozone. The three-year average of the annual 4th-highest eight-hour average ozone level (this is the value used to determined compliance with standard) has remained at about 85% of the standard (0.088 ppm) (CDPHE 2006).

SAFB completed an Air Emissions Inventory for calendar year 2002 (USAF 2003a). The installation-wide criteria pollutant totals (actual and potential emissions) are shown in Table 2. As defined in 40 CFR 52.21, the potential to emit is the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. For purposes of potential to emit calculations, operating hours for emergency equipment (such as emergency generators) is limited to 500 hours per year by the USEPA. SAFB has chosen to limit its total actual and potential emissions to less than 100 tons under a synthetic minor operating permit (95EP772), approved by the Colorado Air Pollution Control Division on April 19, 2005. This permit contains Federally enforceable limits on emissions from stationary sources requiring an APEN (permitted sources). These permitted sources include 4 boilers and 13 diesel generators at the base. Many of the stationary sources at SAFB do not require a permit to operate because the criteria pollutants they generate are below the threshold of 2 tons per year. Actual and potential emissions of any pollutant from the operation of the 17 permitted sources and the non-permitted sources must be less than 100 tons per year to qualify SAFB as a synthetic minor source. The potential to emit CO exceeded the threshold of a major source (more than 100 tons per year). SAFB is planning talks with the State of Colorado to discuss the possibility of a Title V permit (Wasche 2006).

The base is not subject to the Prevention of Significant Deterioration (PSD) review requirements of 40 CFR 52.21 and CCR Title 5, Chapter 1001, Regulation 3, Part B, Section IV.D.3 because the actual or potential emission of any criteria pollutant does not exceed 250 tons per year.

The main stationary source of emissions at SAFB are the seven large generators at the Central Utilities Plant, which combust diesel fuel. The largest source of potential CO emissions is small equipment (unpermitted sources).

Table 2. Title V 2002 Air Pollutant Emissions at SAFB

	Emissions (tons per year)						
	PM_{10}	$PM_{2.5}$	NO_x[a]	SO_x[a]	CO	VOCs[a]	HAPs
Stationary Sources, Actual [b]	1.03	0.98	24.49	0.29	11.38	2.04	0.66
Stationary Sources, Potential	4.33	4.16	98.57	4.18	113.06	10.56	15.49

[a]NO_x - nitrogen oxides, SO_x =sulfur oxides, VOCs = volatile organic carbon compounds

[b]Does not include stationary fugitive sources per 40 CFR 51.165 and 5 CCR 1001, Regulation 3, Part A, Section I.B.23.b.

Source: USAF 2003a (latest available). Permitted sources were calculated with the 2005 Construction Permit conditions and fuel usage.

SAFB is a minor source of HAPs, with actual emissions of 0.66 tons per year and the potential to emit 15.49 tons per year. HAPs emissions are below the thresholds for specific requirements under 40 CFR 61 and 63 for source categories.

3.2 Soils, Geology, and Topography

Geological resources discussed in this section include physical features of the earth such as geology (surface and subsurface features), topography, and soils.

3.2.1 Geology and Topography

SAFB is situated in the Colorado Piedmont section of the Great Plains Physiographic Province. The Southern Rocky Mountain Physiographic Province is located about 18 miles to the west. The Colorado Piedmont is a mature elevated plain, dissected by numerous streams. In the local area, this includes Chico and Black Squirrel Creeks and their tributaries.

The base is underlain by about 25 to 100 feet of Quaternary alluvium (primarily sand and gravel) from tributaries of the Arkansas River (EPCPD 2003). These deposits are underlain by the Arapahoe Formation, which consists of a 200 foot-thick sequence of interbedded conglomerate, sandstone, siltstone, and shale. The deposits of the Laramie and Fox Hills Formations underlie the Arapahoe Formation. The Laramie Formation (500 to 600 feet thick) is composed of sandstone and shale. The sandstone is fine to medium, friable, and carbonaceous. The Fox Hills Formation, about 100 feet thick, consists of sandstone and siltstone interbedded with shale. Pierre Shale underlies the Laramie-Fox Hills Formation (USGS 1984).

There are no major active faults in the Colorado Springs vicinity; the nearest major faults are located about 80 to 100 miles from the area. The Northern Sangro de Cristo Fault, with a characteristic magnitude (an expected magnitude of earthquake based on fault geology and stress in the fault) of 7.5, is located about 90 miles southwest of the site. The Southern Sawatch Range Fault, with a characteristic magnitude of 7.2, is located about 100 miles southwest of the site. The Cheraw Fault, with a characteristic magnitude of 7.1, is located about 90 miles southeast of the site (USGS 2002, USGS 2004). The U.S. Geological Survey (USGS) calculates the probability of potential ground motion from faults and earthquake events in an area, compared to the motion of an object falling due to gravity. There is a 10% chance that a peak acceleration of 3.5% of gravity would be exceeded in 50 years (USGS 2003). This would approximately equal a value of V to VI on the Modified Mercalli Scale for earthquake intensity. Earthquakes of this magnitude would typically cause breakage of windows or plaster or other slight damage. On average, this would equal magnitudes in the range of 4.0 to 4.4 on the Richter Scale (this is variable depending on the proximity of the earthquake to the site). Since 1973, there have been 12 earthquakes within 100 kilometers (62 miles) of the site, with magnitudes ranging from 2.2 to 4.0 (USGS 2005a, USGS 2005b).

Elevation on the land to be leased for the MHPI varies from about 6,275 feet to about 6,340 feet above mean sea level. The area consists of a ridge, about 6,325 to 6,340 feet in elevation, and two slopes. The land slopes toward the southwest and to the southeast. Both of these slopes are at

a gradient of 1 to 6%. Drainage off of the ridge is generally to the southwest into an intermittent stream and to the southeast toward a broad valley.

3.2.2 Soils

Soils on the parcels include five series of sandy loams (USDA 2004):

- Ascalon sandy loam, 1-3% slopes on uplands
- Ascalon sandy loam, 3-5% slopes on uplands
- Bresser sandy loam, 0-3% slopes on terraces and uplands
- Bresser sandy loam, 3-5% slopes on terraces and uplands
- Truckton sandy loam, 3-9% slopes on uplands

These soils occur on uplands and side slopes on slight to moderate gradients. The hazard of water erosion varies from slight to moderate on these soils. These soils are highly to very highly erodible by wind, especially when vegetative cover is removed. Flooding does not occur on these soils. The Ascalon soils have moderate limits for construction due to shrink-swell (the tendency of some soils to change volume due to varying moisture conditions), low strength, and changes in volume from frost. The Bresser soils have slight to moderate limits for construction of dwellings due to slope. The Truckton soils have moderate limits for construction due to slope and changes in volume from frost.

Three soil borings were drilled on the proposed housing site (one each in the southwestern, north central, and east areas of the site) in December 2005. The boring in the southwest area indicated clayey sand to a depth of 3.5 feet and silty sand from 3.5 feet to 14.5 feet (the bottom of the boring). The boring in the north central area indicated a silty sand to a depth of 6.5 feet, with silty to clayey sand to 15 feet. Clayey sand to a depth of 3.5 feet was indicated in the east area, with silty to clayey sand from 3.5 to 6.5 feet, and silty sand from 6.5 to 15 feet (USAF 2006a). The sand content of the soils ranged from 55 to 84%. These borings indicate that the soil is generally good for construction and would not have to be extensively modified.

As discussed in Section 3.1.3, El Paso County requires a grading permit for fugitive particulate emissions and waterborne sediments from disturbed ground of more than one acre in size. The permit includes requirements to limit soil erosion and fugitive dust through best management practices, outlined in the El Paso County Land Development Code, Section 51. Erosion control requirements are discussed in Section 3.1.3. Additionally, if a proposed project is anticipated to disturb 25 acres or more for six months or longer, a Colorado APEN is required. Measures to control water erosion (vegetative controls such as maintaining as much vegetation as possible, and structural controls such as sediment traps and basins and ground cover) are also included within permit requirements.

The El Paso County Land Development Code also requires a final site plan for stabilizing steep slopes and limiting storm water runoff from completed construction. Additional requirements for runoff and sediment discharge are discussed in Section 3.3.2.

3.3 Water Resources

The hydrologic cycle results in the transport of water into various media such as the air, the ground surface, and subsurface. Natural and human-induced factors determine the quality of water resources. Water resources discussed in this section include groundwater, surface water (including storm water runoff), floodplains, and wetlands.

3.3.1 Groundwater

SAFB is near the southern edge of the Denver Aquifer system (USGS 1984, EPCPD 2003). The proposed site is underlain by about 25 to 100 feet of Quaternary alluvium (primarily sand and gravel) from tributaries of the Arkansas River (EPCPD 2003, USGS 1984, USGS 1995). These deposits are underlain by the Arapahoe Formation which consists of a 200 foot-thick sequence of interbedded conglomerate, sandstone, siltstone, and shale in the vicinity of SAFB, due to the base's location near the edge of the Denver Aquifer System. The deposits of the Laramie and Fox Hills Formations underlie the Arapahoe Formation. The Laramie Formation (about 500 feet thick) is composed of sandstone and shale. The sandstone is fine to medium, friable, and carbonaceous. The Fox Hills Formation is composed of sandstone and siltstone interbedded with shale. Pierre Shale underlies the Laramie-Fox Hills Formation (USGS 1984, USGS 1995). The depth to groundwater at the parcel for the proposed housing is not known, however, the depth to groundwater in the vicinity is about 50 feet (USGS 2006a).

3.3.2 Surface Water

The project area lies within the Chico Creek Watershed (USGS hydrologic unit catalog 11020004), which drains into the Arkansas River (located about 35 miles to the south of the project area). This watershed consists of several intermittent streams, including Black Squirrel Creek and Chico Creek. There are several unnamed intermittent and ephemeral streams in the vicinity of SAFB (USGS 2006b). Two intermittent streams drain the western part of the base. One of these streams is about 850 feet west of the proposed housing area. There are no streams on the parcel proposed for the housing area (USGS 2006b, USGS 1981, USDA 1981). A ridge divides the parcel; drainage is to the southwest into the intermittent stream and to the southeast into a broad valley with no developed drainage system (USAF 2005a).

There are no waters of the U.S. in the vicinity of the proposed housing.

3.3.3 Floodplains

There are no floodplains in the vicinity of the proposed housing. The closest floodplains are about one mile to the east, in the northeast corner of the base.

3.3.4 Wetlands

Wetlands are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil

conditions (Federal Interagency Committee for Wetland Delineation 1989). Wetlands are diverse ecosystems that provide natural flood control by storing spring runoff and heavy summer rains, replenish groundwater supplies, remove water pollutants, and filter and use nutrients. They also provide habitat for many plant and animal species, including economically valuable waterfowl and 45% of the nation's endangered species.

The U.S. Army Corps of Engineers (USACE) regulates those wetlands that are considered waters of the U.S. under Section 404 of the *Clean Water Act* and Executive Order 11990 (Protection of Wetlands). Waters of the U.S. include all waters used, previously used, or that could be used for interstate or foreign commerce, including all waters subject to the ebb and flow of the tide; interstate waters, including interstate wetlands; waters whose destruction or degradation could affect interstate or foreign commerce; all impoundments or tributaries of these waters; the territorial sea; and wetlands adjacent to any of these waters. Waters of the U.S. include lakes, rivers, perennial and intermittent streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, and natural ponds (40 CFR 122.2, 33 CFR 328). A wetland is not considered to be under USACE jurisdiction (and therefore, waters of the U.S.) based on its use and potential use by migratory bird species alone (68 *Federal Register* 10). There are no waters of the U.S. on SAFB, nor receiving drainage from water features on the base (USAF 2005b).

A wetland determination for nine potential wetland sites on SAFB was performed by USACE in June and August of 2000 (USAF 2001). Two of these sites were determined to be jurisdictional wetlands. The area of these wetlands had diminished considerably as compared to a previous survey conducted in 1991. There are no wetlands in the vicinity of the proposed housing site. The closest wetlands are about ½ mile to the south of the site (USAF 2001, USAF 2003b).

3.4 Biological Resources

Biological resources consist of an area's vegetation and wildlife, and the habitats (including wetlands) in which they occur. This section is divided into discussions of vegetation, wildlife, and threatened, endangered, and sensitive species.

3.4.1 Vegetation

Vegetation on the parcel proposed for privatization is consistent with a shortgrass prairie ecosystem, and is dominated by blue grama (*Bouteloua gracilis*), buffalo grass (*Buchloe dactyloides*), three-awned grass (*Aristida purpurea*), dropseed (*Sporobolus cryptandrus*), and needle-and-thread grass (*Stipa comata*) (USAF 2005c). Heavy grazing in the past is reflected in the species composition (USAF 2005c). There are no trees located on this parcel.

During a survey conducted in 2004 (USAF 2005c), seven species of state and federally listed noxious weeds were identified on SAFB: Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), diffuse knapweed (*Centaurea diffusa*), spotted knapweed (*Centaurea maculosa*), musk thistle (*Carduus nutans*), puncturevine (*Tribulus terrestris*), and Russian olive (*Elaeagnus angustifolia*). Six other invasive species also were found during the field surveys, including cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola kali*), kochia (*Kochia scoparia*),

tumble mustard (*Sisymbrium altissimum*), yellow sweetclover (*Melilotus officinalis*), and goatsbeard (*Tragopogon dubius*).

There are no wetland habitats within the 150-acre parcel proposed for the lease.

3.4.2 Wildlife

SAFB is home to 22 bird species, 12 species of mammals, and 1 reptile species typical of the shortgrass prairie, summarized in Table 3.

Table 3. Wildlife Species on SAFB

BIRDS	
Common Name	**Scientific Name**
Mallard	*Anas platyrhynchos*
Western burrowing owl	*Athene cunicularia*
Great-horned owl	*Bubo virginianus*
Swainson's hawk	*Buteo swainsoni*
Lark bunting	*Calamospiza melanocorys*
Scaled quail	*Callipepla squamata*
Killdeer	*Charadrius vociferus*
Common nighthawk	*Chordeiles minor*
American crow	*Corvus brachyrhynchos*
Yellow-rumped warbler	*Dendroica coronata*
Horned lark	*Eremophila alpestris*
American kestrel	*Falco sparverius*
Barn swallow	*Hirundo rustica*
Loggerhead shrike	*Lanius ludovicianus*
Northern mockingbird	*Mimus polyglottos*
Brown-headed cowbird	*Molothrus ater*
House sparrow	*Passer domesticus*
Western meadowlark	*Sturnella neglecta*
European starling	*Sturnus vulgaris*
American robin	*Turdus migratorius*
Western kingbird	*Tyrannus verticalis*
Mourning dove	*Zenaida macroura*

REPTILES	
Common Name	**Scientific Name**
Lesser earless lizard	*Holbrookia maculata*

MAMMALS	
Common Name	**Scientific Name**
Pronghorn	*Antilocapra americana*
Coyote	*Canis latrans*
Black-tailed prairie dog	*Cynomys ludovicianus*
Ord's kangaroo rat	*Dipodomys ordii*
Black-tailed jackrabbit	*Lepus californicus*
Meadow vole	*Microtus pennsylvanicus*
Deer mouse	*Peromyscus maniculatus*
Raccoon	*Procyon lotor*
Western harvest mouse	*Reithrodontomys megalotis*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Desert cottontail	*Sylvilagus audubonii*
Pocket gopher	*Thomomys* sp.

Source: USAF 2005c

3.4.3 Threatened, Endangered, and Sensitive Species

The western burrowing owl (*Athene cunicularia)* is a state-listed threatened species and is also protected under the *Migratory Bird Treaty Act*. It is a small, brown, long-legged ground-dwelling bird that uses abandoned rodent burrows, usually from a prairie dog. Their range extends from Canada's southern prairie provinces throughout the western U.S., including southern California and Texas. Burrowing owls are resident in central and southern Florida. In Colorado, burrowing owls are a migratory species, and can be found almost anywhere there are prairie dog burrows from late March or early April through October (CDOW 2006a). During winter, Colorado's burrowing owls migrate to Mexico and Central America (CDOW 2006a). Populations of burrowing owls have been monitored annually at SAFB since 2001 (USAF 2005c). Three

nesting pairs with 13 fledglings were observed in 2004, and during 2005, a pair of burrowing owls was observed nesting in the parcel that is proposed for privatization.

The presence of the black-tailed prairie dog (*Cynomys ludovicianus)* (a Colorado listed species of special concern) has been identified on the subject parcel. Black-tailed prairie dogs are reddish cinnamon in summer and more reddish in the winter; they are chubby and have sharp teeth and black-tipped tails, weigh one to three pounds as adults, and are 14 to 17 inches long (CDOW 2006b). Black-tailed prairie dog communities, called "towns," can vary greatly in size, from colonies with as few as 10 individuals to as many as several hundred. The population of black-tailed prairie dogs on SAFB is controlled under a management plan to prevent the existing population from expanding into the restricted area, where they may pose a problem for maintaining the security systems, and to decrease the potential for exposure to humans in case of a sylvatic plague (the wild form of bubonic plague) outbreak among the animals (USAF 2005d). The plan assigns one of three management levels to each area of the base: to maintain the area as a prairie dog habitat, to maintain the area as a buffer between active colonies and those areas where prairie dogs are not desired, or to maintain the area free from prairie dogs. The parcel proposed for privatization under the MHPI includes areas assigned to all three of these management approaches.

There are no other Federally or state listed threatened or endangered species known to be in residence at SAFB (USAF 2005c). However, threatened or endangered species and species of concern that may use the base as migrants or have potential to occur there include the bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), Mexican spotted owl (*Strix occidentalis lucida*), mountain plover (*Charadrius montanus*), Preble's meadow jumping mouse (*Zapus hudsonius preblei)*, lynx (*Lynx canadensis*), and swift fox (*Vulpes velox*) (USAF 2005c).

One globally rare plant species, the plains ragweed, has been identified at SAFB in a 40-acre area about one mile south of the parcel proposed for privatization. This species is known only to exist on the Great Plains of Colorado, occurring in playas on the prairie or artificial habitats similar to playas.

3.5 Human Health and Safety

A safe environment is one in which there is little or no potential for death, severe injury or illness, or property damage. The parcel proposed for transfer under the MHPI is undeveloped land with no current public access. As such, there are no human health and safety issues with the parcel, aside from those typically associated with rural settings (e.g., animal bites, trips and falls).

Potential safety risks outside of the subject parcel but in the general vicinity include those associated with vehicle traffic and limited use of hazardous materials associated with grounds maintenance. Presently, SAFB personnel manage vehicle traffic risks through strict surveillance of posted speed limits. Use of hazardous materials for grounds maintenance is limited to an extent such that minimal human health or safety risk is posed.

3.6 Solid Waste and Hazardous Materials

3.6.1 Solid Waste

Solid wastes include all waste materials that are neither hazardous nor toxic, and which are normally disposed of by landfilling or incineration, or are recycled or recovered.
In accordance with AFI 32-7042, *Solid and Hazardous Waste Compliance* and AFI 32-7080, *Pollution Prevention Program*, SAFB strives to recycle as much of their solid waste stream as possible. The management of solid (non-hazardous) waste on SAFB includes the collection and disposal of solid wastes and recyclable material by contract. Collection of recyclables (paper, plastic, cans, and cardboard) occurs on a periodic basis. There are seven pickup locations, including five inside the restricted area. There are no active landfills on base; solid waste is taken by a contractor to the Colorado Springs landfill (USAF 2003b).

3.6.2 Hazardous Materials and Wastes and Petroleum

Hazardous materials are substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present a substantial danger to public health or the environment if released. When improperly stored, transported, or otherwise managed, hazardous materials can significantly affect human health and safety, and the environment. These materials are defined within various laws to have specific meanings. For this EA, substances identified as hazardous by the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA), as well as petroleum products, are considered hazardous materials.

The use or a release of a hazardous material usually results in the generation of a hazardous waste. Examples of hazardous wastes generated include contaminated fuels and spent or off-specification solvents, paints, and thinners. Hazardous wastes, as defined for this document, include those substances identified by the *Resource Conservation and Recovery Act* (RCRA). Special wastes include wastes that require special handling (e.g., used oil, dewatered sludge), and are also tracked and managed by SAFB. Hazardous waste management consists of the collection, storage, and transportation of hazardous wastes (as defined by RCRA).

No hazardous materials, hazardous wastes, or petroleum are used or stored on the parcel proposed for privatization. There are no Air Force Installation Restoration Program (IRP) sites on or adjacent to the SAFB subject parcel.

Hazardous Materials Management. SAFB has established a contractor-operated hazardous materials pharmacy (HAZMART) with oversight authority on all hazardous material entering the base. The HAZMART is charged with managing materials to reduce the amount of hazardous waste generated on the installation.

Hazardous Waste Generation. SAFB is classified as a Conditionally Exempt Small Quantity Generator because the base generates less than 100 kg per calendar month of universal/hazardous waste. These wastes are generated in industrial operations that are not located on or adjacent to the parcel proposed for privatization. There are several waste streams leading to initial accumulation points (IAPs) where a quantity up to 55 gallons may be stored. Once that quantity

has been accumulated, the waste must be removed to the Central Accumulation Point (CAP) within 24 hours. IAPs are located at Buildings 300, 600, and 720. The CAP is located at Building 660 (USAF 2003b).

Underground Storage Tanks and Aboveground Storage Tanks. During preparation of the Environmental Baseline Survey (EBS) (USAF 2006b) for the proposed real estate transaction, there was no evidence of underground storage tanks (USTs) or aboveground storage tanks (ASTs) observed on the SAFB subject parcel during the site reconnaissance and no evidence of any USTs or ASTs identified on the parcel during the records review.

There are a total of eight regulated USTs on SAFB. Three 12,000-gallon gasoline tanks are at the Army Air Force Exchange Service (AAFES) station. Two 5,000-gallon tanks (diesel and automotive gasoline) are used at the service station north of Building 600. Two 39,000-gallon diesel tanks north of Building 600 are used for emergency generators and boilers at the central utilities plant. These tanks are deferred from leak detection. One 20,000-gallon diesel tank at Building 700 is used for emergency generators and is also deferred from leak detection.

There are a total of 13 ASTs at SAFB. Two 20,000-gallon tanks at Building 712 are regulated and are used for emergency generators and boilers. Additionally, three 500-gallon day tanks are located at Building 712. One 3,000-gallon day tank and one 250-gallon day tank in Building 600 feed the generators and boilers. Two 120-gallon ASTs in Building 700 serve emergency generators. One 250-gallon AST supplies the emergency generator at Building 420. Three ASTs, two located at Building 600 and one located at Building 660, store used oil.

None of the ASTs or USTs are within 2,000 feet of the subject parcel.

In 1996, two releases from tanks were reported to the Colorado Department of Labor. Both events were cleaned up, and the sources of the release were addressed. Closure letters were sent by the Colorado Department of Labor for both events (3/28/97 and 11/21/03).

Asbestos. There are no indications that any asbestos-containing materials were ever stored or disposed on the parcel, nor were any structures known to have been present, including any that may have contained asbestos.

Lead-Based Paint. No buildings, including any that may have contained lead-based paint, are known to have been located on the parcel.

Polychlorinated Biphenyls (PCBs). Polychlorinated biphenyls (PCBs) are a synthetic molecular additive used in lubricating oils to enhance cooling characteristics and are typically found in electrical transformers, fluorescent light ballasts, and machinery gear case oils. The parcel has no present or historic buildings or structures that might contain PCBs. There are no records or indications that PCBs were ever stored or disposed on the parcel.

Radon. Radon is a naturally occurring odorless, colorless gas with radioactive qualities that may be harmful to human health. Due to the location of SAFB and the geology of the eastern slope of the Rocky Mountains, radon is commonly detected at SAFB facilities. The USEPA action level

for radon is 4 picocuries per liter (pCi/L). CDPHE states that, in Colorado, between one third and one half of homes have radon in excess of this action level (CDPHE 2005). USEPA has mapped the U.S. for radon potential, assigning one of three categories to each county (greater than 4 pCi/L, between 2 and 4 pCi/L, or less than 2 pCi/L). El Paso County is assigned to USEPA's Zone 1, indicating a predicted indoor radon screening level greater than 4 pCi/L.

Radon sampling was conducted at several SAFB buildings in 2001, 2002, and 2004 (none of which are located on the parcel to be leased). The results are summarized below:

- 2001: 16 samples from 8 locations throughout the base (each location was sampled in duplicate). Results ranged from 0.2 to 3.89 pCi/L.

- 2002: 3 samples (one each in 3 rooms) at the base Child Development Center. Results were 0.6 to 0.9 pCi/L.

- 2004: 4 samples—2 rooms each in Building 120 and Building 210. Results were 1.92 and 2.10 pCi/L in Building 120 rooms, and 1.18 and 4.36 pCi/L in Building 210 rooms.

Of these samples, 22 of 23 reported results below the Federal action level for radon exposure.

Pesticides. During the EBS (USAF 2006b), it was determined there was no knowledge of pesticides being or having been applied to the parcel proposed for family housing. Various noxious weeds are present within the parcel and have been maintained in the past by livestock grazing, a common method for weed management.

3.7 Noise

Noise is sound that injures, annoys, interrupts, or interferes with normal activities or otherwise diminishes the quality of the environment. Noise can be described as intermittent or continuous, steady or impulsive, stationary or transient.

The parcel proposed for transfer under the MHPI lies within the boundary of SAFB. The parcel is presently vacant. As such, noise levels in the area are low and are consistent with a rural setting. Noise in the area is intermittent, impulsive, and transient. Current noise in the area consists primarily of vehicle traffic noise (located approximately 1.5 miles north of the parcel at Highway 94, and thus is minor), with occasional noises from agricultural operations and small aircraft (although these occasional noises are uncommon and are limited to the daytime hours). Any other area noises are temporary and limited to the daytime hours.

3.8 Cultural Resources

Cultural resources are archaeological, historical, and Native American items, places, or events considered important to a culture, community, tradition, religion, or science. Archaeological and historic resources are locations where human activity measurably altered the earth or left deposits of physical or biological remains. Prehistoric examples include arrowheads, rock scatterings, and village remains, whereas historic resources generally include campsites, roads,

fences, homesteads, trails, and battlegrounds. Architectural examples of historic resources include bridges, buildings, canals, and other structures of historic or aesthetic value. Native American resources can include tribal burial grounds, habitations, religious ceremonial areas or instruments, or anything considered essential for the persistence of their traditional culture.

SAFB has been completely surveyed for historic and archaeological resources. Five separate surveys were conducted from 1982 to 1997 (USAF 2004b). Base-wide, the surveys identified a total of 7 historic sites and 19 isolated artifacts (13 prehistoric and 6 historic), none of which were found to be eligible for nomination to the National Register of Historic Places (NRHP) (USAF 2004b), and none of which are located on the parcel proposed for privatization.

3.9 Land Use

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

SAFB covers 3,840 acres, 640 of which are currently developed for mission use. The ten land use categories defined for SAFB are briefly characterized as follows (USAF 2003b):

- ***Airfield.*** Helicopter operations are occasionally conducted in and out of SAFB and are restricted to daylight in visual meteorological conditions.

- ***Mission Operations and Maintenance.*** This land use area is the area of the primary mission. The primary facilities in this group include the Operations Building, the Colorado Tracking Station, the Defense Satellite Communications System facility, and the Joint National Integration Center. The buildings of this category are all located within the restricted area.

- ***Industrial.*** The industrial areas encompass the Base Support Facility, the Central Utilities Plant, and the Fire Station. This land use occurs mainly within the restricted area.

- ***Administrative.*** Inside the restricted area, primary facilities classified in the administrative land uses category are the Operations Support Facility and two modular facilities that accommodate a number of tenant organizations. Outside the restricted area, administrative facilities include Pass and Registration, the main gate, the Security Forces facility, Entry Control, and Wing Headquarters.

- ***Community-Commercial.*** Currently, there are two facilities that fall in this land use category in the restricted area: a small physical fitness facility and a dining hall. Outside the secure area, an AAFES Gas Station and the base Fitness Center are the primary buildings in this land use category.

- ***Community-Service.*** Community services functions are located primarily in a temporary facility and the Child Development Center.

- ***Medical.*** Small medical and dental clinics are operated on-base.

- ***Housing-Accompanied and Unaccompanied.*** There are no dormitory or military family housing land uses on base, but areas have been approved for future housing and dormitories.

- ***Outdoor Recreation.*** Two areas have been developed for outdoor recreational use, one inside the restricted area next to the Fitness Center and the other outside the restricted area along Falcon Parkway. The area near the Fitness Center contains a basketball court, tennis court, volleyball court, running track, climbing wall, and a picnic pavilion. The area along Falcon Parkway contains one softball field and a picnic pavilion.

- ***Open Space.*** Open space on SAFB is used primarily as a buffer for security of sensitive areas or as reserved land for future use. The vast majority of this undeveloped space (approximately 3,200 acres) surrounds the core mission area. There are presently a number of projects planned or under construction that will decrease the amount of open space on base, including a Security Forces Administrative Facility, an Operational Support Facility, Security Forces training facilities, and industrial facilities.

Land surrounding SAFB is currently zoned Rural Residential (RR-3). This zoning allows for single-family dwellings on minimum five-acre lots (if sub-division is permitted) or farms and ranches on minimum lot sizes of 35 acres. Currently, the predominant use is cattle grazing. There is no current development in the immediate area that could impact the installation.

3.10 Traffic and Transportation

Traffic and transportation issues refer to the movement of vehicles and humans throughout a road or highway network. The parcel proposed for transfer under the MHPI is not served by any major interstate or U.S. highways. The parcel is currently accessed by an unpaved, little-used road extending northeast from the developed area of SAFB.

El Paso County's 2004 *Major Transportation Corridors Plan* reported that all roads near SAFB (Enoch Road, Curtis Road, Peyton Highway, Drennan Road, and Highway 94) are considered uncongested roads (EPCDOT 2004). The same study predicted that, between 2000 and 2030, only about 350 dwelling units would be added to the approximately 5-mile-by-6-mile area containing the base, bounded by Highway 94, Peyton Highway, Drennan Road, and Curtis Road; in 2000, this area contained approximately 200 units. The study described all of these roads as two-lane roads. The County's plan calls for widening Highway 94, and the portion of Curtis Road north of Highway 94, to four-lane roads in the base's vicinity, to accommodate projected development; both road projects are expected to start by 2015. Plans for public transportation in the base's area include consideration of "tripper service" (limited service) along Highway 94 from Ellicott Highway to Curtis Road, and potential location of a park-and-ride facility at Highway 94 and Curtis Road. The plan also recommended development of bikeways along Curtis Road and Highway 94 in the vicinity of SAFB.

Available traffic counts reported by El Paso County (EPCDOT 2005) are summarized in Table 4.

Table 4. Local Traffic Counts

Road Counted	Cross Road	Direction from Intersection	Average Daily Traffic Volume	Date Reported*
Curtis Road	Highway 94	north	2,701	10/29/03
Curtis Road	Highway 94	south	1,650	10/29/03
Enoch Road	Schriever AFB	north	7,286	8/30/97
Enoch Road	Schriever AFB	south	346	8/30/97
Enoch Road	Highway 94	south	6,830	10/29/03
Highway 94	Curtis Road	west	10,976	11/19/03
Peyton Hwy	Highway 94	north	343	10/27/98
Peyton Hwy	Highway 94	south	359	1/29/03

*Most recent data reported if more than one study conducted at location.

Additionally, in 2005, a transportation study was commissioned by SAFB. The study analyzed the present-day transportation infrastructure near SAFB, projected short-term and long-term impacts of planned activities on SAFB, and identified suggestions for upgrade and improvement of the existing transportation infrastructure (USAF 2005e). The following traffic counts were included in the report.

Table 5. SAFB Traffic Counts

Road Counted	Direction	Time of Day	Number of Vehicles
Entering Enoch Road at Highway 94	south	morning peak (6:00 – 8:00 AM)	813
Exiting Enoch Road at Highway 94	north	evening peak (3:15 – 5:00 PM)	662
Entering Curtis Road at Highway 94	south	morning peak (6:00 – 8:00 AM)	530
Exiting Curtis Road at Highway 94	north	evening peak (3:15 – 5:00 PM)	441
Entering SAFB at Irwin Road Gate	east	morning peak (6:00 – 8:00 AM)	729
Exiting SAFB at Irwin Road Gate	west	evening peak (3:15 – 5:00 PM)	640

3.11 Socioeconomics and Environmental Justice

3.11.1 Population

El Paso County has the same geographic boundary as the Colorado Springs Metropolitan Statistical Area (MSA). The county had an estimated total population in 2004 of 539,225 (USBC 2005) and has shown an average annual increase in the last 20 years of 2 to 3% (PPACG 2005). This growth is predicted to continue at a slower rate of 1 to 2% annually over the next 25 years (PPACG 2005).

The 2004 American Community Survey (USBC 2005) reported demographic characteristics for El Paso County, the State of Colorado, and the United States, as summarized in Table 6. A slightly greater proportion of El Paso County's population consists of pre-school or school-aged children compared to the state-wide and national population, while minority (non-white) residents comprise a higher proportion than the national population, but less than the non-white population percent statewide, due to significantly higher Black / African-American population compared to the Colorado census results. The Hispanic / Latino population in the County is also higher by more than a third over the state-wide proportion.

Table 6. Demographic Characteristics of County, State, and Nation

	El Paso County	State of Colorado	U.S.
Total population	539,225	4,498,611	285,691,501
Age (years)			
<5	44,397 (8.2%)	337,719 (7.5%)	20,008,152 (7.0%)
5 to 14	82,310 (15.3%)	644,897 (14.3%)	40,743,721 (14.3%)
15 to 19	38,524 (7.1%)	293,076 (6.5%)	19,077,645 (6.7%)
20 to 64	325,375 (60.3%)	2,792,381 (62.1%)	171,656,682 (60.1%)
>64	48,619 (9.0%)	431,078 (9.6%)	34,205,301 (12.0%)
Median age (years)	33.5	34.5	36.2
One race	520,690 (96.6%)	4,394,381 (97.7%)	280,285,784 (98.1%)
White	436,106 (80.9%)	3,755,623 (83.5%)	216,036,244 (75.6%)
Black or African American	36,427 (6.8%)	178,731 (4.0%)	34,772,381 (12.2%)
Native American and Alaska Native	3,719 (0.7%)	30,148 (0.7%)	2,151,322 (0.8%)
Asian	13,784 (2.6%)	113,570 (2.5%)	12,097,281 (4.2%)
Native Hawaiian and other Pacific Islander	1,506 (0.3%)	7,529 (0.2%)	403,832 (0.1%)
Other	29,148 (5.4%)	308,780 (6.9%)	14,824,724 (5.2%)
Two or more races	18,535 (3.4%)	104,230 (2.3%)	5,405,717 (1.9%)
Hispanic or Latino	67,740 (12.6%)	862,631 (19.2%)	40,459,196 (14.2%)

In 2004, there were 209,000 households in El Paso County. The average household size was 2.6 people, compared to an average of 2.4 people in Colorado and the same as the nationwide average. Families (both married-couple families and other families) made up 69% of the households in El Paso County, compared to 64% in Colorado and 67% nationwide (USBC 2005).

3.11.2 Employment and Income

The unemployment rate in El Paso County was estimated at 7.1% for 2004; the state and national unemployment rates were 7.1% and 7.2%, respectively (USBC 2005). In 2004, the County's three largest employers were military: Fort Carson with 15,159 jobs, USAFA with 6,410, and Peterson AFB with 5,542 (PPACG 2005). In 2004, for the employed population 16 years and older, the leading industries in El Paso County were educational, health, and social services (16%) and retail trade (15%) (USBC 2005). The median income of households in El Paso County was $47,836, compared to state and national medians of $48,198 and $44,684, respectively (USBC 2005).

3.11.3 Housing

Of the 227,386 housing units in El Paso County in 2004, about 7.9% were vacant; the corresponding vacancy rate for the State of Colorado was 8.0% (USBC 2005). Approximately 65% of occupied housing units in El Paso County are owner-occupied, and the homeowner vacancy rate stood at 1.8% in 2004. The rental vacancy rate was 11.2%, which was somewhat higher than the rate for the State (9.2%) (USBC 2005). The median monthly rent in the county was $682, with 40% of renters paying 35% or more of their income for rent (USBC 2005).

3.11.4 Public Schools

Ellicott School District #22 operates one elementary school, one middle school, and one senior high school (NCES 2006). Total student enrollment in the 2003-2004 school year was 907. There are 63.3 full-time equivalent (FTE) teachers in the district and an overall student-teacher ratio of 14.3 (NCES 2006). Details for each school are summarized below (NCES 2006):

- Ellicott Elementary School has 24.4 FTE teachers and 355 students in pre-kindergarten through fourth grade.
- Ellicott Middle School has 19 FTE teachers and 273 students in fifth through ninth grades.
- Ellicott Senior High School has 20.4 FTE teachers and 279 students in ninth through twelfth grades.

The schools are located in the nearby town of Ellicott, approximately 10.3 miles from SAFB.

SECTION 4. ENVIRONMENTAL CONSEQUENCES

4.1 Air Quality

The analysis was based on a review of existing air quality in the region, information on SAFB air emission sources, projections of emissions from the proposed activities, and a review of the Federal and Colorado regulations for air quality. Emissions from construction and operation of the proposed facilities were analyzed.

Proposed Action

Construction of the proposed housing would generate emissions of criteria pollutants from grading and excavating operations, construction equipment, trucks driving on paved and unpaved roads, and worker vehicles (see Table 7 and Appendix B). Up to 150 acres in the proposed housing area would be disturbed from grading and construction of housing and installation of utility lines. Fugitive dust emissions (including PM_{10} and $PM_{2.5}$) would be generated from grading and fill operations, and from truck trips on paved and unpaved roads during construction. A grading permit for fugitive particulate emissions will be required from El Paso County for disturbing more than one acre of ground. As discussed in Section 3.1.3, this permit will require the completion of a drainage plan and an erosion control plan. The erosion control plan must include mandatory practices to limit soil erosion (from wind and water). Some of the required measures would control fugitive dust. A Colorado APEN for fugitive dust will be required for construction if grading and excavating would disturb more than 25 acres for longer than six months (the time of land disturbance begins with initial grading and clearing and ends when the disturbed ground is stabilized through compaction or revegetation). This APEN, if applicable, will require the implementation of fugitive dust control measures from onsite unpaved roads, disturbed soil, and mud and dirt on paved roads adjacent to the site. These measures include application of water and chemical stabilizers, revegetation, temporary furrows, and synthetic or natural coverings (netting or mulching) to disturbed areas as needed, to reduce fugitive dust (a source of PM_{10}) levels by 80% from uncontrolled levels. Emissions from construction would not be significant.

Emissions from unpermitted stationary sources would increase with the proposed action (see Table 8 and Appendix B). Residential furnaces would be added for each of the housing units. No new permitted stationary sources would be added; therefore, no APENs for criteria pollutants or HAPs will be required. Long-term actual and potential emissions from stationary sources would increase, but the estimated emissions would increase over a several-year period and would not exceed the NAAQS or state standards due to the small amount of criteria pollutants generated, the relatively large area in which the emissions would occur, and the dispersive meteorological conditions (winds average between 8 and 12 miles per hour) in which the emissions would be generated. SAFB would continue to comply with permitting requirements and the impacts to air quality would not be significant. Therefore, the focus of the analysis centers on conformity with the SIP for the CO maintenance area.

Table 7. Estimated Emissions Compared to Colorado Springs Maintenance Area Emission Inventory

	Emissions (tons per year)					
	$PM_{2.5}$	PM_{10}	SO_x	NO_x	VOCs	CO
Non-Road Construction						
Emission inventory [1]						1032.95
Regionally significant						103.30
Proposed action	0.41	1.71	0.86	3.91	0.28	1.97
Mobile Emissions						
Emission inventory [1]						142233.20
Regionally significant						14223.32
Proposed action	0.000	0.001	0.004	0.043	0.037	0.63
Proposed Action - Total	0.41	1.71	0.86	3.95	0.32	2.60
Conformity Threshold						100.00

[1] Inventory is for CO only. Source: CDPHE 2003.

Table 8. Estimated Emissions from Stationary Sources (Natural Gas)

	Emissions (tons per year)					
	PM_{10}	SO_x	NO_x	VOCs	CO	HAPs
Actual Title V emissions	1.03	0.29	24.49	2.04	11.38	0.66
Proposed action [1]	0.04	0.00	0.46	0.03	0.19	0.01
Total emissions including proposed action	1.07	0.29	24.95	2.07	11.57	0.67
Potential Title V emissions	4.33	4.18	98.57	10.56	113.06	15.49
Proposed action potential emissions [2]	0.07	0.01	0.91	0.05	0.39	0.02
Total potential emissions including proposed action	4.40	4.19	99.48	10.61	113.45	15.51

Note: Actual and potential emissions are for comparing emissions to Title V thresholds, and do not include fugitive emissions per 40 CFR 51.165.

[1] Emissions are from natural gas consumption (space heating, water heaters, and appliances) in the proposed 269 housing units. See Appendix B for details.

[2] Potential emissions from proposed action are based on doubling emissions estimates.

SAFB, as part of the Colorado Springs metropolitan area, is located within a maintenance area for CO. Emissions would be regionally significant if they exceeded 10% of the inventory for any affected pollutant (in this case, CO). The SIP budget for CO from non-road construction emissions in the Colorado Springs Metropolitan Area is 2.83 tons per day (1,032.95 tons per year) for 2007 (CDPHE 2003). Construction emissions from the proposed action do not comprise 10% of the daily inventory and are not regionally significant. The SIP budget for CO from mobile sources is 389.68 tons per day (142,233.20 tons per year) for 2007. Mobile emissions from the proposed action do not comprise 10% of the daily inventory and are not regionally significant.

Conformity thresholds, as defined in 40 CFR 51, Subpart W, are used to determine conformity with a SIP. The threshold for CO is 100 tons per year. Estimated emissions from the proposed action are about 2.6% of this threshold (see Table 7), will conform to the SIP, and are not significant. The proposed action is not regionally significant and the total direct and indirect emissions would be below the 100 tons per year de minimis threshold for CO. Therefore, this project is exempt from further conformity analysis pursuant to 40 CFR 93.153.

Construction equipment would generate small amounts of HAPs (about 0.08 tons per year). These emissions will not be significant. Long-term emissions of HAPs (from natural gas combustion within the proposed military family housing) would increase by about 0.01 tons per year as a result of the proposed action. SAFB will remain a minor source for HAPs, as actual emissions or the potential to emit a single HAP would remain below 10 tons per year, and the actual emissions or potential to emit all HAPs will remain below 25 tons per year. Impacts to air quality would not be significant.

No Action Alternative

Emissions of criteria pollutants and HAPs at SAFB would remain the same as at present. There would be no impacts on air quality.

Off-Base Privatized Housing Alternative

Emissions from constructing the proposed housing off-base would be similar to those from the proposed action. The housing unit density standards would most likely be greater than those under the proposed action; although the area of land disturbance may be less, the same permit requirements would apply. Constructing the housing off-base would not add unpermitted stationary sources to SAFB; therefore, long-term emissions would be less at the base. Potential impacts to air quality are not likely to be significant, and it would appear that this alternative would conform with the SIP for CO if the project details were substantially similar to construction of the housing on-base (the proposed action).

4.2 Soils, Geology, and Topography

Geological studies, soil surveys, previous EAs, and a USGS topographical map were reviewed to characterize the existing environment. Construction activities that could influence geological resources were evaluated to predict the type and magnitude of potential impacts. For example,

soils would be disturbed during construction activities. The predicted post-construction environment was compared to the existing environment to determine if significant changes in any existing conditions would occur.

Proposed Action

The proposed action would result in about 150 acres in the proposed housing area being disturbed during grading, installation of utility lines, and construction of housing. The proposed action requires an El Paso County grading permit and, if 25 or more acres were disturbed for more than 6 months, an APEN from the State of Colorado. The grading and construction activities would take place in areas with slight to moderate slopes, with a moderate to severe risk of erosion.

The El Paso County grading permit includes mandatory controls to reduce potential erosion. Permit requirements must include a drainage plan to control storm water runoff (and potential erosion) during construction. Storm water runoff could be controlled by sediment barriers such as silt fences or straw bales, or structural controls such as a temporary sediment basin. Measures to control erosion must conform with the El Paso County Drainage Criteria Manual. The El Paso County Land Development Code also requires a final site plan for stabilizing steep slopes and limiting storm water runoff from completed structures. These best management practices must be implemented in accordance with County requirements. If an APEN is required, further measures to control wind erosion and fugitive dust shall also be implemented. These controls could include daily watering or chemical stabilization of exposed surfaces, maintaining existing vegetation as much as possible, and revegetating sites as soon as possible, limiting vehicle speeds, or gravelling temporary roads, wind breaks, temporary compaction, or synthetic or natural covering, such as netting or mulching. Areas would be vegetated as soon as practical as the proposed action is being completed. SAFB's *Integrated Natural Resources Management Plan* (INRMP) requires the use of native seed mixes for all revegetation projects to promote the establishment of xeriscape natural vegetation cover (USAF 2005c). Impacts to soils and geological resources would not be significant. Further permit requirements and potential impacts to hydrogeology and groundwater are discussed in Section 4.3.

As discussed in Section 3.2.1, there are no major faults in the project area. The risk of potential earthquake damage is slight, with the expected magnitudes of any seismic events in the range of 4.0 to 4.4 on the Richter Scale (V to VI on the Modified Mercalli Scale). Seismic design parameters would not be required. Impacts from seismicity would not be significant.

In accordance with permit requirements and best management practices, topsoil would be restored and vegetation would be reestablished to reduce the potential for erosion. Long-term soil productivity would be significantly impacted.

No Action Alternative

No impacts to soils, geology, or topography would occur.

Off-Base Privatized Housing Alternative

Impacts from constructing the proposed housing off-base would likely be similar to those from the proposed action. The amount of soil disturbed would be similar. The contractor would be required to obtain an El Paso County grading permit and implement best management practices to control erosion. The potential significance of impacts would depend upon the site selected and characteristics of the developer's proposal for the off-base site, but permit requirements and best management practices would likely reduce the potential for impacts to the insignificant level.

4.3 Water Resources

Maps showing topography, watersheds, and base drainage were examined. The review focused on the proximity of the proposed activities to surface waters, hydrogeology in the project area, wetlands, and water quality in the local area, and evaluated the effects of the actions with regard to those factors. Data sources for the analysis included the INRMP, *General Plan*, and regulations pertaining to surface water and wetlands.

Proposed Action

Grading during construction would not impact groundwater. A spill or leak of fuel or lubricants is not likely during construction in this area, but if one occurs, it must be cleaned up immediately, in accordance with the PO's approved Spill Response Plan, to prevent potential contamination of the alluvial aquifer. Given the small amount of oil and fluids used by construction equipment, impacts would not be significant.

About 150 acres could be disturbed during construction. Disturbed areas would be vulnerable to wind and water erosion during grading and excavation of the site. Particulate matter would be transported and deposited by wind in the local area. The potential for water erosion on the affected soils is slight for most of the affected area. In the southwest quarter of the proposed site, slopes are up to 6%, and the hazard of water erosion is moderate. Mandatory erosion control measures required by the grading permit would limit runoff and sedimentation from erosion to preconstruction conditions, and the impact to the intermittent stream about 850 feet to the west of the proposed site would not be significant. Runoff would increase after streets and housing units are developed, due to the creation of impermeable surfaces. Adequate stormwater drainage would need to be incorporated into the development. An adequate stormwater drainage system would prevent increased stormwater flow into the nearby intermittent stream and prevent accelerated erosion along its banks.

As discussed in Section 3.3.3, the nearest floodplains are about one mile from the proposed housing site, and would not be affected by the proposed action.

The nearest wetlands are about ½ mile to the south of the proposed housing site and would not be affected by the proposed action.

No Action Alternative

Under the no action alternative, there would be no impact to groundwater, surface water, or floodplains.

Off-Base Privatized Housing Alternative

Impacts from constructing the proposed housing off-base would be similar to those of the proposed action. The housing unit density standards would most likely be greater than those under the proposed action; although the area of land disturbance may be less, the same permit requirements would apply. The contractor would be required to obtain an El Paso County grading permit and implement best management practices to control erosion. Depending on the site selected, a National Pollutant Discharge Elimination System (NPDES) permit could be required (if construction at the site would affect waters of the U.S.). Adequate stormwater drainage would need to be incorporated into the development, in accordance with County requirements. The potential significance of impacts would depend upon the site selected and characteristics of the developer's proposal for the off-base site, but permit requirements and best management practices would likely reduce the potential for impacts to the insignificant level.

4.4 Biological Resources

Proposed Action

The existing vegetation on the parcel proposed for transfer consists of grazing-altered shortgrass prairie. Under the proposed action, this vegetation would be largely removed on 150 of the base's 3,840 acres, to be replaced with surfaces consistent with a residential subdivision: turfgrass, landscape/bedding plants, ornamental shrubs, housing and related structures, and paved roads and walkways. This would affect less than 4% of the base's land area, and is not considered to be a significant effect. The PO is expected to develop defensible space around the residential area as part of the project design, to protect the area (and hence the PO's investment) from the potential hazard of grassland fire in adjacent undeveloped areas; this planning will also minimize the potential for undeveloped areas to be affected by a residential fire. Noxious weed management is required by the *Colorado Noxious Weed Act* (CRS 35-5.5), which mandates control of noxious weeds listed under the Act, with enforcement up to and including eradication by the local governing body and assessment of the associated costs to the affected landowner or occupant.

Starting at the time of initial construction, local wildlife will tend to avoid the parcel's human and mechanical activity, and their presence in the area will shift to adjacent and nearby undisturbed areas. Area disturbance activities will need to be scheduled so as not to interfere with the nesting season of the western burrowing owl (approximately 1 April through 31 October). Informal consultation and/or coordination with the U.S. Fish and Wildlife Service and the Colorado Department of Wildlife regarding the western burrowing owl and the black-tailed prairie dog on the parcel will continue, with the PO taking responsibility. No significant adverse effects on wildlife are expected as a result of the proposed action.

No Action Alternative

Management of SAFB's natural resources by the Air Force has been conducted in accordance with policies summarized in the base's INRMP (USAF 2005c). Under the no action alternative, management of these resources would continue as in the past, and no impacts to the effective management of biological resources would occur.

Off-Base Privatized Housing Alternative

Under this alternative action, military family housing would be constructed at a location not occupied by SAFB. A possible location has not been identified, but is expected to be similar in nature to the parcel identified for transfer under the MHPI (that is, a rural unoccupied parcel). Effects on vegetation and general wildlife species in any nearby location are likely to be similar to those of the proposed action. However, the potential for effects to endangered or threatened species, or other species of special concern, cannot be assessed without identification of a specification location, and this remains a data gap for the analysis of this alternative in this EA.

4.5 Human Health and Safety

Proposed Action

Under the proposed action, 269 family housing units would be constructed at SAFB. The addition of these units would significantly increase the volume of traffic in an area that is currently unoccupied. The area would be occupied by residential structures, and vehicle traffic is not expected to be high speed. Safety risks posed by vehicle traffic can be minimized by speed control, effective signage, pedestrian rights-of-way, and planning to limit access between housing units and major traffic arteries. Military families that would occupy the new residences are likely presented with similar vehicle safety risks at their current off-site housing locations.

A new residential area also introduces potential human health risks associated with pesticide applications. Such risks are easily addressed by education of tenants in the proper application of pesticides in accordance with published instructions. It is not anticipated that large-scale pesticide application would occur. Military families that would occupy the new residences are also likely presented with similar human health risks at their current off-site housing locations.

Development of the area would reduce the human health and safety risks typically associated with rural settings (such as animal bites, trips and falls). Area development would likely cause animals to relocate to other undeveloped areas. Construction of sidewalks and pedestrian rights-of-way would eliminate uneven walking surfaces common to open rural fields.

Construction activities present a new set of safety risks. These risks include health risks due to hazardous materials that may become airborne; risks associated with temporary increases in heavy equipment; occupational risks associated with construction zones in general (including trip and fall hazards and noise hazards); and unauthorized entrance to construction areas (with associated potential for injury) by members of the public (particularly children). These safety risks would be short-term, ceasing after construction activities are completed. Additionally, these

safety risks can be minimized through the use of water sprays, industry standard occupational protective measures (such as fall protection and hearing protection), and other standard construction management practices. Implementation of measures to restrict access to construction sites may deter children from entering such areas during work and non-work hours. The PO would be required to follow all state and local requirements for security procedures during construction. Finally, since noise increases would be intermittent and short in duration, special risks to children from construction noises are not anticipated.

While construction of a new residential area introduces human health and safety risks, these construction-related risks are expected to be short-term. Area development would reduce the human health and safety risks typically associated with rural settings. Other human health and safety risks common to residential areas would be similar to those likely presented at the current off-site housing locations of prospective tenants.

No Action Alternative

Under the no action alternative, no immediate changes from current health hazards and safety risks would be realized. The area would remain undeveloped, with minimal area vehicle traffic safety risks and hazardous material use health hazards. Human health and safety risks typically associated with rural settings would remain.

Off-Base Privatized Housing Alternative

Under this alternative action, military family housing would be constructed at a location not occupied by SAFB. A possible location has not been identified, but is expected to be similar in nature to the parcel identified for transfer under the MHPI (that is, a rural unoccupied parcel). The actions to be performed under this alternative are predicted to pose the same set of human health and safety risks as those posed by the proposed action. Construction-related risks are expected to be short-term. Area development would reduce the human health and safety risks typically associated with rural settings. Other human health and safety risks common to residential areas (such as increased traffic and pesticide usage) would be similar to those likely presented at the current off-site housing locations of prospective tenants.

4.6 Solid Waste and Hazardous Materials

The analysis was based on a review of potential issues with hazardous materials and wastes. The analysis focused on the types of proposed activities and where they would occur. The analysis looked at the mechanisms of potential spills or leaks, the likelihood of a dispersion of hazardous material, and the severity of consequences that could occur.

Proposed Action

Solid waste generation would show a small short-term increase due to generation of waste materials during housing construction, followed by a long-term increase in recurring solid waste generation by the occupants of the 269 residential housing units. The PO will be responsible for disposal of solid waste generated from the proposed action, using either the Colorado Springs

landfill or privately owned landfills. The military families who will occupy these housing units presently reside in the general area served by the same landfills, so no overall increase in long-term solid waste generation in the Colorado Springs area would occur, nor would there be any new long-term impacts on local landfill capacity.

Fuels and lubricants would be used for equipment during excavation, grading, and construction of housing units within the proposed action site. Other hazardous materials such as paints, thinners, and sealants may be used during the construction activities, but must be controlled under standard safety and handling procedures. Although construction of new housing units could temporarily increase the use of hazardous materials and amount of hazardous waste generated, no new types of hazardous materials/wastes would be used or generated. The PO will be responsible for management and disposal of hazardous materials and hazardous wastes. Standard safety procedures will be required (e.g., no smoking while fueling equipment). Overall, construction activities would minimally change the short-term generation of wastes. Since the site does not contain any improvements or history of storing or disposing hazardous materials, construction would not generate any waste containing asbestos, lead-based paint, or PCBs, nor would there be impacts during construction from above-ground or underground storage tanks. The Air Force will require the PO to take all necessary measures consistent with the Air Force Radon Assessment and Mitigation Program to ensure that levels of radon within all housing units are lower than the Air Force action level of 4 picocuries per liter and, in all new construction, implement prudent radon reduction measures consistent with the latest building practices in the local area. Sections 4.2 and 4.3 address potential impacts to geological and water resources from potential spills of hazardous materials.

Overall, the proposed action would be associated with a short-term increase in solid waste generation from construction, followed by a long-term localized increase in generation of municipal-type solid waste from residential occupation of the new housing units; this increase would be offset by dispersed localized decreases in the areas where SAFB families currently reside, resulting in no net change to municipal solid waste generation in the Colorado Springs area. A short-term increase in hazardous waste generation would also occur during the construction phase, but would not have any significant environmental impact.

No Action Alternative

Under the no action alternative, there would be no generation of solid waste and hazardous materials from construction or residential housing use. SAFB military families would continue to utilize off-base housing, contributing a comparable amount of household waste to the Colorado Springs-area solid waste disposal facilities as if they were housed at SAFB.

Off-Base Privatized Housing Alternative

Under this alternative action, new military family housing would be constructed at a location not occupied by SAFB. A potential location has not been identified, but would be expected to be similar in nature to the parcel identified for transfer under the MHPI (that is, a rural unoccupied parcel). Solid and hazardous waste generation would be similar to that expected for the proposed action, with only the location differing.

4.7 Noise

Proposed Action

Under the proposed action, 269 family housing units would be constructed at SAFB. The addition of these units would significantly increase the volume of traffic in an area that is currently unoccupied. As a result, noise created by area traffic would increase. Services provided in residential communities (such as solid waste disposal, school bus) would be introduced, and associated traffic would also increase area noise. While the newly created noise would not differ from off-site housing locations currently occupied by SAFB personnel, noise would increase in the SAFB area.

During construction activities, noise would increase due to operation of heavy equipment, increases in traffic from waste hauling activities, and other construction-related sources. These noises would be short-term, ceasing to continue after construction activities are completed. Additionally, construction activities could be scheduled to limit these noises to daylight hours, and noise management measures could be implemented.

Overall, noise would increase in the proposed action's area. However, these noise increases are not anticipated to cause disruption to current area occupants or activities, nor are they anticipated to present any human health risks. Construction-related noises would be short-term and can be minimized and/or managed. Traffic noises would not significantly differ from those at off-site housing locations currently occupied by prospective tenants.

No Action Alternative

Under the no action alternative, no changes from current noise levels would be realized. Noises would continue to consist primarily of minor vehicle traffic noise (located approximately 1.5 miles north of the parcel at Highway 94), with occasional noises from agricultural operations and small aircraft.

Off-Base Privatized Housing Alternative

Under this alternative action, military family housing would be constructed at a location not occupied by SAFB. The proposed location has not been identified, but the location is expected to be similar in nature to the parcel identified for transfer under the MHPI (that is, a rural unoccupied parcel). The same increases in noise would be realized under this alternative, with only the location differing. Such noise increases are not anticipated to cause disruption to area occupants or activities, nor are they anticipated to present any human health risks. Construction-related noises would be short-term and can be minimized and/or managed. Traffic noises would not significantly differ from those at other housing locations currently occupied by prospective tenants.

4.8 Cultural Resources

Proposed Action

The U.S. Air Force is required to comply with existing legislation to ensure that properties that may qualify for inclusion on the NRHP are not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly. The parcel proposed for construction of new family housing is not known to contain any cultural resources. Therefore, no impacts to cultural resources are expected as a result of the proposed action.

No Action Alternative

Under the no action alternative, there would be no housing construction at SAFB, and therefore no impacts to cultural resources.

Off-Base Privatized Housing Alternative

Under this alternative action, military family housing would be constructed at a location not occupied by SAFB. A potential location has not been identified, but would be expected to be similar in nature to the parcel identified for transfer under the MHPI (that is, a rural unoccupied parcel). An archaeological survey would need to be conducted on any proposed site prior to construction. Evaluation of potential impacts to cultural resources is not possible without identification of a specific site, and this remains a data gap for this EA.

4.9 Land Use

Proposed Action

Under the proposed action, 269 family housing units would be constructed on approximately 150 acres of what is now categorized as open space at SAFB. This would represent a shift from the "open space" category to the "housing" category of approximately 3.9% of the base's land, which is not considered to be a significant effect, and is within the land use planning envisioned in the base's General Plan.

No Action Alternative

Under the no action alternative, there would be no change to land use at SAFB.

Off-Base Privatized Housing Alternative

Under this alternative action, military family housing would be constructed at a location not occupied by SAFB. A potential location has not been identified, but the location is expected to be similar in nature to the parcel identified for transfer under the MHPI (that is, a rural unoccupied parcel). The potential impact on land use in the region of constructing a 269-unit housing development would not be negligible, but this is not likely to be a significant adverse effect on local land use, as local housing developers are actively advertising new construction for

private residential development unrelated to SAFB's MHPI plans. However, a zoning change would likely be required, as much of the surrounding land is zoned for single-family dwellings on minimum five acre lots (if sub-division is permitted) or farms and ranches on minimum lot sizes of 35 acres.

4.10 Traffic and Transportation

Proposed Action

Under the proposed action, 269 family housing units would be constructed at SAFB. The addition of these units would significantly increase the volume of traffic in this immediate on-base area, which is currently unoccupied and undeveloped. Not only would personal vehicle traffic increase, but traffic from support services (such as solid waste disposal, school bus) would also be introduced into the area.

Assuming that one individual per household works at SAFB, construction of the new units would eliminate 269 commuter round trips per day between SAFB and Colorado Springs. However, assuming 75% of spouses work in Colorado Springs, 202 new commuter round trips per day between SAFB and Colorado Springs would result. Additionally, area services (including shopping, entertainment, health care, and dining) are primarily located in Colorado Springs. Assuming each household makes an additional three round trips per week to the Colorado Springs area for such services, an addition of 115 round trips per day between SAFB and Colorado Springs would result. Therefore, a net increase of 48 round trips per day between SAFB and Colorado Springs, assumed to primarily utilize Highway 94, are projected. Using the baseline traffic count of 10,976 vehicles per day on Highway 94 westbound at Curtis Road (Table 4), the proposed action would result in a traffic increase of approximately 0.4%.

Local roads are currently considered uncongested (EPCDOT 2004), and a minor increase in traffic volume from current levels is expected to result from the proposed action. Finally, El Paso County officials have anticipated a potential need to expand the transportation infrastructure in the area (including widening Highway 94 and expanding public transportation) in response to predicted growth east of Colorado Springs (EPCDOT 2004).

Additionally, the 2005 transportation study commissioned by SAFB (USAF 2005e) projects transportation impacts of short-term and long-term planned activities at SAFB. Included in the short-term planned activities is the addition of 330 family housing units (a larger projected addition of housing units than would be constructed under the proposed action). The following table presents the projected changes to traffic counts at key intersections. It should be noted that the study did not project the transportation impacts created solely by the addition of family housing units, and thus these projections can be viewed as a bounding estimate for the proposed action. It should also be noted that the traffic counts presented below are a small fraction of the total traffic volumes measured by EPCDOT (presented in Section 3.10 of this EA).

Table 9. Projected SAFB Traffic Counts

Road Counted	Direction	Time of Day	Number of Vehicles (net change from baseline volume)
Entering Enoch Road at Highway 94	south	morning peak (6:00 – 8:00 AM)	817 (+ 0.5%)
Exiting Enoch Road at Highway 94	north	evening peak (3:15 – 5:00 PM)	638 (- 4%)
Entering Curtis Road at Highway 94	south	morning peak (6:00 – 8:00 AM)	614 (+ 16%)
Exiting Curtis Road at Highway 94	north	evening peak (3:15 – 5:00 PM)	479 (+ 9%)
Entering SAFB at Irwin Road Gate	east	morning peak (6:00 – 8:00 AM)	854 (+ 17%)
Exiting SAFB at Irwin Road Gate	west	evening peak (3:15 – 5:00 PM)	716 (+ 12%)

The 2005 transportation study also identified traffic and pedestrian infrastructure improvements that may be implemented to minimize any new hazards posed by increases in area traffic (USAF 2005e).

During construction, localized increases in traffic volumes may also occur. These increases would be dominated by construction and heavy equipment traffic. These volume increases would be short-term, ceasing after construction activities are completed. Additionally, construction activities could be scheduled to time these traffic volume increases to daylight hours and away from morning and afternoon rush hours.

Overall, traffic in the immediate area would increase, but this increase would primarily be a shift in traffic from one area to another and is characterized as an insignificant increase with respect to overall area traffic. Traffic increases in the immediate area are not expected to pose an unrealistic increase in hazards, and new hazards posed can be minimized and/or managed.

No Action Alternative

Under the no action alternative, no changes from the current traffic volumes would be realized. Military family housing would not be constructed at SAFB, and personnel would continue to commute from other areas.

Off-Base Privatized Housing Alternative

Under this alternative action, military family housing would be constructed at a location not occupied by SAFB. A potential location has not been identified. The same increases in traffic volumes predicted under the proposed action would occur under this alternative. Not only would personal vehicle traffic increase, but support services (such as solid waste disposal, school bus) would also be introduced into the area. Construction-related traffic would also increase in the short-term.

Since an off-base location has not been identified, the potential for a decrease in traffic volumes on local roads due to reduced commute distances and access to local services cannot be predicted. However, traffic volumes on local roads in the immediate SAFB area would not be expected to decrease.

Overall, traffic in the immediate area would increase, but this increase would primarily be a shift in traffic from one area to another and is characterized as an insignificant increase with respect to overall area traffic. Traffic increases in the immediate area are not expected to pose an unrealistic increase in hazards, and new hazards posed can be minimized.

4.11 Socioeconomics and Environmental Justice

Proposed Action

During the transition period of the proposed action (estimated to be six years), new jobs will be created to directly accomplish construction activities, and indirectly as a result of purchasing goods and services needed for construction and consuming goods and services made possible by wage and salary expenditures of direct workers. Overall, there would be a short-term beneficial impact to the local economy. The proposed presence of 269 new family residences at SAFB represents a beneficial impact on the local housing supply.

Under the proposed action, it is estimated that public school enrollment in Ellicott District #22 will increase by 131, 76, and 51 elementary, middle, and high school students, respectively (USAF 2005f). This represents increases of 37, 29, and 18% in enrollment in the respective schools. The elementary school is currently operating at maximum student capacity with all students in permanent facilities at a reasonable classroom size, and has insufficient space to accommodate the additional students expected as a result of housing privatization at the base. The Air Force will require prospective bidders to initiate dialogue with school district officials to address elementary school issues, and the PO must include in their proposal a description of the proposed solution and documentation of endorsement by the local school district. This approach is expected to result in no significant adverse impact to the local public school district. In the long term, Federal impact aid will be provided to the school district (approximately $350,000 to $400,000 annually) to support the education of these students living on Federal land (SAFB), which does not generate property tax revenue for the school district; this will make the students' ongoing education cost-neutral for the school district.

Environmental justice impacts are those environmental impacts that affect children, minority populations, or low-income communities. As described in the preceding sections of Chapter 4, this EA predicts no significant environmental impacts to any environmental values, including air and water quality, health and safety, noise, traffic and transportation, or socioeconomics. Any effects from increased enrollment in the local public school district will be addressed and managed as part of the PO's plan in coordination with school district officials, as described in the previous paragraph. Beneficial impacts are expected to be realized for each family who relocates to the new on-base housing, in terms of reduced commuting time for the military member (and therefore more time with family members), as well as the efficiencies, cleanliness, and reliability afforded by a new house and availability of on-base community amenities. No significant

impacts to environmental justice are expected, since no significant adverse impacts to anyone, regardless of age, ethnicity, or economic class, are projected from the proposed action.

No Action Alternative

There would be no activities affecting local employment and income, housing, or school enrollment under the no action alternative.

Off-Base Privatized Housing Alternative

Under this alternative action, military family housing would be constructed at a location not occupied by SAFB. A potential location has not been identified, but is assumed to also be within the boundaries of Ellicott School District #22. Effects on employment and income, housing, and public school enrollment would be expected to be similar to those posed by the proposed action, and would not represent any significant adverse impacts.

4.12 Cumulative Impacts

Cumulative impacts are those changes to the physical and biological environments that would result from the proposed action in combination with reasonably foreseeable future actions. Significant cumulative impacts could result from impacts that are not significant individually, but when considered together, are collectively significant. Reasonably foreseeable future actions include those identified in the *General Plan* for SAFB (USAF 2003b).

The proposed action shall comply with Federal and Colorado air quality laws and Air Force policies that are designed to minimize long-term cumulative impacts to air quality. The proposed action shall conform with the Colorado Springs maintenance plan for CO. Short-term construction emissions would not violate state or Federal standards. Increases in long-term emissions would be minimal compared to existing emissions generated at SAFB and in the Colorado Springs area. Emissions of all criteria pollutants in the metropolitan area are well below the standards (PPACG 2004), with the exception of ozone, which is being generated at about 85% of the standard (CDPHE 2006). The addition of 0.19 tons per year of CO emissions from the proposed housing at SAFB would not substantially add to the current and projected CO emissions in the Colorado Springs Metropolitan Area, and CO emissions would remain well below the ozone standard and the maintenance plan emissions budget.

The current potential to emit CO at SAFB exceeds the Title V threshold, and the projected potential to emit from proposed projects (such as the Space Test and Evaluation Facility) would further increase the potential to emit CO. The proposed housing would slightly increase the potential to emit CO. The current potential to emit NO_x is very close to the Title V threshold. The potential to emit NO_x from current sources and the proposed housing would not exceed the Title V thresholds. SAFB is currently considering obtaining a Title V operating permit. Actual and potential emissions from the proposed housing would not substantially increase existing emissions and cumulative impacts to air quality would not be significant.

Impacts to soils from the proposed action and other ongoing and planned actions over the next seven years (from potential erosion) would be limited by permit requirements and would not be significant. Impacts to surface water would also be limited by permit requirements and would not be significant. Impacts to groundwater would be minimal.

All activities at SAFB affecting natural resources are managed in accordance with the INRMP and applicable regulations, and any impacts from the proposed action and other activities would have limited effects to vegetation, wildlife, and protected species. None of these impacts would be significant.

Only minor impacts to human health and safety, solid waste and hazardous materials, and noise from the proposed action were identified. Impacts to these resource areas would not substantially contribute to ongoing and future impacts at SAFB or in the local area.

No impacts to cultural resources were identified. Impacts to land use and traffic would be minor over both the short term and long term. No significant cumulative impacts would result to these resources from the proposed action.

No significant adverse socioeconomic impacts were identified. Effects on the local public school district would be minimized by implementation of a plan approved by the school district to accommodate additional enrollment. Given the slight socioeconomic impacts, which would not disproportionately impact any minorities, there would not be any significant cumulative impacts to environmental justice.

No cumulative impacts would be expected under the no action alternative. An assessment of cumulative impacts from the off-base privatized housing alternative remains a data gap for this analysis, as a specific location has not been proposed at this time.

Any future Federal action that may have potentially significant impacts to the environment would be assessed in a separate NEPA document.

SECTION 5. AGENCIES CONTACTED

Sources for this EA included the documents listed in Section 7 and SAFB personnel, including Mr. Al Fernandez (Environmental Impact Analysis Process Manager), Mr. Jonathan Wasche (Environmental Engineer), Mr. Ralph Mitchell (Planner), Major Stacie Remy (Deputy Staff Judge Advocate), Mr. Bill Leonard (Housing Privatization Program Manager), and Ms. Melissa Trenchik (Natural/Cultural Resources Manager).

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SECTION 7. REFERENCES

68 *Federal Register* 10. Appendix A, Joint Memorandum, to Advance Notice of Proposed Rulemaking on the Clean Water Act Regulatory Definition of "Waters of the United States." January 15, 2003. U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. Federal Register 68(10):1991-1998.

Colorado Department of Public Health and Environment, 2003. Revised Carbon Monoxide Maintenance Plan for the Colorado Springs Attainment/Maintenance Area. Air Pollution Control Division. Denver, CO. http://www.cdphe.state.co.us/ap/down/SIPcolspgsCO.pdf

Colorado Department of Public Health and Environment, 2005. Frequently asked questions about radon. Hazardous Materials and Hazardous Waste Management Division. http://www.cdphe.state.co.us/hm/rad/radon/radonfaq.asp

Colorado Department of Public Health and Environment, 2006. Air Quality Index Reporting System. Report for 8-hour Ozone Concentrations at Air Force Academy and Manitou Springs Air Quality Monitoring Stations. January. http://apcd.state.co.us/psi/main.html

Colorado Division of Wildlife, 2006a. Species profile: Burrowing owl. http://wildlife.state.co.us/WildlifeSpecies/Profiles/Birds/BurrowingOwl.htm

Colorado Division of Wildlife, 2006b. Species profile: Black-tailed prairie dog. http://wildlife.state.co.us/WildlifeSpecies/Profiles/Mammals/BlackTailedPrairieDog.htm

Colorado Springs *Gazette*, 2005. Vacancy rates reach 4-year low. October 8, 2005.

El Paso County Planning Department, 2003. *Highway 94 Comprehensive Plan Update*. July. http://adm2.elpasoco.com/Planning/HWY94/New/03_hwy94comp_plan.pdf

El Paso County Department of Transportation, 2004. Major Transportation Corridors Plan. http://adm2.elpasoco.com/transprt/Major_Trans_Corridors_Plan/report_final.pdf

El Paso County Department of Transportation, 2005. All traffic counts. http://adm2.elpasoco.com/transprt/all_traffic.asp

Federal Interagency Committee for Wetland Determination, 1989. Federal Manual for Identifying and Delineating Jurisdictional Wetlands, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S. Department of Agriculture Soil Conservation Service. Washington, D.C.

National Center for Education Statistics, 2006. Search for Public School Districts. http://nces.ed.gov/ccd/districtsearch/

National Climatic Data Center, 1998. Climatic Wind Data for the United States. November. http://www5.ncdc.noaa.gov/documentlibrary/pdf/wind1996.pdf

National Weather Service, 1997-2005. Climatological Report for 1997 through 2005 for Colorado Springs, CO. http://www.crh.noaa.gov/pub/?n=/climate/year.php

National Weather Service, 2005a. Normals and Extremes for Colorado Springs, CO. http://www.crh.noaa.gov/pub/climate/cli/coloradosprings.php

National Weather Service, 2005b. Colorado Springs Record Precipitation Data http://www.crh.noaa.gov/pub/?n=/climate/cospcpn.php

National Weather Service, 2005c. *Daily Extremes for August, Colorado Springs, CO.* http://www.crh.noaa.gov/pub/climate/cli/colospC/augr.text

Pikes Peak Area Council of Governments, 2004. *2004 Air Quality Data Addendum - Air Quality in the Pikes Peak Region Spatial and Temporal Trends.* http://www.ppacg.org/Envir/Air/2004%20air%20quality%20addendum.pdf

Pikes Peak Area Council of Governments, 2005. El Paso County Profile 2005, Demographic & Economic Overview. Colorado Springs, CO.

U.S. Air Force, 2001. Wetlands Re-Examination, Schriever AFB. August.

U.S. Air Force, 2003a. Air Emissions Inventory for Calendar Year 2002. Schriever AFB, CO. November.

U.S. Air Force, 2003b. *General Plan for Schriever AFB, CO.* December.

U.S. Air Force, 2004a. Housing Requirements and Market Analysis Update, 2005-2010. Peterson Air Force Base, Colorado.

U.S. Air Force, 2004b. *Integrated Cultural Resources Management Plan, Volume I* (draft). Schriever Air Force Base, October.

U.S. Air Force, 2005a. Geodatabase for Schriever AFB. Elevation contours layer.

U.S. Air Force, 2005b. Letter to Mr. Gregory Davis, USEPA, from Lt. Col Rick Blaisdell, dated 13 October 2005 (regarding Schriever AFB status under the *Clean Water Act*).

U.S. Air Force, 2005c. Integrated Natural Resources Management Plan, 65% draft. Schriever AFB, September 2005.

U.S. Air Force, 2005d. Management of Black-tailed Prairie Dogs on Schriever Air Force Base, Colorado. March 2005.

U.S. Air Force 2005e. Schriever Air Force Base Traffic Engineering and Planning Study. October 2005.

U.S. Air Force, 2005f. Student demographics Excel spreadsheet. Schriever AFB, CO.

U.S. Air Force, 2006a. Summary of subsurface exploration and laboratory testing: Residential housing projects, Schriever AFB, El Paso County, Colorado. Submitted to U.S. Air Force HydroGeoLogic, Inc. (Colorado Springs, CO); prepared by Terracon (Colorado Springs, CO). 11 January 2006.

U.S. Air Force, 2006b. Environmental Baseline Survey, Schriever AFB Military Family Housing Privatization Initiative.

U.S. Bureau of the Census, 2005. American Community Survey, 2004 Data Profiles. http://www.census.gov/acs/www/

U.S. Department of Agriculture, 1981. Soil Survey of El Paso County Area. June.

U.S. Department of Agriculture, 2004. Soil Survey Geographic Database for El Paso County Area, Colorado. March. http://soildatamart.nrcs.usda.gov/Download.aspx?Survey=CO625&UseState=CO

U.S. Geological Survey, 1981. USGS topographic map: Corral Bluffs Quadrangle. July.

U.S. Geological Survey, 1984. *Bedrock Aquifers in the Denver Basin, Colorado – A Quantitative Water Resources Appraisal*. Open File Report 84-431.

U.S. Geological Survey, 1995. Groundwater Atlas of the United States: Arizona, Colorado, New Mexico, Utah. (Figure 80) HA 730-C. http://capp.water.usgs.gov/gwa/ch_c/C-Denver_Basin1.html

U.S. Geological Survey, 2002. Documentation of Changes in Fault Parameters for the 2002 National Seismic Hazards Maps. USGS Open File Report 02-467. http://pubs.usgs.gov/of/2002/ofr-02-467/ofr_02-467.pdf

U.S. Geological Survey, 2003. National Seismic Hazard Maps Peak Acceleration (%g) with 10 Percent Probability of Exceedance in 50 Years. http://earthquake.usgs.gov/hazmaps/products_data/2002/2002April03/US/USpga500v4.pdf

U.S. Geological Survey, 2004. Fault and Fold Database of Quaternary Faults by State and Region. Colorado http://earthquakes.usgs.gov/qfaults/co/index.html

U.S. Geological Survey, 2005a. Earthquake Hazards Interactive Maps. http://eqmaps.cr.usgs.gov/website/nshmp/viewer.htm

U.S. Geological Survey, 2005b. Earthquake Database. National Earthquake Information Center. http://gldss7.cr.usgs.gov/neis/epic/epic.html

U.S. Geological Survey, 2006a. USGS Water Resources, Ground-water Levels for Colorado (El Paso County). http://waterdata.usgs.gov/co/nwis/gw

U.S. Geological Survey, 2006b. National Hydrography Dataset. January. http://nhd.usgs.gov/data.html

Wasche, Jonathan, 2006. Schriever AFB Air and Tanks Program Manager. Personal communication regarding air permit status. January 10, 2006.

Yim, R.A., 1999. Statement of Randall A. Yim, Acting Deputy Under Secretary of Defense (Installations), before the Military Installations and Facilities Subcommittee of the Committee on the Armed Services of the United State House of Representatives. March 9, 1999.

APPENDIX A
ACRONYMS, ABBREVIATIONS, AND DEFINITION OF TERMS

ACRONYMS AND ABBREVIATIONS

AFB	Air Force base
AFI	Air Force Instruction
APEN	Air Pollutant Emissions Notice
AQCR	Air Quality Control Region
CAA	*Clean Air Act*
CCR	Colorado Code of Regulations
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CO	carbon monoxide
DoD	Department of Defense
EA	environmental assessment
EPCDOT	El Paso County Department of Transportation
EPCPD	El Paso County Planning Department
FAR	Federal Acquisition Regulations
FTE	full-time employee
HAP	hazardous air pollutant
HAZMART	hazardous materials pharmacy
HRMA	Housing Requirements and Market Analysis
INRMP	Integrated Natural Resources Management Plan
LBP	lead-based paint
MHPI	Military Housing Privatization Initiative
MSA	metropolitan statistical area
NAAQS	national ambient air quality standard
NCDC	National Climatic Data Center
NCES	National Center for Education Statistics
NEPA	*National Environmental Policy Act*
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWS	National Weather Service
PCBs	polychlorinated biphenyls
$PM_{2.5}$	particulate matter less than 2.4 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
PO	Project Owner
PPACG	Pikes Peak Area Council of Governments
RCRA	*Resource Conservation and Recovery Act*
RFP	request for proposals
SIP	state implementation plan

TLF	temporary lodging facility
USAF	U.S. Air Force
USAFA	U.S. Air Force Academy
USBC	U.S. Bureau of the Census
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank

DEFINITION OF TERMS

Aquifer. The water-bearing portion of subsurface earth material that yields or is capable of yielding useful quantities of water to wells.

Asbestos. A carcinogenic substance formerly used widely as an insulation material by the construction industry, often found in older buildings.

Cultural resources. Remains of human activity, occupation, or endeavor, reflected in districts, sites, structures, building, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in past human events. Cultural resources consist of (1) physical remains, (2) areas where significant human events occurred, even though evidence of the events no longer remains, and (3) the environment immediately surrounding the actual resource.

Cumulative impact. The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time

Endangered species. Plant or animal species that are in danger of extinction throughout all or a significant part of their range.

Environmental assessment. A systematic environmental analysis of site-specific activities used to determine whether such activities would significantly affect the human environment, and whether an environmental impact statement is required.

Environmental baseline survey. An EBS is prepared for any property to be transferred, purchased, or leased. An EBS is based on all existing environmental information related to storage, release, treatment, or disposal of hazardous substances or petroleum products on the property to determine or discover the obviousness of the presence or likely presence of a release or threatened release of any hazardous substance or petroleum product.

Environmental impact statement. An analytical document developed for use by decisionmakers to weigh the environmental consequences of a potential action.

Erosion. Wearing away of soil and rock by weathering and the action of streams, wind, and underground water.

Groundwater. Water within the earth that supplies wells and springs.

Habitat. The environment in which an organism occurs.

Hazardous Substance. A substance defined as a hazardous substance pursuant to CERCLA 42 U.S.C. Sec. 9601(14), as interpreted by USEPA regulations and the courts.

Hazardous Waste. Any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the *Solid Waste Disposal Act* (42 U.S.C. Sec. 6921) (but not including any waste the regulation of which under the *Solid Waste Disposal Act* (42 U.S.C. Sec. 6901, et. seq.) has been suspended by Act of Congress). The *Solid Waste Disposal Act* of 1980 amended the *Resource Conservation and Recovery Act* (RCRA). RCRA defines a hazardous waste in 42 U.S.C. Sec. 6903 as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (a) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitation reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Intermittent stream. A stream that flows only at certain times of the year when it receives water from winter rain or melting snow.

Military Housing Privatization Initiative. A program to allow private sector financing, ownership, operation, and maintenance of military housing. Under the program, which was initially authorized in 1996 under the *National Defense Authorization Act* and has been reauthorized until 2012, DoD can provide direct loans, loan guarantees, and other incentives to encourage private developers to construct and operate housing either on or off military installations.

National Environmental Policy Act. Federal legislation enacted in 1969 that requires Federal agencies to consider environmental impacts in their decision-making process.

Noxious weed. According to the *Federal Noxious Weed Act* (FL 93-629), a weed that causes disease or has other adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

Perennial stream. A stream that flows continuously year round.

Project Owner. The private developer who would be contracted by the Air Force to implement the Military Housing Privatization Initiative at Schriever Air Force Base.

Runoff. The part of the precipitation in a drainage area that is discharged from the area in stream channels, including surface runoff, ground water runoff, and seepage.

Threatened species. A plant or animal species that is not in danger of extinction but is likely to become so within the foreseeable future throughout all or a significant portion of its range.

Toxic Substances Control Act. This law was enacted in 1976 to give the USEPA the ability to track industrial chemicals currently produced or imported into the United States. The USEPA repeatedly screens these chemicals and can require reporting or testing of those that may pose an environmental or human health hazard, or can ban the manufacture and import of those chemicals that pose an unreasonable risk.

Underground Storage Tank (UST). Any tank, including underground piping connected to the tank, which is or has been used to contain hazardous substances or petroleum products and the volume of which is ten percent or more beneath the surface of the ground.

APPENDIX B
AIR EMISSIONS ESTIMATES FOR THE PROPOSED ACTION

Estimated Air Emissions from Proposed Construction and Operation Activities

This appendix presents calculations performed for estimating air emissions generated from activities related to the construction and operation of housing units at SAFB.

Table B-1. Construction Emissions Summary [1]

		Emissions (tons)						
		CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	HAPs
Construction Non-Road Emissions								
Grading (fugitive dust)						3.38	0.47	
Trucks - paved roads						0.12	0.03	
Trucks - unpaved roads						1.47	0.23	
Construction Equipment		3.74	0.81	11.60	2.55	0.02	0.49	0.24
Asphalt plant (off site)		2.16	0.04	0.14	0.02	0.15		0.000341
Subtotal	tons	5.90	0.85	11.73	2.57	5.14	1.22	0.24
	lbs	11800	1701	23463	5147	10275	2449	482
	tons/year	1.97	0.28	3.91	0.86	1.71	0.41	0.08
	lbs/year	3933.20	567.14	7820.92	1715.59	3424.84	816.22	160.60
	tons/day avg	0.00787	0.00113	0.01564	0.00343	0.00685	0.00163	0.00032
	lbs/day avg	15.7	2.3	31.3	6.9	13.7	3.3	0.6
Worker Vehicles	tons	1.90	0.11	0.13	0.01	0.002		
	lbs	3791	223	260	27	4		
	tons/yr	0.6319	0.0372	0.0434	0.0045	0.0007		
	lbs/yr	1263.77	74.34	86.73	8.92	1.36		
	tons/day avg	0.0025275	0.0001487	0.0001735	0.0000178	0.0000027		
	lbs/day avg	5.0551	0.2974	0.3469	0.0357	0.0055		
Total Emissions	tons	7.80	0.96	11.86	2.59	5.14	1.22	0.24
	lbs	15591	1924	23723	5174	10279	2449	482
	tons/yr	2.60	0.32	3.95	0.86	1.71	0.41	0.08
	lbs/yr	5196.96	641.48	7907.65	1724.51	3426.20	816.22	160.60
	tons/day avg	0.0104	0.0013	0.0158	0.0034	0.0069	0.0016	0.0003
	lbs/day avg	20.8	2.6	31.6	6.9	13.7	3.3	0.6

[1] See Tables B-3 through B-10 for emissions estimate calculations.

Table B-2. Housing Units (Stationary Sources) Operation Emissions Summary [1]

Source	Emissions (tons/year)					
	CO	VOCs	NO_x	SO_x	PM_{10}	HAPs
Natural gas consumption	0.19	0.03	0.46	0.00	0.04	0.009

[1] See Tables B-11 and B-12 for emissions estimate calculations.

Table B-3. PM Emissions from Grading (fugitive dust)

Calculation		Result
PM emission rate = $\frac{1.0*s^{1.5}}{M^{1.4}}$ lb/hr [1]		9.397 lb/hr PM
where s = silt (%), M = moisture (%) [2,3]		
PM_{10} = PM * 0.75		7.05 lbs/hr PM_{10}
$PM_{2.5}$ = PM * 0.105		0.99 lbs/hr $PM_{2.5}$
Remainder of PM is greater than 10 microns		
Total grading hours =	960 hours [4]	6765.8 lbs PM_{10}
		947.21 lbs $PM_{2.5}$
Total grading emissions (tons) =		3.38 tons PM_{10}
		0.47 tons $PM_{2.5}$

[1] Sources: USEPA 1995, USEPA 1998a.

[2] Silt content averages 20% for affected soil types (USDA 2004).

[3] 5% soil moisture was assumed.

[4] Assumes typical residential development with minimal topographic change, about 3/4 day per acre.

Table B-4. PM Emissions from Trucks Driving on Paved Roads

Equation	$EF = k(sL/2)^{0.65} (W/3)^{1.5}$
	where:
	EF = emission factor for normal conditions
	k = particle size multiplier for PM_{10} (0.016) or $PM_{2.5}$ (0.004)
	sL = silt loading (g/m^2); default value for normal conditions, low average daily traffic roads = 0.4
	W = mean vehicle weight (tons); assumed to be 10
PM_{10} emission factor	0.034 lb/mile
$PM_{2.5}$ emission factor	0.009 lb/mile
Additional assumptions:	
10	miles/round trip
6	trucks/hour
8	hours of activity
15	days
Yield:	
7200	Total vehicle miles travelled
246.29	Total PM_{10} emissions (lbs)
0.123	Total PM_{10} emissions (tons)
61.572	Total $PM_{2.5}$ emissions (lbs)
0.031	Total $PM_{2.5}$ emissions (tons)

[1] Emission factor formula from USEPA 2003a.

Table B-5. PM Emissions from Trucks Driving on Unpaved Roads

Equation[1]:	$EF = k(s/12)^a(W/3)^b$
	where:
	EF = emission factor on unpaved roads (uncontrolled)
	k = particle size multiplier for PM_{10} (1.5) or $PM_{2.5}$ (0.23)
	s = silt (%); assumed to be 20%
	W = mean vehicle weight (tons); assumed to be 15
	a and b are empirical constants; a =0.9 and b = 0.45

PM_{10} emission factor	4.084 lb/mile
$PM_{2.5}$ emission factor	0.626 lb/mile

	Additional assumptions:
1	Mile/round trip
6	Trucks/hour
8	Hours of activity
15	Days
	Yield:
720	Total vehicle miles travelled
2940.24192	Total PM_{10} emissions (lbs)
1.47	Total PM_{10} emissions (tons)
450.837095	Total $PM_{2.5}$ emissions (lbs)
0.225	Total $PM_{2.5}$ emissions (tons)

[1] Source: USEPA 2003b.

Table B-6. Emissions from Construction Equipment Operation

Equipment	Days	Hours/day	Pieces		CO	VOCs	NO_x	SO_x	PM_{10} [2]	$PM_{2.5}$ [2]
Grading and Excavating										
Scraper	120	8	2							
Emissions factor (grams/hr) [1]					382.67	50.43	1219.19	266.98	1.42	46.04
Emissions (grams)					734718.0	96823.3	2340845.6	512593.9	2733.8	88394.0
Emissions (lbs)					1618.32	213.27	5156.05	1129.06	6.02	194.70
Bulldozer	120	8	2							
Emissions factor (grams/hr) [1]					114.06	30.02	332.75	79.76	0.57	18.30
Emissions (grams)					218996.7	57630.7	638877.7	153133.1	1086.8	35138.3
Emissions (lbs)					482.37	126.94	1407.22	337.30	2.39	77.40
Grader	120	8	1							
Emissions factor (grams/hr) [1]					164.11	46.07	545.61	125.25	0.69	22.34
Emissions (grams)					157549.8	44224.5	523784.1	120235.4	663.4	21448.9
Emissions (lbs)					347.03	97.41	1153.71	264.84	1.46	47.24
Roller	60	8	2							
Emissions factor (grams/hr) [1]					101.29	26.66	295.50	76.16	0.50	16.25
Emissions (grams)					97241.1	25589.8	283680.8	73113.6	482.5	15602.4
Emissions (lbs)					214.19	56.37	624.85	161.04	1.06	34.37
Backhoe/loader	40	8	2							
Emissions factor (grams/hr) [1]					277.55	38.35	236.92	38.80	0.64	20.81
Emissions (grams)					177633.28	24541.44	151631.04	24833.60	411.95	13319.57
Emissions (lbs)					391.26	54.06	333.99	54.70	0.91	29.34
Grading and Excavating Emissions				lbs	3053.17	548.04	8675.81	1946.94	11.85	383.05
				tons	1.53	0.27	4.34	0.97	0.01	0.19
Paving [3]										
Paving Equipment	15	8	1							
Emissions factor (grams/hr) [1]					102.21	26.90	298.18	69.17	0.51	16.40
Emissions (grams)					12265.3	3227.7	35781.4	8299.8	60.9	1968.0
Emissions (lbs)					27.02	7.11	78.81	18.28	0.13	4.33
Asphalt Paver	15	8	1							
Emissions factor (grams/hr) [1]					154.86	16.26	190.37	39.79	0.31	9.96
Emissions (grams)					18583.6	1950.8	22844.5	4774.2	37.0	1195.1
Emissions (lbs)					40.93	4.30	50.32	10.52	0.08	2.63
Dump Truck	15	8	12							
Emissions factor (grams/hr) [1]					316.91	41.76	1009.70	218.65	1.18	38.13
Emissions (grams)					456356.6	60140.0	1453973.3	314850.7	1698.1	54904.3
Emissions (lbs)					1005.19	132.47	3202.58	693.50	3.74	120.93
Roller	15	8	1							
Emissions factor (grams/hr) [1]					101.29	26.66	295.50	76.16	0.50	16.25
Emissions (grams)					12155.1	3198.7	35460.1	9139.2	60.3	1950.3
Emissions (lbs)					26.77	7.05	78.11	20.13	0.13	4.30
Paving Emissions				lbs	1099.91	150.92	3409.82	742.43	4.09	132.20
				tons	0.55	0.08	1.70	0.37	0.00	0.07

Table B-6. Emissions from Construction Equipment Operation (continued)

Equipment	Days	Hours/day	Pieces	CO	VOCs	NO_x	SO_x	PM_{10} [2]	$PM_{2.5}$ [2]
Building & Facility Construction									
Crane	200	8	2						
Emissions factor (grams/hr) [1]				73.85	30.53	393.88	91.58	0.38	12.42
Emissions (grams)				236328.00	97682.24	1260416.00	293046.72	1228.91	39734.61
Emissions (lbs)				520.55	215.16	2776.25	645.48	2.71	87.52
Generators	200	8	2						
Emissions factor (grams/hr) [1]				133.11	20.78	263.98	66.84	0.40	13.08
Emissions (grams)				425962.94	66500.54	844736.64	213880.13	1294.06	41841.42
Emissions (lbs)				938.24	146.48	1860.65	471.10	2.85	92.16
Air Compressors	350	8	2						
Emissions factor (grams/hr) [1]				33.70	23.59	232.50	40.10	0.29	9.48
Emissions (grams)				188697.60	132088.32	1302013.44	224550.14	1641.67	53080.63
Emissions (lbs)				415.63	290.94	2867.87	494.60	3.62	116.92
Concrete Truck [4]	50	8	2						
Emissions factor (grams/hr) [1]				316.91	41.76	1009.70	218.65	1.18	38.13
Emissions (grams)				253531.4	33411.1	807763.0	174917.0	943.4	30502.4
Emissions (lbs)				558.44	73.59	1779.21	385.28	2.08	67.19
Building & Facility Const.Emissions			lbs	2432.86	726.17	9283.98	1996.46	11.25	363.79
			tons	1.22	0.36	4.64	1.00	0.01	0.18
Utilities Relocation									
Excavator	90	8	2						
Emissions factor (grams/hr) [1]				104.62	27.53	305.20	73.15	0.52	16.79
Emissions (grams)				150649.63	39644.64	439489.15	105341.47	747.58	24171.90
Emissions (lbs)				331.83	87.32	968.04	232.03	1.65	53.24
Backhoe/loader	40	8	2						
Emissions factor (grams/hr) [1]				277.55	38.35	236.92	38.80	0.64	20.81
Emissions (grams)				177633.28	24541.44	151631.04	24833.60	411.95	13319.57
Emissions (lbs)				391.26	54.06	333.99	54.70	0.91	29.34
Bulldozer	40	8	2						
Emissions factor (grams/hr) [1]				114.06	30.02	332.75	79.76	0.57	18.30
Emissions (grams)				72998.9	19210.2	212959.2	51044.4	362.3	11712.8
Emissions (lbs)				160.79	42.31	469.07	112.43	0.80	25.80
Crane	10	6	1						
Emissions factor (grams/hr) [1]				73.85	30.53	393.88	91.58	0.38	12.42
Emissions (grams)				4431.15	1831.54	23632.80	5494.63	23.04	745.02
Emissions (lbs)				9.76	4.03	52.05	12.10	0.05	1.64
Utilities Relocation Emissions			lbs	893.64	187.73	1823.15	411.26	3.40	110.02
			tons	0.45	0.09	0.91	0.21	0.00	0.06
Total Emissions			lbs	7479.59	1612.86	23192.77	5097.10	30.59	989.05
			tons	3.74	0.81	11.60	2.55	0.02	0.49

[1] Calculated with the following formula: emissions (grams/horsepower-hour) x horsepower x typical load factor
Emission rates and horsepower from USEPA 2006.
Assumes Tier 2 equipment (model years 2001 and newer).
Typical load factor from USAF 2002.

[2] Per USEPA 2004a, PM_{10} from construction equipment exhaust is calculated at 3% of total PM, and $PM_{2.5}$ is calculated at 97% of total PM.

[3] Asphalt paving assumes standard 6-inch thickness for 2 miles of 27-ft-wide road with density of 2 tons per cubic yard, 10 mile round trip for 15-ton dump trucks, and four 2-hour round trips each for 12 trucks per day loading, transporting, and unloading.

[4] For building floors; assumes 0.5-ft floor thickness, 9 cubic yards per truck, 2-hour round trip.

Table B-7. HAPs from Construction Equipment

HAPs emissions = VOCs emissions x 29.83% [1]

VOCs emissions =	1612.86	lbs
HAPs emissions =	481.12	lbs
=	0.24	tons

[1] From USAF 2002.

[2] From Table B-6.

Table B-8. Emissions from Worker Vehicles

			Vehicle Exhaust Component				
			CO	VOCs	NO_x	SO_x	PM_{10}
Number of workers [1]	15						
Commute (miles) [2]	15						
Days [3]	750						
Total Miles	168,750						
	Emissions factor [4]	grams/mile	10.2	0.6	0.7	0.072	0.011
	lbs/mi	lbs/mile	0.02247	0.00132	0.00154	0.00016	0.00002
Total emissions		lbs	3791.30	223.02	260.19	26.76	4.089
		tons	1.90	0.11	0.13	0.01	0.002

[1] Assumed to average 15 per day for the life of the project.

[2] Assumed to average 15 miles.

[3] Number of work-days in the 3-year project, assumed to be 250 work days per year.

[4] From Tables 4-5, 4-6, 4-7, and 4-50 in USAF 2002 for calendar year 2007; assumes average vehicle model year of 2003 for low altitude light duty gas vehicles.

Table B-9. Emissions from Off-Site Hot Mix Asphalt Plant

		CO	VOCs	NO_x	SO_x	PM_{10}
Emission factors (lbs/ton asphalt) [1]		0.4	0.0082	0.025	0.0046	0.027
Tons of HMA		10,800				
Emissions	lbs	4,320	89	270	50	292
Emissions	tons	2.16	0.04	0.14	0.02	0.15

[1] From USEPA 2004b, for batch mix plants using a natural gas-fired dryer, hot screens, and mixer.

Table B-10. HAPs Emissions from Off-Site Hot Mix Asphalt Plant

HAPs emissions = VOCs emissions x 0.77% [1]

VOCs emissions =	89	lbs [2]
HAPs emissions =	0.68	lbs
=	0.000341	tons

[1] From USEPA 2004b

[2] From Table B-9.

Table B-11. Estimated Emissions from Housing Units

		CO	VOC	NO_x	SO_x	PM_{10}
Emission factors (lbs/million ft^3) [1]		40.0	5.5	94.0	0.6	7.6
Emission factors (lbs/thousand ft^3)		0.0400	0.0055	0.0940	0.0006	0.0076
Additional factors:		269 housing units				
		36 average annual consumption/unit (thousand ft^3) [2]				
Yield:		9684 total annual consumption (thousand ft^3)				
Emissions:						
	lbs/year	387.3600	53.2620	910.2960	5.8104	73.5984
	tons/year	0.194	0.027	0.455	0.003	0.0368

[1] From USEPA 1998b.

[2] From USDOE 2001 for western U.S.; all sources (space heating, water heating, appliances).

Table B-12. Estimated HAPs Emissions from Housing Units

	Inorganic HAPs	Organic HAPs	Total
Emission factors (lbs/million ft^3) [1]	0.00606	1.881198	1.887258
Emission factors (lbs/thousand ft^3)	0.00000606	0.001881198	0.00188726
Additional factors:	269 housing units		
	36 average annual consumption/unit (thousand ft^3) [2]		
Yield:	9684 total annual consumption (thousand ft^3)		
Emissions:			
lbs/year	0.05869	18.21752	18.27621
tons/year	0.00003	0.00911	0.00914

[1] From USEPA 1998b.

[2] From DOE 2001 for western U.S.; all sources (space heating, water heating, appliances).

References

USAF – *see* U.S. Air Force.

U.S. Air Force, 2002. *Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations.* Institute for Environment, Safety, and Occupational Health Risk Analysis. January.

USDA – *see* U.S. Department of Agriculture.

U.S. Department of Agriculture, 2004. Soil Survey Geographic Database for El Paso County Area, Colorado. March.
http://soildatamart.nrcs.usda.gov/Download.aspx?Survey=CO625&UseState=CO

USDOE – *see* U.S. Department of Energy

U.S. Department of Energy, 2001. N*atural Gas Consumption and Expenditures in U.S. Households by End Uses and Census Region, 2001.*
http://www.eia.doe.gov/emeu/recs/byfuels/2001/byfuel_ng.pdf

U.S. Environmental Protection Agency, 1995. *AP-42 Volume I, Chapter 13.2.3 Heavy Construction Operations*. January
http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s02-3.pdf

U.S. Environmental Protection Agency, 1998a. *AP-42 Volume I, Chapter 11.9 Western Surface Coal Mining.* October.
http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s09.pdf

U.S. Environmental Protection Agency, 1998b. *AP-42, Volume 1, Chapter 1.4, Natural Gas Combustion.* July.
http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf

U.S. Environmental Protection Agency, 2003a. *AP-42, Volume I, Chapter 13.2.1 Paved Roads.* December.
http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf

U.S. Environmental Protection Agency, 2003b. *AP-42, Volume I, Chapter 13.2.2 Unpaved Roads*. December.
http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0202.pdf

U.S. Environmental Protection Agency, 2004a. *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression – Ignition*. April.
http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2004/420p04009.pdf

U.S. Environmental Protection Agency, 2004b. *AP-42, Volume I, Chapter 11.1 Hot Mix Asphalt Plants.* April.
http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf

U.S. Environmental Protection Agency, 2006. *Nonroad Engine Modeling.* February.
http://www.epa.gov/otaq/nonrdmdl.htm

USEPA – *see* U.S. Environmental Protection Agency.