
US Army Corps of Engineers
Los Angeles District

# ENVIRONMENTAL ASSESSMENT
# FOR

# CONSTRUCTION OF A
# GENERAL INSTRUCTION BUILDING

## DAVIS-MONTHAN AIR FORCE BASE
## TUCSON, ARIZONA
## United States Air Force
## 355th Fighter Wing

EGC, INC.

**February 2017**

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# FINDING OF NO SIGNIFICANT IMPACT

**NAME OF THE PROPOSED ACTION**

Construct a General Instruction Building (GIB) to support the training mission at Davis-Monthan Air Force Base (DMAFB) in Tucson, Arizona (AZ).

**DESCRIPTION OF THE PROPOSED ACTION AND NO ACTION ALTERNATIVE**

Davis-Monthan AFB proposes to construct a GIB to support the training mission at DMAFB in Tucson, AZ. The proposed project would be constructed on approximately 15 acres of land located near the Swan Gate of DMAFB and include, at a minimum, a 56,000 square feet (ft^2) Military Construction (MILCON) facility with access control, force protection and physical security measures appropriate for storage, and processing and instruction with parking for 336 vehicles, including privately owned vehicles (POVs) and General Service Administration (GSA) vehicles.

Under the No Action Alternative, the existing facility located on DMAFB being used as a training classroom would continue to be utilized even though the facility is undersized (18,000 square feet). The existing facility was originally designed for Air Force (AF) billeting and is scheduled to be demolished by the AF as part of the AF "2020" facility reduction initiative. Also, the utilities of the existing facility are insufficient to support the entire training mission to one centralized location.

**SUMMARY OF ENVIRONMENTAL CONSEQUENCES**

**Earth Resources.** Under the Proposed Action, up to approximately 15 acres of surface area would be disturbed as a result of construction of the GIB and the associated infrastructure. Best management practices (BMPs) would be utilized to limit soil movement, stabilize runoff, and control sedimentation. Impacts to earth resources would not be significant.

**Water Resources.** The implementation of construction BMPs and adherence to both the Arizona Department of Environmental Quality (ADEQ) construction general permit and the DMAFB Stormwater Management Plan (SWMP) would minimize the potential for exposed soils or other contaminants from construction activities reaching surface waters. There are no

wetlands or floodplain in the project area. Impacts to water resources would not be significant.

**Biological Resources.** The project area is located in the area of a previous project (Solar Power System) on DMAFB, which did not reveal any native vegetation or threatened / endangered species. Further, a field survey conducted on 08 December 2016 confirmed there are no significant biological resources concerns in the Swan Gate area. Therefore, Impacts to biological resources would not be significant.

**Air Quality.** Davis Monthan AFB is located in a maintenance area for carbon monoxide (CO) and in attainment for all other national ambient air quality criteria pollutants. Because CO emissions would be below de minimis levels, a formal conformity determination is not required. Dust emissions from construction activities would produce localized air emission increases; however, the increases would be short in duration and not result in any long-term impact to the Pima County air quality. Air quality impacts would not be significant.

**Climate Change.** The greenhouse gas (GHG) emissions generated from the construction and operations of the Proposed Action are anticipated to be well below the annual United States Environmental Protection Agency (USEPA) reporting threshold of 25,000 metric tons of carbon dioxide equivalent. Therefore, the impacts of the Proposed Action on GHG concentrations are not anticipated to be significant.

**Noise.** Construction noise emanating the Proposed Action would likely be noticeable in the immediate site vicinity but would not be expected to create adverse impacts. The acoustic environment on and near DMAFB would remain relatively unchanged from existing conditions. Noise impacts would not be significant.

**Land Use and Visual Resources.** Implementation of the Proposed Action would not result in significant impacts to on-base or off-base land uses. Visual resources would generally not be impacted. Impacts to land use and visual resources would not be significant.

**Socioeconomics and Environmental Justice.** The Proposed Action would add approximately

159 permanent staff and approximately 126 transient students to the DMAFB population; however, the population increase is not expected to have any significant adverse impacts on local services, such as, schools, police, or fire protection. Also, the Proposed Action is not expected to create adverse environmental or health effects; therefore, no disproportionately high or adverse impacts to minority, low-income, or youth populations are expected. Impacts to socioeconomics and environmental justice would not be significant.

**Cultural Resources.** The project area is located in the area of a previous project (Solar Power System) on DMAFB, which has been either surveyed for cultural / architectural resources or disturbed and did not reveal any archaeological sites or artifacts. Further, a field survey conducted on 08 December 2016 confirmed there are no significant cultural resources concerns in the Swan Gate area. Therefore, activities from construction of the GIB would not be expected to impact archaeological or traditional resources. Impacts to cultural resources would not be significant.

**Safety.** Implementation of the Proposed Action would involve safety risks associated with construction activities but would not conflict with safety zones identified at DMAFB. Construction activities would have a low risk of worker fatalities or other injuries because all activities would comply with OSHA standards and Air Force occupational safety requirements. Impacts to safety would not be significant.

**Solid and Hazardous Materials and Waste.** Construction of the Proposed Action would involve the use of hazardous materials (e.g., fuel, oil) by the construction personnel and generate minimal solid wastes, which would be recycled or disposed in a local landfill. All hazardous materials and wastes would be handled, sorted, and disposed of in accordance with applicable federal, state, and local regulations. There is no known asbestos containing materials (ACM) or lead base paint (LBP) on either of the proposed alternatives for the GIB. In addition, the newly constructed GIB would not contain ACMs or LBPs. Impacts from solid and hazardous materials and waste would not be significant.

**Infrastructure.** Construction activities associated with the Proposed Action would temporarily increase traffic on DMAFB, especially in the vicinity of the project area and at the DMAFB

entrance gates. Traffic management measures would be implemented to notify drivers of any detours and access restrictions. The newly constructed GIB would require potable water, wastewater treatment (sanitary), electricity, and telecommunications services, which will require new pipelines and other service lines. The installation of these new pipelines and service lines could result in the temporary disruption of services in the immediate area of the GIB project. If any services need to be turned off during construction, DMAFB personnel would notify all affected parties and attempt to schedule the activities during off-peak times. With appropriate measures and planning, impacts on infrastructure would be insignificant.

**CONCLUSION**

Based on the findings of this EA conducted in accordance with the requirements of the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321-4347), Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] §§ 1500-1508), and 32 CFR Part 989, et seq., *Environmental Impact Analysis Process* (formerly known as Air Force Instruction [AFI] 32-7061), and after careful review of the potential impacts, I conclude implementation of the Proposed Action would not result in significant impacts to the quality of the human or the natural environment. Therefore, a Finding of No Significant Impact (FONSI) is warranted, and an Environmental Impact Statement (EIS) is not required for this action.



_____

SCOTT C. CAMPBELL,
Colonel, USAF Commander

_____

Date

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# EXECUTIVE SUMMARY

In accordance with the National Environmental Policy Act of 1969 (NEPA, 42 United States Code 4321-4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] §§ 1500-1508), and 32 CFR Part 989, et seq., Environmental Impact Analysis Process (formerly known as Air Force Instruction 32-7061), the 355th Fighter Wing (355 FW) has prepared an Environmental Assessment (EA) to evaluate the new construction of a General Instruction Building (GIB) to support the training mission at Davis-Monthan Air Force Base (DMAFB).

## PURPOSE AND NEED

The purpose of this Proposed Action is to provide a GIB to support the increasing training mission at DMAFB. The existing training facility is both undersized and outdated. Also, the existing facility is scheduled for demolition.

## PROPOSED ACTION AND NO-ACTION ALTERNATIVE

The Proposed Action involves the construction of a GIB on one of two alternative sites (Preferred Alternative and Alternative No. 2) located at DMAFB. The GIB must accommodate a maximum student load of 126 students and 159 instructors (military, civilian, and contractor personnel) per training iteration. The GIB is required to be, at a minimum, a 56,000 square feet (ft^2) Military Constructed (MILCON) facility with access control, force protection and physical security measures appropriate for storage, processing and instruction. Also, the GIB is required to have communication lines, electrical, water, sewer, and climate control. Additionally, the site is required to have parking for 336 vehicles, including privately owned vehicles (POVs) and General Service Administration (GSA) vehicles.

Under the No Action Alternative, the existing facility located on DMAFB being used for training would continue to be utilized even though the facility is undersized (18,000 square feet). The existing facility was originally designed for Air Force (AF) billeting and is scheduled to be demolished by the AF as part of the AF "2020" facility reduction initiative. Also, the design, security, and information technology of the existing facility is insufficient to support the entire training mission to one centralized location.

## SUMMARY OF ENVIRONMENTAL CONSEQUENCES

**Earth Resources.** Under the Proposed Action, up to approximately 15 acres of surface area would be disturbed as a result of construction of the GIB and the associated infrastructure at the preferred alternative location (Swan Gate). Best management practices (BMPs) would be utilized to limit soil movement, stabilize runoff, and control sedimentation. Impacts to earth resources would not be significant.

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Impacts to safety would not be significant.

**Solid and Hazardous Materials and Waste**. Construction of the Proposed Action would involve the use of hazardous materials (e.g., fuel, oil) by the construction personnel and generate minimal solid wastes, which would be recycled or disposed in a local landfill. All hazardous materials and wastes would be handled, sorted, and disposed of in accordance with applicable federal, state, and local regulations. There is no known asbestos containing materials (ACM) or lead base paint (LBP) on either of the proposed alternatives for the GIB. In addition, the newly constructed GIB would not contain ACMs or LBPs. Impacts from solid and hazardous materials and waste would not be significant.

**Infrastructure.** Construction activities associated with the Proposed Action would temporarily increase traffic on DMAFB, especially in the vicinity of the project area and at the DMAFB entrance gates. Traffic management measures would be implemented to notify drivers of any detours and access restrictions. The newly constructed GIB would require potable water, wastewater treatment (sanitary), electricity, and telecommunications services, which will require new pipelines and other service lines. The installation of these new pipelines and service lines could result in the temporary disruption of services in the immediate area of the GIB project. If any services need to be turned off during construction, DMAFB personnel would notify all affected parties and attempt to schedule the activities during off-peak times. With appropriate measures and planning, impacts on infrastructure would be insignificant.

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| °F | Degrees Fahrenheit |
| 355 FW | 355th Fighter Wing |
| 55 ECG | 55th Electronic Combat Group |
| ACC | Air Combat Command |
| ACHP | Advisory Council on Historic Preservation |
| ACM | Asbestos-Containing Material |
| ADEQ | Arizona Department of Environmental Quality |
| AF | Air Force |
| AFI | Air Force Instruction |
| AFMC | Air Force Materiel Command |
| AIRFA | American Indian Religious Freedom Act |
| AMARG | Aerospace Maintenance and Regeneration Group |
| ANGB | Air National Guard Base |
| APZ | Accident Potential Zone |
| AST | Aboveground Storage Tank |
| ATFP | Anti-Terrorism / Force Protection |
| AZ | Arizona |
| AZGFD | Arizona Game and Fish Department |
| BCAMP | Base Comprehensive Asset Management Plan |
| BMP | Best Management Practice |
| CAA | Clean Air Act |
| CEQ | Council on Environmental Quality |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CES | Civil Engineering Squadron |

| | |
|---|---|
| CFR | Code of Federal Regulations |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| CWA | Clean Water Act |
| CY | Calendar Year |
| CZ | Clear Zone |
| dB | Decibels |
| DMAFB | Davis-Monthan Air Force Base |
| DoD | Department of Defense |
| EA | Environmental Assessment |
| EIAP | Environmental Impact Analysis Process |
| EOD | Explosive Ordinance Disposal |
| ERP | Environmental Restoration Program |
| ESA | Endangered Species Act |
| FAMCAMP | Family Campground |
| FEMA | Federal Emergency Management Agency |
| FOB | Forward Operating Base |
| ft^2 | Square feet |
| FW | Fighter Wing |
| FY | Fiscal Year |
| GHG | Greenhouse Gas |
| GIB | General Instruction Building |
| GSA | General Service Administration |
| HAP | Hazardous Air Pollutant |
| IICEP | Interagency and Intergovernmental Coordination for Environmental Planning |

| | |
|---|---|
| IPaC | Information for Planning and Conservation |
| MGD | Million Gallons per Day |
| MILCON | Military Construction |
| MMRP | Military Munitions Response Program |
| MSC | Flood Map Service Center |
| MSL | Mean Sea Level |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| NFIP | Natioanl Flood Insurance Program |
| NHPA | National Historic Preservation Act |
| No. | Number |
| NOx | Nitrogen Oxide and Nitrogen Dioxide |
| NRHP | National Register of Historic Places |
| OBP | Office of the Border Patrol |
| OSHA | Occupational Safety and Health Administration |
| PDEQ | Pima County of Environmental Quality |
| POV | Privately Owned Vehicle |
| ppm | Parts Per Million |
| PR CoE | Personnel Recovery Center of Excellence |
| QD | Quantity-Distance |
| RCRA | Resource Conservation and Recovery Act |
| ROI | Region of Influence |
| SDZ | Surface Danger Zone |
| SHPO | State Historic Preservation Officers |

| | |
|---|---|
| SIP | State Implementation Plan |
| SOC | Source Operations Course |
| SW | Southwest |
| SWMP | Stormwater Management Plan |
| SWPPP | Stormwater Pollution Prevention Plan |
| TMDL | Total Maximum Daily Load |
| USACE | United States Army Corp of Engineers |
| USC | United States Code |
| USEPA | US Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| US | United States |
| UST | Underground Storage Tank |
| VOC | Volatile Organic Compounds |
| WRF | Water Reclamation Facility |
| WSC | Wildlife of Special Concern in Arizona |

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# 1.0 PURPOSE AND NEED FOR ACTION

## 1.1 INTRODUCTION

Davis-Monthan Air Force Base (DMAFB) is located in Tucson, Arizona. The 355th Fighter Wing (355 FW) is the host unit at DMAFB providing medical, logistical, and operational support to all DMAFB units and is composed of four Groups: the 355 Operations Group, the 355 Maintenance Group, the 355 Medical Group, and the 355 Mission Support Group. The missions of the Wing consist of training A-10 and OA-10 pilots and providing A-10 and OA-10 close support and forward air control to ground forces worldwide. The 355 FW is also tasked to provide command, control, and communications countermeasures in support of tactical forces with its EC-130H aircraft and employing the EC-130E aircraft, provide airborne command, control, and communications capabilities for managing tactical air operations in war and other contingencies worldwide. In addition to the 355 FW, the Twelfth Air Force, the 563rd Rescue Group, and the Aerospace Maintenance and Regeneration Group (AMARG) are all based at DMAFB (Davis-Monthan 2016c).

Davis-Monthan AFB proposes to construct a General Instruction Building (GIB) to support the training mission at DMAFB in Tucson, AZ. The proposed project would be constructed on approximately 15 acres of land located near the Swan Gate of DMAFB and include, at a minimum, a 56,000 square feet (ft^2) Military Construction (MILCON) facility with access control, force protection and physical security measures appropriate for storage, and processing and instruction with parking for 336 vehicles, including privately owned vehicles (POVs) and General Service Administration (GSA) vehicles.

This environmental assessment (EA) has been prepared to analyze the potential environmental consequences associated with the Proposed Action and the No Action Alternative at DMAFB in accordance with the requirements of the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 *et seq.*) and its implementing regulations.

Section 1.2 provides background information on DMAFB. The purpose and need for the Proposed Action are described in Section 1.3. A detailed description of the Proposed Action and

No Action Alternative is provided in Chapter 2.0. Chapter 3.0 describes the existing conditions of various environmental resources, which could be affected by the Proposed Action and the alternatives. Effects of the Proposed Action and alternatives on resources are addressed in Chapter 4.0. Chapter 5.0 addresses potential cumulative effects of the Proposed Action and the alternatives, in conjunction with other recent-past, current, and future actions.

## 1.2 BACKGROUND

Davis-Monthan AFB is located at the southeastern edge of Tucson in the northeastern portion of Pima County, Arizona and is included in the City of Tucson city limits. The City of Tucson annexed the base in 1995. Davis-Monthan AFB is less than 5 miles northeast of Interstate 10, about 6 miles east of the Santa Cruz River, and 6 miles northeast of Tucson International Airport. Davis-Monthan AFB occupies 10,587 acres, of which approximately 2,200 acres are developed or otherwise improved, approximately 3,500 acres are semi-improved, and approximately 4,800 acres are unimproved. Acreage is constantly subject to change due to development and mission changes. An additional 274 acres are under easement to, and maintained by, Pima County (Davis-Monthan 2016a).

DMAFB is located in the Tucson Basin and surrounded by the Tucson (west), Santa Catalina (north), Rincon (east), and Santa Rita (south) mountains. These features are within a larger geological unit known as the Basin and Range Province characterized by northwest-southeast trending mountain ranges separated by wide, alluvial basins. The Basin and Range Province extends from west Texas through southern New Mexico, southeastern and northwestern Arizona, northwestern Mexico, Nevada, western Utah, and part of southern California. The Tucson Valley is a typical basin, with gently sloping terrain and elevations ranging from 2,550 to 2,950 feet above mean sea level. DMAFB falls within the Sonoran Desert biotic community encompassing south-central Arizona and neighboring northwestern Mexico. Rainfall averages only 10 to 11 inches per year. Even so, it is sufficient to support a wide variety of hardy cacti, shrubs and trees. In fact, the Sonoran desert is considered one of the world's most arboreal deserts and supports many perennial species reaching greater than 10 feet, and resembles a depauperate version of the more tropical Sinaloan thornscrub of northwestern Mexico. A number of species, including the giant saguaro cactus and ironwood are endemic to the Sonoran Desert (Davis-Monthan 2016a).

See Figure 1.2-1 located at the end of this Chapter for a regional vicinity map of DMAFB.

## 1.3 PURPOSE AND NEED

The purpose of this Proposed Action is to provide a GIB to support the increasing training mission at DMAFB. The existing training facility is both undersized and outdated. Also, the existing facility is scheduled for demolition.

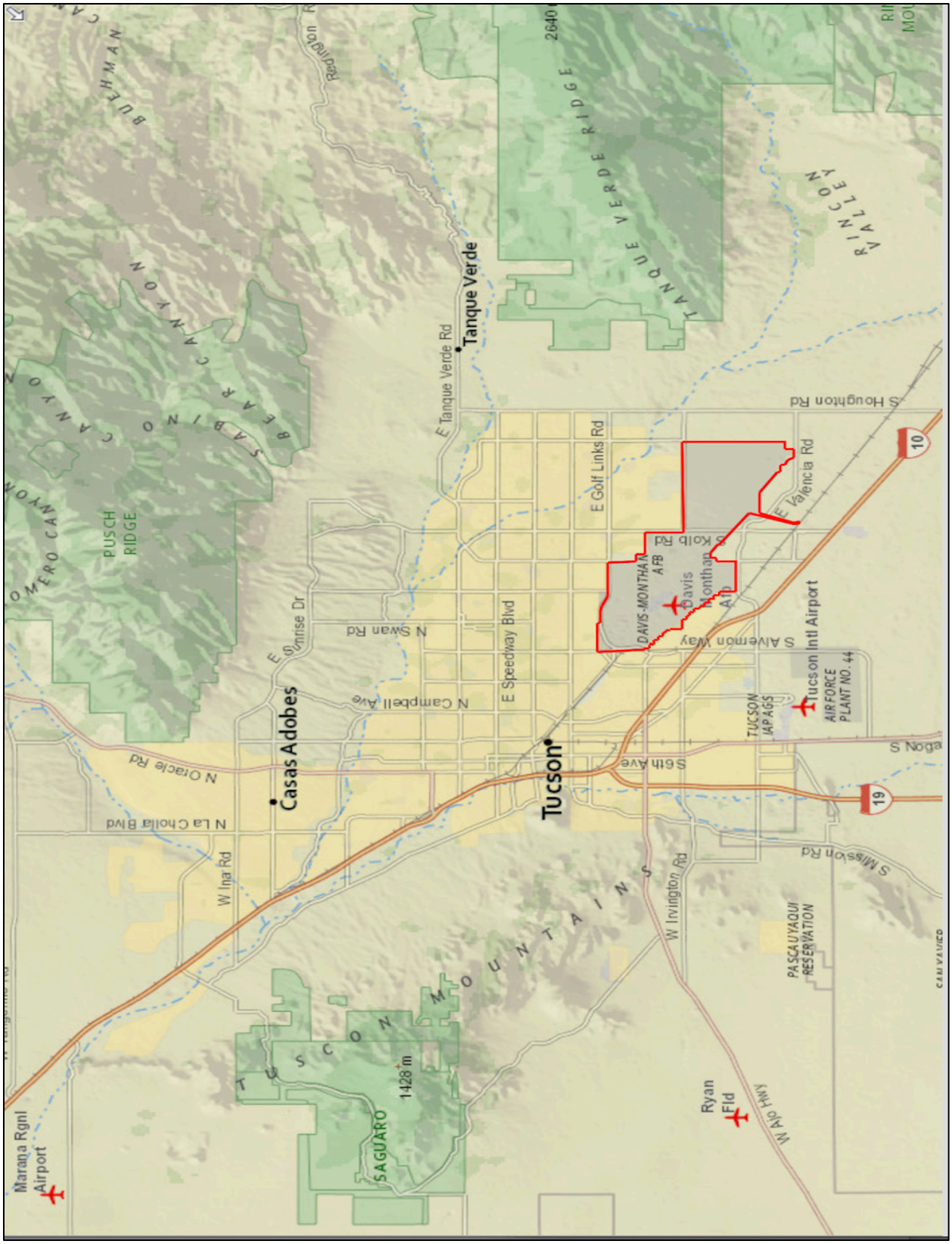


**Figure 1.2-1. Regional Location of Davis-Monthan Air Force Base**

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# 2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section describes the components and locations of the proposed GIB. This chapter presents the Proposed Action and the No Action Alternative.

## 2.1 PROPOSED ACTION

The Proposed Action involves the construction of a GIB on one of two alternative sites located at DMAFB: Preferred Alternative and Alternative No. 2. The GIB must accommodate a maximum student load of 126 students and 159 instructor (military, civilian, and contractor personnel) per training iteration. The GIB is required to be, at a minimum, a 56,000 ft^2 MILCON facility with access control, force protection and physical security measures appropriate for storage, processing and instruction. Also, the GIB is required to have communication lines, electrical, water, sewer, and climate control. Additionally, the site is required to have parking for 336 vehicles, including privately owned vehicles (POVs) and General Service Administration (GSA) vehicles. The Proposed Action footprint is estimated to be approximately 15 acres.

The alternatives are discussed below, and Figure 2.1-1 located at the end of this Chapter shows the location of the alternatives.

**Preferred Alternative—Swan Gate.** The Swan Gate location is bounded by Golf Links Road to the north; Swan Road to the west; and the operational base environment, including a helicopter operations area taxiways and the flood plain, to the east (see Figure 2.1-1). Although the location is near helicopter operations, no interference to flight line operations is expected. The site is the largest unimproved site and is located in a low area; therefore, further hydrological surveys are required. The site has utilities available, with access to the communications node less than a half-mile away. The size of the Swan Gate site is less than 20 acres depending on the boundaries used to define the site but has plenty of room for the estimated project footprint and future expansion, if necessary. The proximity to the DMAFB gates would allow for less traffic as a result of the GIB.

**Alternative No. 2—Track Site.** The Track Site is located between Durango Road and 4th Street and is in the northwest corner of DMAFB (see Figure 2.1-1). The Track site is a trapezoidal shaped piece of land and smallest site due to anti-terrorism / force protection (AT/FP) concerns and close proximity to multiple roads. The site is located within a high traffic area due to the number of streets surrounding the site. Due to AT/FP concerns, future expansion is limited. Also, this alternative would not be sufficient to accommodate the vehicle parking requirements (Davis-Monthan 2014).

## 2.2 SELECTION CRITERIA

Several selection criteria were identified for use in evaluating the three alternatives at DMAFB for the GIB. These selection criteria were

- **Accessibility**. Each location was examined to determine the accessibility, both construction and operational, to nearby public roadways. Also, the impact to current base operations was considered.
- **Future Expansion**. An evaluation was completed for each location to determine the ability of expanding the training facility in the future, and the impact of expansion would have on the surrounding infrastructure.
- **Existing Utilities**. The existing utilities and easements for each location were determined.
- **Construction Costs**. Each location was evaluated to determine the costs for grade differentials, dewatering, soil stabilization, soil consistency, and general construction.
- **Security**. The overall security concerns of utilizing each location were evaluated.

Each alternative was evaluated against the above listed selection criteria and given a weighted score. Based on the results, the Swan Gate is the preferred location. The results of the evaluation are listed in Table 2.2-1 below (Davis-Monthan 2014).

**Table 2.2-1. Evaluation Factors Summary Table**

| Evaluation Factor | Preferred Alternative (Swan Gate) | Alternative No. 2 (Track Site) |
|---|---|---|
| Accessibility | 5 | 3 |
| Future Expansion | 5 | 1 |
| Existing Utilities | 4 | 4 |
| Construction Costs | 4 | 3 |
| Security | 3 | 4 |
| **Total** | **21** | **15** |

1 = Unacceptable
2 = Poor
3 = Average
4 = Good
5 = Preferred

## 2.3 NO-ACTION ALTERNATIVE

Under the No Action Alternative, the existing facility located on DMAFB would continue to be utilized even though the facility is undersized (18,000 square feet). The existing facility was originally designed for Air Force (AF) billeting and is scheduled to be demolished by the AF as part of the AF "2020" facility reduction initiative. Also, the design, security, and information technology of the existing facility is insufficient to support the training mission to one centralized location.

## 2.4 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

In addition to the Proposed Action and the No Action Alternative discussed above, other alternatives were evaluated. Each alternative was determined to be unsuitable and therefore eliminated from consideration. These alternatives included:

- The Personnel Recovery Center of Excellence (PR CoE) at DMAFB
- Medina Annex at Lackland AFB, Texas
- Camp Bullis Military Reservation, Texas
- Camp Swift Military Reservation, Texas
- Keesler AFB, Mississippi
- Tucson Air National Guard Base (ANGB) located at the Tucson International Airport, Arizona
- Devens Reserve Forces Training Area at Fort Devens, Massachusetts

- Fort Bragg Military Reservation, North Carolina
- Fort Sam Houston Military Reservation, Texas

After a comprehensive analysis was performed, none of the alternatives were deemed to have the necessary space to support the expanding training requirements (Davis-Monthan 2014).

## 2.5 ENVIONMENTAL IMPACT ANALYSIS PROCESS

The Environmental Impact Analysis Process (EIAP) is used to evaluate the potential environmental consequences of a proposal and to notify and involve the public in the decision-making process. The proponent of a given action is ultimately responsible for compliance with the EIAP. The Air Force EIAP requires decisions on proposals be based on an understanding of the potential environmental consequences of the Proposed Action and its reasonable alternatives, including the No Action Alternative. Based on the EIAP, any of the alternatives could be selected for implementation.

As a part of the EIAP, this EA has been prepared to evaluate the potential environmental impacts of the proposed GIB on DMAFB. The following resources were analyzed in this EA:

- Earth resources
- Water resources
- Biological resources
- Air quality
- Climate change
- Noise
- Land use and visual resources
- Socioeconomics and environmental justice
- Cultural resources
- Safety
- Hazardous materials and waste management
- Infrastructure

Chapter 3.0 describes the affected environment for these resources and Chapter 4.0 addresses the

potential environmental consequences of implementing either the Proposed Action or the No Action Alternative. A comparison of the environmental consequences is presented at the end of this Chapter in Table 2.7-1.

### 2.5.1 Public and Agency Involvement

Executive Order 12372, *Intergovernmental Review of Federal Programs*, requires notifications to other agencies having relevant information regarding resources in the project area prior to making any detailed statement of potential environmental consequences. Through the process of Interagency and Intergovernmental Coordination for Environmental Planning (known as the IICEP process), DMAFB has notified concerned federal, state, tribal, and local agencies about the proposed projects and preparation of this EA and allowed them sufficient time to provide input on the proposed action and EA.

Davis-Monthan AFB posted a notice on its website and published an advertisement in the local newspapers announcing the availability of the Final Draft EA. The Final Draft EA was available for a 30-day public and agency review period to facilitate public involvement during the NEPA process. Davis-Monthan AFB will provide notice of the availability of the Final EA and an electronic copy of the Final EA will be available on its website.

Table 2-5.1 below summarizes the comments received on the Final Draft EA. Copies of the comment letters received during the review period and a copy of a sample transmittal letter are included in Appendix A.

**Table 2-5.1. Summary of Public Comments Received on Draft EA**

| Commentator | Date | Summary of Comment | Response to Comment |
|---|---|---|---|
| | | | |

[Table to be populated with comments received from letters and the public. The populated table will appear in the Final EA.]

### 2.5.2 Regulatory Compliance

#### 2.5.2.1 National Environmental Policy Act

The NEPA requires federal agencies to take into consideration the potential environmental

consequences of proposed actions in their decision-making process. The intent of NEPA is to protect, restore, and enhance the environment through well-informed federal decisions. The Council on Environmental Quality (CEQ) was established under the NEPA to implement and oversee federal policy in this process. The CEQ subsequently issued the *Regulations for Implementing the Procedural Provisions of the NEPA*. These Regulations are located in Title 40, Parts 1500–1508 of the Code of Federal Regulations (40 CFR 1500–1508) and specify an EA be prepared to:

- Briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI);
- Aid in an agency's compliance with NEPA when an EIS is not necessary; and
- Facilitate preparation of an EIS when one is necessary.

The activities addressed within this document constitute a federal action and therefore must be assessed in accordance with the NEPA. To comply with the NEPA, as well as other pertinent environmental requirements, the decision-making process for the Proposed Action includes the development of the EA to address the environmental issues related to the proposed activities. The Air Force implementing procedures for the NEPA are contained in 32 CFR 989.

#### 2.5.2.2 Endangered Species Act

The Endangered Species Act (ESA) of 1973 is found in Title 16, Chapter 35, Sections 1531–1544 of the US Code (16 USC §§ 1531–1544) and establishes measures for the protection of plant and animal species federally listed as threatened and endangered and for the conservation of habitats critical to the continued existence of those species. Federal agencies must evaluate the effects of their proposed actions through a set of defined procedures, which can include the preparation of a Biological Assessment and can require formal consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Act (Section 1536 of the Code).

#### 2.5.2.3 Clean Air Act

The Clean Air Act (CAA) is found in 42 USC §§ 7401–7671, as amended, and provides the authority for the US Environmental Protection Agency (USEPA) to establish nationwide air quality standards to protect public health and welfare. Federal standards, known as the National Ambient Air Quality Standards (NAAQS), were developed for six criteria pollutants: ozone ($O_3$),

nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), particulate matter, and lead (Pb). The CAA also requires each state prepare a State Implementation Plan (SIP) for maintaining and improving air quality and eliminating violations of the NAAQS. Under the CAA Amendments of 1990, federal agencies are required to determine whether their undertakings are in conformance with the applicable SIP and demonstrate their actions will not cause or contribute to a new violation of the NAAQS; increase the frequency or severity of any existing violation; or delay timely attainment of any standard, emission reduction, or milestone contained in the SIP.

#### 2.5.2.4 Water Resources Regulatory Requirements

The Clean Water Act (CWA) was signed into law in 1977 and is found in 33 USC § 1251. The CWA regulates pollutant discharges affecting aquatic life forms or human health and safety. The US Army Corp of Engineers (USACE) and US Presidential Executive Order (EO) 11990 regulates the discharge of dredged and/or fill material into "waters of the US," including wetlands under Section 404 of the CWA. "Waters of the US" include any waterbody or watercourse which has been determined to be regulated under Section 404 using the Rapanos Guidance of June 5, 2007 and may include ephemeral washes, drainage ditches, intermittent and perennial watercourses, and wetlands. Executive Order 11988 requires federal agencies to take action to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains. Federal agencies are directed to consider the proximity of their actions to or within floodplains.

#### 2.5.2.5 Cultural Resources Regulatory Requirements

The National Historic Preservation Act (NHPA) was signed into law in 1966 and is found in 16 USC § 470. The NHPA established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP) and outlines procedures for the management of cultural resources on federal property. Cultural resources can include archaeological remains, architectural structures, and traditional cultural properties, such as, ancestral settlements, historic trails, and places where significant historic events occurred. The NHPA requires federal agencies to consider potential impacts to cultural resources listed, nominated to, or eligible for listing on the NRHP; designated a National Historic Landmark; or valued by modern Native Americans for maintaining their traditional culture. Section 106 of the NHPA requires federal agencies to consult with State Historic Preservation Officers (SHPOs), if their undertakings might affect

such resources. Title 36, Part 800 of the CFR—*Protection of Historic Properties* provides an explicit set of procedures for federal agencies to meet their obligations under the NHPA, which includes the inventorying of resources and consultation with SHPOs.

The American Indian Religious Freedom Act (AIRFA) was signed into law in 1978 and is found in 42 USC § 1996. The AIRFA was created to protect and preserve the traditional religious rights and cultural practices, to include access to sacred sites, of the American Indians, Eskimos, Aleuts, and Native Hawaiians. The Native American Graves Protection and Repatriation Act found in 25 USC §§ 3001–3013 requires consultation with Native American tribes prior to excavation or removal of human remains and certain objects of cultural importance.

#### 2.5.2.6 Other Regulatory Requirements

Other regulatory legislation potentially applying to the implementation of the Proposed Action includes guidelines promulgated by EO 12898—*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* and EO 13045—*Protection of Children from Environmental Health Risks and Safety Risks*.

In a policy formulated to address EO 13084—*Consultation and Coordination with Indian Tribal Governments*, the DoD has clarified its policy for interacting and working with federally recognized American Indian and Alaska Native governments. Under this policy guidance, proponents must provide timely notice to, and consult with, tribal governments prior to taking any actions having the potential to affect protected tribal resources, tribal rights, or Indian lands.

## 2.6 PERMIT REQUIREMENTS

This EA has been prepared in compliance with NEPA, other federal statutes, such as the CAA and the CWA, and applicable state statutes and regulations. A list of DMAFB permits has been compiled and reviewed during the preparation of this EA. Table 2.6-1 below summarizes potentially applicable federal, state, and local permits and the potential for requirements to modify the permits due to the Proposed Action. Management actions and procedures would need to be reviewed, coordinated, and/or updated to ensure AF compliance with applicable instructions, guidance, and directives.

**Table 2.6-1. DMAFB Permit Requirements and Proposed Action Implementation**

| Permit Type / Number(s) | Resource | Proposed Action |
|---|---|---|
| Synthetic Minor / 3000 | Air | No change to existing permit is expected |
| Synthetic Minor / 3001 | Air | No change to existing permit is expected |
| Synthetic Minor / 3002 | Air | No change to existing permit is expected |
| Synthetic Minor / 3003 | Air | No change to existing permit is expected |
| Synthetic Minor / 3004 | Air | No change to existing permit is expected |
| Synthetic Minor / 3005 | Air | No change to existing permit is expected |
| Synthetic Minor / 3006 | Air | No change to existing permit is expected |
| Hazardous Air Pollutants / 1701, 3000, 3001, 3002, 3004, 3005, 3006 | Air | No change to existing permit is expected |
| Industrial Waste Water / No. 2R10761 | Water | No change to existing permit is expected |
| Aquifer Protection / 102325 | Water | No change to existing permit is expected |
| Aquifer Protection / 10007 | Water | No change to existing permit is expected |
| Stormwater Multi-Sector Group / AZR05A12F | Water | The DMAFB Stormwater Pollution Prevention Plan (SWPPP) would need to be updated. |
| Stormwater Phase 2 MS4 / AZG2002-002 | Water | Ensure pre-/post-construction activities are in accordance with the DMAFB Stormwater Management Plan. |

## 2.7 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2.7-1 below summarizes the potential environmental consequences of implementing the Proposed Action and No Action Alternative, based on the detailed impact analyses presented in Chapter 4.0.

**Table 2.7-1. Summary of Potential Environmental Consequences**

| Resources | Proposed Action | No Action |
|---|---|---|
| Earth | Ground disturbances would expose soils to potential wind and water erosion. The impacts to the soils can be minimized or avoided by implementing proper construction techniques, erosion control measures, and structural engineering designs.<br><br>No significant impacts expected. | No change in the current earth resources conditions would occur. |
| Water | The GIB project would add impervious surfaces to the Base, which has the potential of affecting the water quality through the discharge of pollutants into surface waters.<br><br>Prior to construction, the contractor would be required to obtain coverage under ADEQ construction general permit (AZG2013-001) for stormwater and prepare a Stormwater Pollution Prevention Plan (SWPPP), which must include Best Management Practices (BMPs) to minimize the potential for exposed soils or other contaminants from construction activities to reach surface waters. Also, the construction activities would not occur within the boundaries of a 100-year floodplain zone.<br><br>Impacts to water resources would not be significant. | No changes to impervious surfaces or impacts on water quality would occur |
| Biological | Minor impacts to vegetation, wildlife, and migratory birds as a result of construction activities. Conduct pre-construction surveys for any wildlife and implement measures to protect any nests and / or burrows discovered.<br><br>Impacts to biological resources would not be significant. | No changes to current biological conditions would occur. |
| Air Quality | Combustion engines and fugitive dust emissions would produce localized, short-term elevated air pollutant concentrations, which would not result in any long-term impacts on the air quality.<br><br>Impacts to air quality would not be significant. | No changes to air quality would occur. |
| Climate Change | The construction and operation of the GIB would generate greenhouse gas (GHG) emissions. However, the emission levels would not be significant.<br><br>Impacts on GHG concentrations are not anticipated to be significant. | No changes to the current GHG emissions would occur. |
| Noise | Construction noise would be intermittent and short-term.<br><br>No long-term noise impacts would result. | No changes to the noise environment would occur. |
| Land Use / Visual | Construction of the GIB would not be incompatible with surrounding land uses. The proposed GIB will be located within the DMAFB boundaries and would not be incompatible with off-base land use. The GIB may be visible from off-base locations but is not expected to impact Visual Resources.<br><br>No significant impacts would result. | No changes to land use or visual resources would occur. |
| Socioeconomics / Environmental Justice | No significant change to DMAFB employment is anticipated. Also, no disproportionate impacts to minority or low-income populations are expected.<br><br>No significant impacts expected. | No change in current economic or social conditions. |

**Table 2.7-1. Summary of Potential Environmental Consequences (con't)**

| Resources | Proposed Action | No Action |
|---|---|---|
| Cultural Resources | No cultural or historic resources anticipated to be affected.<br><br>Impacts to cultural resources would not be significant. | Cultural resources would remain as the present condition. |
| Safety | Construction activities could potentially expose workers to health and safety risks. All construction activities must comply with DMAFB policies and federal guidelines for safety.<br><br>No significant impacts are expected. | No change in current safety conditions. |
| Solid and Hazardous Materials and Wastes | Unrecyclable construction waste would be landfilled. Hazardous materials/waste and construction debris would be handled, stored, and disposed of in accordance with DMAFB procedures and applicable federal, state, and local regulations. Waivers would be obtained for construction activities near any ERP sites or in closed ranges. | No change in current solid or hazardous waste generation or hazardous materials use. |
| Infrastructure | Construction vehicles would generate short-term increases in on-base traffic. A slight increase in utility usage is anticipated with the implementation of the Proposed Action. Also, utility line installations may require temporary disruptions to services.<br><br>No significant impacts are expected. | No change in current infrastructure conditions. |

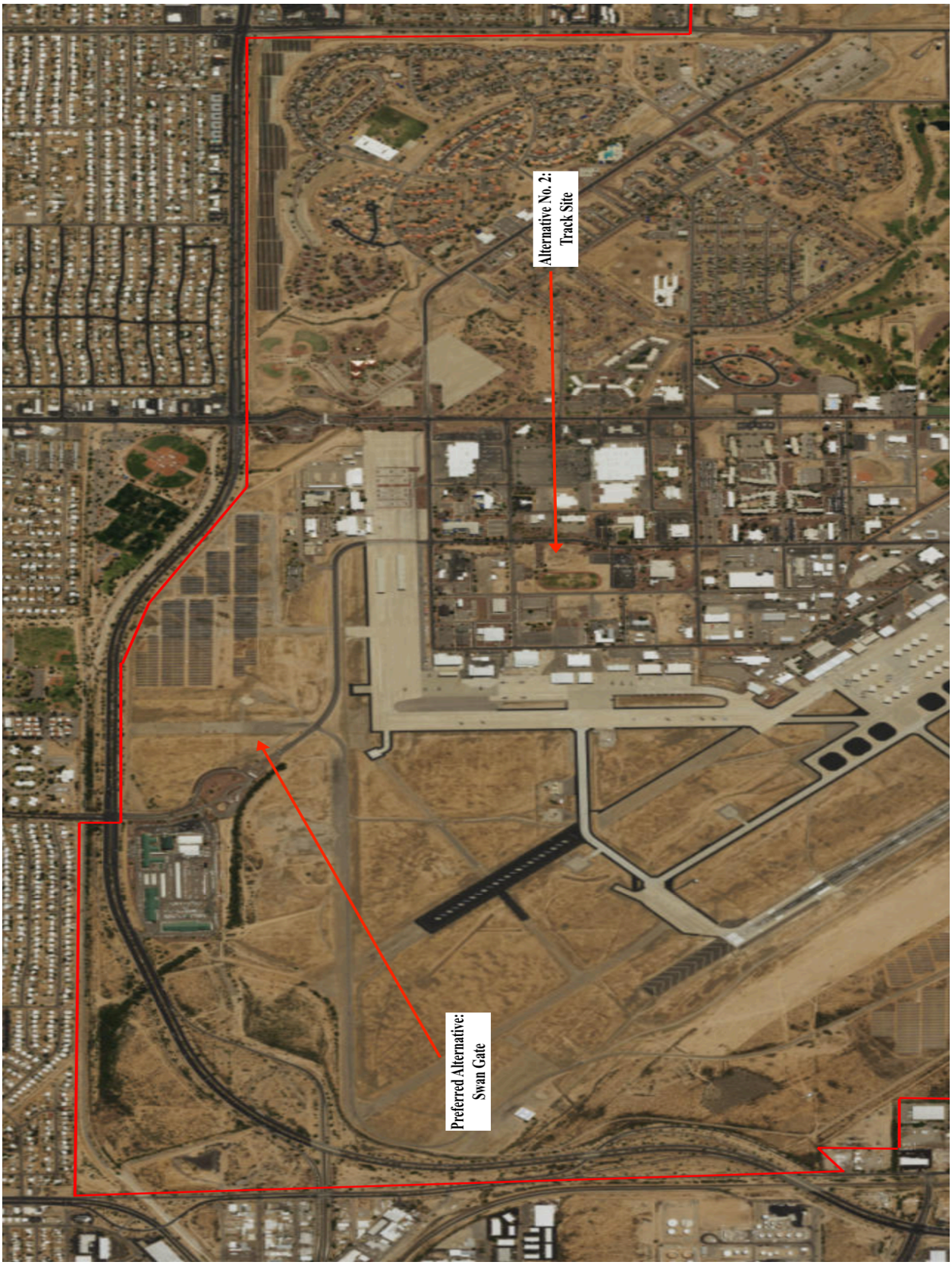


**Figure 2.1-1. Proposed GIB Alternatives at Davis-Monthan Air Force Base**

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# 3.0 EXISTING CONDITIONS

Section 3.0 describes the existing environmental and socioeconomic conditions potentially affected by the Proposed Action. This section provides information to serve as a baseline from which to identify and evaluate environmental and socioeconomic changes likely to result from implementation of the Proposed Action. Baseline conditions represent current conditions. The potential environmental and socioeconomic impacts of implementing the Proposed Action or the No Action Alternative are described in Section 4.0.

In compliance with the NEPA, CEQ guidelines, and 32 CFR Part 989, *et seq.*, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. These resources and conditions include: earth resources, water resources, biological resources, air quality, noise, land use and visual resources, socioeconomics and environmental justice, cultural resources, safety, solid and hazardous materials and wastes, and infrastructure.

## 3.1 EARTH RESOURCES

Earth resources include geology, soils, and topography. Geologic resources of an area typically consist of surface and subsurface materials and their inherent properties. Soils are unconsolidated materials formed from the underlying bedrock or other parent material and play a critical role in both the natural and human environment. Soil drainage, texture, strength, shrink / swell potential, and erodibility determine the suitability of the ground to support man-made structures and facilities. Topography refers to the surface features of an area including its vertical relief. These resources may have scientific, historical, economic, and recreational value.

### 3.1.1 Geology

Davis-Monthan AFB is located in the Tucson Basin and sits in the Sonoran Desert Section of the Basin and Range physiographic province – a region characterized by deep alluvial deposits transported from adjacent mountains, with relatively young deposits found in present-day drainageways, and much older deposits located on valley floors and terraces. Evidence of intense periods of volcanism can be found throughout the province, with isolated outcrops of granite over one billion years in age, but most of the andesite and basaltic flows were formed in the last 50 million years. The oldest rocks in the Tucson Basin are the metavolcanic Pinal Schist, formed

approximately 1.7 billion years ago. Some basaltic flows occurred as early as four million years ago and as late as 65 million years ago. High-angle normal faulting attributed to wide-spread Basin and Range continental extension began in this area approximately 13 million years ago and continued until approximately five million years ago. The Tucson Basin is an intermontane trough, broadly defined by the Tucson Mountains to the west, the Rincon Mountains to the east, and the Santa Catalina Mountains to the north. The Tucson Mountains are a small range composed of Tertiary intrusive and volcanic rocks bordered by faulted, folded Paleozoic and Cretaceous sedimentary rock. The Santa Catalina and Rincon Mountains are considered to be a typical southern Basin and Range metamorphic core complex, in which mid-Tertiary extension uplifted the rocks from a depth of approximately mid-crust to 1.5 kilometers above the valley floor (Davis-Monthan AFB 2012).

### 3.1.2 Soils

Soils in the Tucson Basin were primarily formed from alluvium with mixed material high in quartz and feldspar and deposited by wind. Bedrock and eolian (material accumulated through wind erosion) materials are less common, but are direct sources of alluvium and calcium carbonate enrichment in the soils. Soils at DMAFB are characteristic of the bajada and are primarily Aridisols and Entisols. Topsoil consists of silts, clays, sands, and gravels, and the subsoil strata are dominated by rock, clay, and caliche material. The majority of the soils consist of gravel and sandy loam about 36 inches deep. These soils typically have low fertility and are potentially erodible by both water and wind. Below the sandy loam layer is typically a layer of calcareous material approximately 48 inches thick. Most Base soils have moderately slow permeability (Davis-Monthan AFB 2012).

A soil-mapping unit represents an area dominated by one major kind of soil, or an area dominated by several kinds of soils (referred to as a complex). Davis-Monthan AFB has eight distinct soil-mapping units (NRCS 2016), and both Proposed Action alternatives (Swan Gate and Track Site) are located in the same mapping unit. Figure 3.1-1 on the next page shows the Proposed Action alternative locations and the associated soil-mapping unit. Following Figure 3.1-1 is a discussion of all eight soil types found at DMAFB.

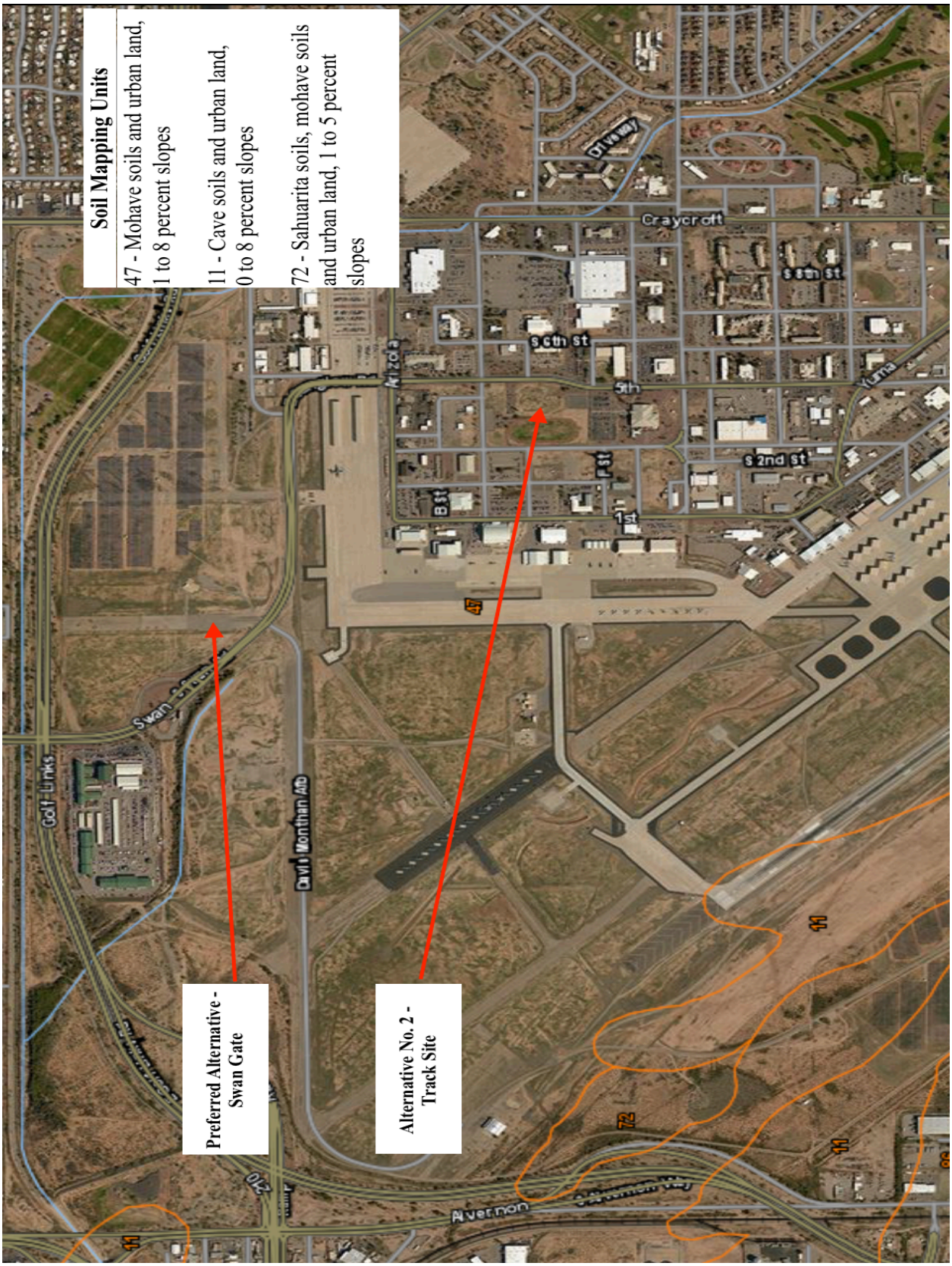


**Figure 3.1-1. Soil Mapping Units at Davis-Monthan Air Force Base**

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Each of the soil map units described below has minor soils encompassed within the map unit. These minor soils may have different properties and limitations, which can only be delineated on-site. The properties and limitations of the soil type comprising the majority of each soil map unit are presented in this section to provide an indication of the conditions and limitations found.

**Cave soils and Urban land, 0 to 8 percent slopes.** This map unit is found on nearly level and gently sloping fan terraces at elevations of 2,300 to 3,200 feet. The *Cave soils and Urban land* mapping unit does not have a regular pattern. Soils included in this mapping unit are small areas of Yaqui soils on lower alluvial fans; Arizo soils on flood plains; Delnorte soils on relict fan terraces; and Mohave, Stagecoach, and Sahuarita soils on fan terraces (NRCS 2003).

Cave soils are formed in mixed alluvium and are shallow to a lime-cemented hardpan (caliche) and well drained. Typically, the surface layer appears as a light brown, gravelly fine sandy loam to a depth of approximately four inches. The next layer of Cave soils appears as a pinkish white, gravelly fine sandy loam to a depth of approximately three inches. A white indurated lime caliche begins at a depth of seven inches, and the depth to caliche can vary from 4 to 20 inches. Under the caliche, generally from 20 to 60 inches deep is pale brown, gravelly loamy sand. Cave soils have moderate permeability, low available water capacity, medium to rapid runoff, and erosion hazards from both water and wind are slight (NRCS 2003).

Urban land consists of areas of soil, which are difficult or impossible to identify due to the soils being heavily altered by construction or obscured by structures and pavement. In general, the underlying and interspersed soils retain many of the characteristics of the soils associated with the unit (NRCS 2003).

The main limitation of *Cave soils and Urban land* for land development is the depth to caliche. The sandy and gravelly material below the caliche is subject to caving or slumping if excavations are deep (NRCS 2003).

**Hantz loam, 0 to 1 percent slopes.** This map unit is very deep and well drained and is found in level swales on alluvial fans and floodplains and is formed in mixed alluvium at elevations from

2,400 to 3,600 feet.

The Hantz loam surface layer is typically five inches thick) with a subsurface layer of grayish brown clay loam seven inches thick. The substratum is grayish brown clay 33 inches thick, with a lower layer of brown clay 16 inches thick. The Hantz loam soils are calcareous throughout, and in some area, the surface layer is silty clay loam, clay loam, or clay. Hantz loam has slow permeability, high available water capacity, medium runoff, water erosion hazard is slight, and wind erosion hazard is moderate. The soil can experience brief flooding episodes in both winter and summer; head cutting and deposition can occur after particularly heavy storms (NRCS 2003).

Hantz loam is not well suited for urban development due to the potential for flooding and high shrink-swell (NRCS 2003).

**Mohave soils and Urban land, 1 to 8 percent slopes.** This map unit is found on broad, gently sloping fan terraces shallowly dissected by ephemeral drainage ways at elevations from 2,200 to 3,300 feet. Included are small areas of Bucklebar, Sahuarita, and Tubac soils intermingled with Mohave soils, Hantz soils in drainage ways, and Yaqui soils on alluvial fans (NRCS 2003).

The Mohave soil is very deep and well drained and is formed in mixed alluvium. The surface layer is typically a yellowish brown loam approximately three inches. The subsurface layer is yellowish brown loam three inches thick. The subsoil extends another 34 inches with a brown sandy clay loam five inches thick; a brown and light brown clay loam 13 inches thick, and a reddish brown, light reddish brown, and pink sandy clay loam 16 inches thick. The substratum reaches a depth of 60 inches or more and consists of light reddish brown and white loam. In places, Mohave soils are effervescent to the surface, and soft masses of lime can be found in the substratum and lower parts of the subsoil. The Mohave soil has moderately slow permeability with high water capacity availability and an effective rooting depth of 60 inches or more. Also, the soil has slow to medium runoff; a slight to moderate hazard of water erosion; and moderate wind erosion (NRCS 2003).

Urban land consists of areas of soil, which are difficult or impossible to identify due to the soils being heavily altered by construction or obscured by structures and pavement. In general, the underlying and interspersed soils retain many of the characteristics of the soils associated with the unit (NRCS 2003).

Most areas of this unit are used for the construction of home sites and urban development. The primary limitation to urban development on this soil is shrink-swell potential (NRCS 2003).

**Pinaleno-Stagecoach complex, 5 to 16 percent slopes.** This map unit (complex) is found on strongly sloping fan terraces at elevations from 2,200 to 3,600 feet. The complex is 40 percent Pinaleno very cobbly sandy loam and 35 percent Stagecoach very gravelly sandy loam. The complex includes small area of Tubac and Mohave soils on broad summits and Palo Verdes and Jaynes soils on relict fan terraces. Also, there are small areas of rubble and talus at the foot slopes of mountains with rock fragments ranging in diameter from three inches to 36 inches or more; these areas make-up approximately 25 percent of the total acreage.

The Pinaleno soil is very deep, well drained, and formed in mixed alluvium. The surface is typically covered by 30 percent stones and cobble and 20 percent gravel with a brown, very cobbly sandy loam surface layer approximately 2-inches thick (in some areas the surface layer is very gravelly sandy loam). The upper 28 inches of the subsoil is reddish brown and red, extremely cobbly sandy clay loam with the lower 30 inches of the subsoil a pink, extremely gravelly, sandy clay loam. The permeability of Pinaleno soil is moderately slow with low water capacity availability. The soil has medium runoff and a slight hazard of water erosion and very light wind erosion (NRCS 2003).

The Stagecoach soil is very deep, well drained, formed in mixed alluvium, and are calcareous throughout. The surface is typically covered by 55 to 65 percent gravel and cobble, with a surface layer of light brown very gravelly sandy loam approximately 10-inches thick (in some areas, the surface layer is very cobbly sandy loam). The next layer is a pink, pinkish gray, and pinkish white very gravelly loam and extremely gravelly loam 30-inches thick. The substratum reaches a depth of 60 inches or more and is light brown, very gravelly loamy sand. Many soft

masses of lime can be found in the subsoil and substratum. In few areas, caliche is found at a depth of 40 inches or more. The permeability of Stagecoach soil is moderate with low water capacity availability and an effective rooting depth of 60 inches or more. The soil has medium runoff and a slight hazard of water erosion and very slight wind erosion (NRCS 2003).

Most areas of this unit are used for rangeland, home sites, and recreational areas. The unit is well suited for recreational development and is mainly limited by slope and large cobble and stones on the surface. If used for home site development, the primary limitations are slope and high lime content in the Stagecoach soils (NRCS 2003).

**Pits and Dumps.** This map unit is found on hills and mountains and slopes range from zero percent to over 100 percent. Areas are often rectangular and range from 10 to over 1,000 acres in size with elevations from 2,300 to 4,000 feet (NRCS 2003).

*Pits and Dumps* are 40 percent open pit mines; 20 percent extremely stony waste rock dumps; 15 percent mine-related landscape and facilities (tailing impoundments, equipment yards, dike-enclosed areas, etc.); and 10 percent sanitary landfills and pits for source materials. Included in *Pits and Dumps* are small areas of Anklam and Pantano soils on volcanic hills; Romero soils on granite hills; Saguaro soils on limestone hills; small areas of Hayhook, Palos Verdes, and Pinaleno soils on fan terraces; and small areas of Torriorthents in areas of reclaimed dumps (NRCS 2003).

Most areas of this unit are used for mining and a few areas are used for home sites and urban development. If used for home site and urban development, the primary limitations are slope; wind erosion; seepage; and sheet, rill, and gully erosion (NRCS 2003).

**Sahuarita soils, Mohave soils, and Urban land, 1 to 5 percent slopes.** This map unit is found on gently sloping fan terraces at elevations from 2,200 to 2,800 feet and includes small areas of Arizo and Anthony soils on flood plains below Sahuarita soils; Yaqui soils on alluvial fans; and Hayhook soils on fan terraces (NRCS 2003).

The Sahuarita soil is very deep, well drained, formed in mixed alluvium, and are calcareous throughout. The surface is typically covered by 35 to 55 percent gravel, and the surface layer is light yellowish brown very gravelly fine sandy loam to a depth of three inches. The subsoil is light yellowish brown fine sandy loam 25 inches thick. The buried subsoil is brown loam 17 inches thick and brown very gravelly sandy clay loam 15 inches or more thick. The Sahuarita soil has moderate permeability in the upper part and moderately slow in the lower part with moderate water capacity availability and an effective rooting depth of 60 inches or more. The soil has slow to medium runoff; a slight hazard of water erosion; and very slight wind erosion (NRCS 2003).

The Mohave soil is very deep and well drained and is formed in mixed alluvium. The surface layer is typically a yellowish brown loam approximately three inches. The subsurface layer is yellowish brown loam three inches thick. The subsoil extends another 34 inches with a brown sandy clay loam five inches thick; a brown and light brown clay loam 13 inches thick, and a reddish brown, light reddish brown, and pink sandy clay loam 16 inches thick. The substratum reaches a depth of 60 inches or more and consists of light reddish brown and white loam. In places, Mohave soils are effervescent to the surface, and soft masses of lime can be found in the substratum and lower parts of the subsoil. The Mohave soil has moderately slow permeability with high water capacity availability and an effective rooting depth of 60 inches or more. Also, the soil has slow to medium runoff; a slight to moderate hazard of water erosion; and moderate wind erosion (NRCS 2003).

Urban land consists of areas of soil, which are difficult or impossible to identify due to the soils being heavily altered by construction or obscured by structures and pavement. In general, the underlying and interspersed soils retain many of the characteristics of the soils associated with the unit (NRCS 2003).

This map unit is primarily used for rangeland and is moderately well suited for urban development. The main limitations are moderate shrink-swell on the Mohave soil and dustiness in disturbed areas. If buildings are constructed on the Mohave soil, properly designing foundations and footings and diverting stormwater runoff away from the buildings will help to

prevent structural damage caused by shrinking and swelling (NRCS 2003).

**Tubac gravelly loam, 1 to 8 percent.** This map unit is very deep, well drained, and formed in mixed alluvium. The soil is found on broad, gently sloping fan terraces, shallowly dissected by ephemeral drainageways at elevations from 2,400 to 3,200 feet and includes Mohave, Pinaleno, and Sahuarita soils on fan terraces above Tubac soils; Yaqui soils on alluvial fans; and Hantz soils in drainageways (NRCS 2003).

The surface of Tubac gravelly loam is typically covered by 25 percent gravel and five percent cobble, with a brown to dark brown gravelly loam approximately two inches thick. The subsurface layer is reddish brown and pinkish gray loam 12-inches thick. The first 17 inches of subsoil is reddish brown clay, with the lower portion of the subsoil reddish brown and brown gravelly sandy clay loam to a depth of 60 inches or more. Subsurface Tubac gravelly loam can be effervescent to the surface in places and many soft masses of lime can be found in the substratum and lower part of the subsoil. The Tubac gravelly loam has slow permeability with moderate water capacity availability and an effective rooting depth of 60 inches or more. Also, the soil has medium runoff with a slight hazard of water erosion and wind erosion (NRCS 2003).

This map unit is primarily used for rangeland with a few areas used for home sites and urban development. If used for home sites and urban development, the main limitations fare shrink-swell potential. If buildings are constructed on Tubac gravelly loam, properly designing foundations and footings and diverting stormwater runoff away from the buildings will help to prevent structural damage caused by shrinking and swelling (NRCS 2003).

**Yaqui fine sandy loam, 1 to 3 percent.** This map unit is very deep, well drained, formed in mixed alluvium, and is calcareous throughout. The soil is found on gently sloping alluvial fans at elevations ranging from 2,200 to 3,600 feet, and in some areas, the surface layer can be loam or very fine sandy loam. Included in this unit are small areas of Anthony soils on alluvial fans; Bucklebar, Sahuarita, and Tubac soils on fan terraces below Yaqui soils; and Hantz soils on flood plains. Also, small areas of Arizo soils in and along narrow drainage ways are included (NRCS 2003).

The surface layer is typically strong, brown, fine sandy loam to a depth of approximately four inches with a subsoil of brown to dark brown sandy clay loam 27 inches thick. Below the subsoil is a buried subsoil of yellowish red clay loam 12 inches thick over pink gravelly loam to a depth of 60 inches or more with fine lime filaments. The Yaqui fine sandy loam has moderate permeability to a depth of 31 inches and moderately slow permeability below 31 inches. The available water capacity is high with an effective rooting depth of 60 inches or more. Also, the soil is subject to rare, very brief periods of flooding during prolonged, high-intensity storm events. Additionally, the soil has slow runoff except where concentrated in shallow rills and gullies with a slight hazard of water erosion and moderately high hazard of wind erosion (NRCS 2003).

This map unit is used for rangeland or home sites and urban development in most areas. If used for home site development, the main limitations are flooding and the hazard of wind erosion in disturbed areas (NRCS 2003).

### 3.1.3 Topography

General topography in the Sonoran Basin and Range MLRA is defined by numerous short southeast to northwest trending fault-block mountain ranges rising abruptly from a smooth, gently sloping desert valley floor (NRCS 2006).

Terrain on DMAFB is predominantly flat and slopes downward from the southeast to the northwest with elevations ranging from 2,550 feet above mean sea level (MSL) on the west side of DMAFB to 2,950 feet above MSL on the east side of the DMAFB. Only two areas located on DMAFB have any significant slope: the road cut for Kolb Road as it passes through DMAFB and the Atterbury Wash (one of the primary ephemeral drainages), which is located in the eastern part of DMAFB (Davis-Monthan AFB 2009a).

## 3.2 WATER RESOURCES

Water resources include surface water, groundwater, and floodplains. Surface water resources include lakes, rivers, and streams and provide economic, ecological, recreational, and human health benefits. Groundwater includes the subsurface hydrologic resources of the physical

environment, which is commonly used as a source of water supply. Floodplains are defined by EO 11988, *Floodplain Management*, as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a one percent or greater chance of flooding in any given year" (area inundated by a 100-year flood). Floodplain values include natural moderation of floods, water quality maintenance, groundwater recharge, and habitat for many plant and animal species.

### 3.2.1 Surface Water

Davis-Monthan AFB is located within the Tucson Basin. The Tucson Basin is drained by the Santa Cruz River, which generally flows due north approximately 2 miles west of the Base. Major tributaries of the Santa Cruz River in the vicinity of the Base are the Rillito River, Julian Wash, and Pantano Wash. Pantano Wash is the nearest of these major tributaries to the Base, located about 0.5 mile northeast of the northeastern most corner of the Base (Davis-Monthan AFB 2009a).

No perennial drainages are located on the Base. Due to the small amount and infrequent nature of precipitation in the region, the local drainages are ephemeral, flowing only during and immediately following rainstorms. These rainstorm events often result in overflows of the typically dry washes and sometimes lead to localized flash flooding. The main surface water feature on the Base is the Atterbury Wash, which is ephemeral and is located in the eastern portion of the Base. See Figure 3.2-1 located at the end of this Section.

The eastern portion of the Base drains toward the Atterbury Wash. The Atterbury Wash drains downstream to Lakeside Lake, a man-made lake fed by water from stormwater runoff, groundwater, and reclaimed water from the Roger Road Wastewater Treatment Plant. Lakeside Lake is listed as a Category 4a—Not Attaining water body. The total maximum daily load (TMDL) for Lakeside Lake was completed in 2005 (ADEQ 2012/2014).

Surface drainage at DMAFB has been modified to comprise a series of ditches, channels, and culverts ultimately discharge downstream into the Santa Cruz River. The stormwater drainage system at the Base consists of 11 drainage areas (see Table 3.2-1 below), each featuring one or more outfalls—a point source discharging stormwater to "waters of the US." There are currently

16 outfalls on DMAFB. The western portion of the base (including 4 of the 16 outfalls) drains toward the Tucson Diversion Channel, which ultimately, along with 7 other outfalls, discharges downstream to the Ajo Detention Basin, located approximately one mile west of the base. The five remaining drainage areas ultimately discharge to Lakeside Lake and eventually reach the Pantano Wash. All surface waters on DMAFB eventually reach the Santa Cruz River (Davis-Monthan AFB 2009a).

**Table 3.2-1. Characteristics of Drainage Areas**

| Drainage Area | Estimated Drainage Area (acres) | Estimated Impervious Area (acres) | Percent Impervious |
|---|---|---|---|
| 001 | 1,280 | 385 | 30 |
| 002A | 2,138 | 535 | 25 |
| 002B/C | 390 | 156 | 40 |
| 004 | 2,043 | 41 | 2 |
| 005A | 344 | 0 | 0 |
| 005B | 98 | 0 | 0 |
| 006 (Outfalls 006A & B) | 2,414 | 0 | 0 |
| 007 (Outfalls 007A, B, & C) | 1,164 | 116 | 10 |
| 008 | 74 | 4 | 5 |
| 009 (Outfalls A & B) | 529 | 11 | 2 |
| 010 | 572 | 257 | 45 |

Source: Davis-Monthan AFB 2016b

Stormwater at DMAFB is managed in accordance with the NPDES Multi-sector General Permit (MSGP) AZR05A12F issued by the ADEQ, which was issued in December 2012. In order to comply with the current requirements of the MSGP, Davis-Monthan AFB has prepared and implemented a SWPPP, which includes water quality monitoring requirements and best management practices (BMPs) to minimize the potential for contaminants to reach nearby surface waters.

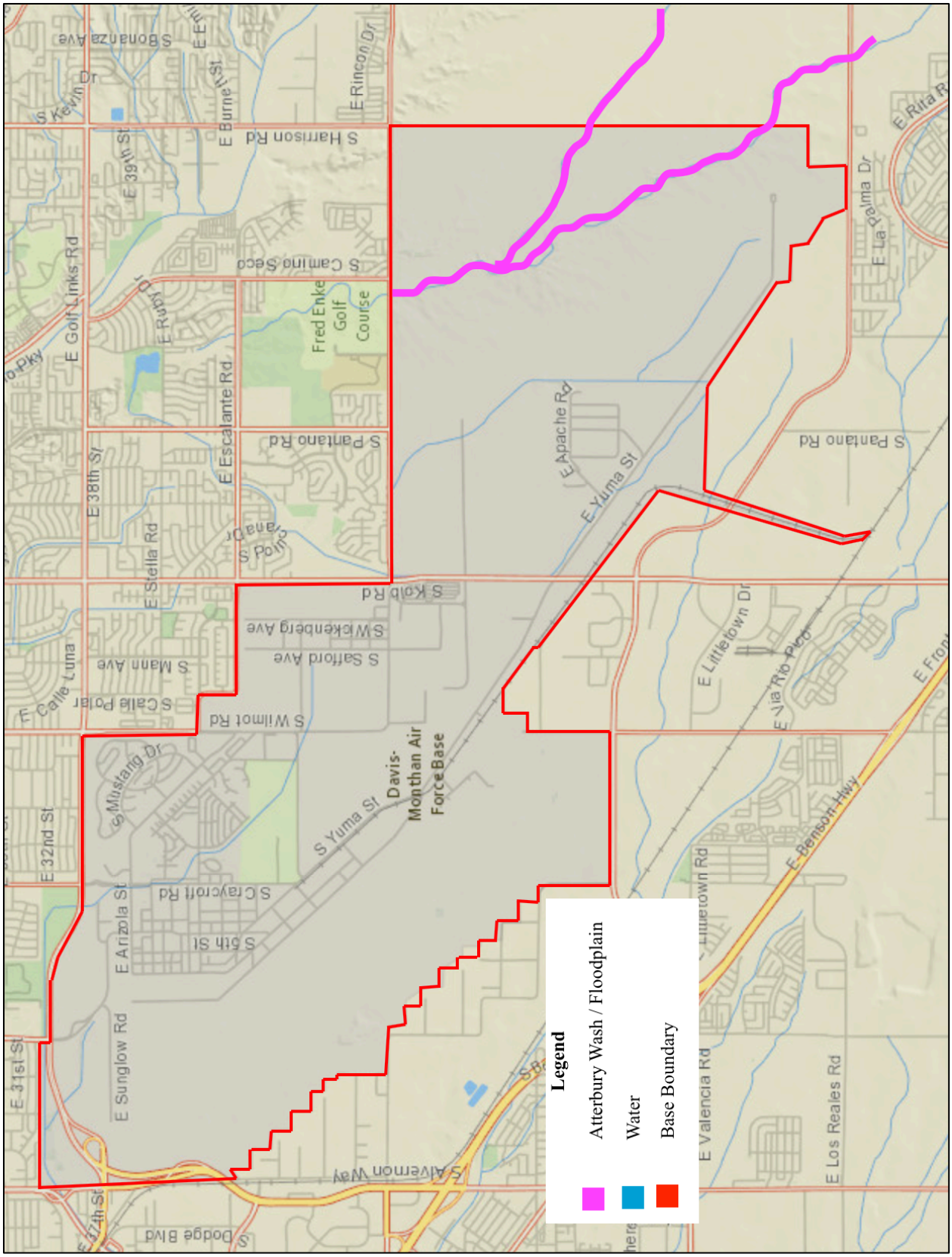


**Figure 3.2-1. Surface Water Features at Davis-Monthan Air Force Base**

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### 3.2.2 Groundwater

The groundwater basins underlying the Tucson Basin and surrounding mountain ranges are found below an impermeable layer of metamorphic, sedimentary, and intrusive igneous rock extending up to 7,000 feet below the surface. Superficial deposits below the basin are primarily stream channel and terrace deposits of the Fort Lowell Formation, the Tinaja beds, and the Pantano Formation. The thickness of the deposits varies throughout the basin. The primary water source for the Base is groundwater withdrawn from the Tinaja beds and the Fort Lowell Formation. The Tinaja beds are a series of beds extending several hundred feet deep below the Fort Lowell Formation and are composed of Catalina gneiss, with volcanics deeper below the ground surface. The deposits range from sandy gravel along the basin's margins to gypsiferous clayey silt and mudstone in the center of the basin. The Fort Lowell Formation is the uppermost basin-fill unit, just below the alluvium deposits, and is considered the main regional aquifer. It ranges from 300 to 400 feet thick and is composed of unconsolidated gravel, sands, and clayey silt. The Pantano Formation is below the Tinaja beds and is several thousand feet thick (Davis-Monthan AFB 2009a).

The depth to water in the Tucson Basin ranges from less than 15 feet to greater than 550 feet. However, because groundwater withdrawal has exceeded recharge, the water table dropped more than 100 feet between 1953 and 1982 as measured by groundwater wells in areas of the Tucson Basin. In the vicinity of DMAFB water wells, the water table has dropped approximately 40 to 60 feet and is currently 250 to 300 feet below the surface (Davis-Monthan 2016a).

The groundwater supply system at the DMAFB is described in Section 3.11.

### 3.2.3 Floodplains

The Federal Emergency Management Agency (FEMA) Flood Map Service Center (MSC) is an Internet-based tool developed to support the National Flood Insurance Program (NFIP). According to the MSC Flood Insurance Rate Map, Revised 2011, the vast majority of DMAFB is located in Base Flood Elevation Zone D, which is categorized as "flood hazards are undetermined, but are possible" (FEMA 2011).

Although the National Flood Plain Insurance Map does not show any portion of DMAFB in a

100-year floodplain, a recent floodplain analysis of Atterbury Wash (see Figure 3.2-1) indicated an estimated peak discharge for a 100-year flood of 2,906 cubic feet per second. The resulting floodplain would vary in width from 69 to 1,154 feet because of extreme changes in stream morphology. In some areas, the banks are 20 feet high and in others they are nearly non-existent (Davis-Monthan AFB 2016a).

## 3.3 BIOLOGICAL RESOURCES

Biological resources consist of native or naturalized plants and animals, along with their habitats, including wetlands. Although the existence and preservation of biological resources are both intrinsically valuable, these resources also provide essential aesthetic, recreational, and socioeconomic benefits to society. This section focuses on plant and animal species and vegetation types typifying or are important to the function of the ecosystem, are of special societal importance, or are protected under federal or state law or statute. For purposes of this assessment, special-status species are species federally listed threatened and endangered species; state listed species; and other sensitive species.

**Federally Listed Threatened and Endangered Species.** The ESA of 1973 provides protection to species listed under this category. Endangered species are those species at risk of extinction in all or a significant portion of their range. Threatened species are those with the potential of being listed as endangered in the near future.

**State Listed Species.** The State of Arizona maintains a list of the Wildlife of Special Concern in Arizona (WSC) in the Arizona Heritage Data Management System, which is maintained by Arizona Game and Fish Department (AZGFD). The list identifies these species as those whose occurrence in Arizona is or may be in jeopardy or has known or perceived threats or population declines, as described by the AZGFD's listing of WSC. Additionally, under the Arizona Native Plant Law, the Arizona Department of Agriculture has identified plant species of particular concern throughout the state. Plants on this list are placed in one of five categories of protection: Highly Safeguarded Protected Native Plants; Salvage Restricted (collection with a permit only); Export Restricted (export out of state prohibited); Salvage Assessed (permits required to remove live trees); and Harvest Restricted (permit required to remove plant by-products).

**Other Sensitive Species.** Species under this heading are federal species of concern or species identified as rare or on a watch list under the Arizona Natural Heritage Program state ranking system. These species are usually species of regional concern and may or may not be adopted as state or federally threatened or endangered. At present, these species receive no legal protection under the ESA.

In addition, EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (2001), recognized the ecological and economic importance of migratory birds to the US and other countries requiring federal agencies to evaluate the effects of their actions and plans on migratory birds (with an emphasis on species of concern) in their NEPA documents. Species of concern refers to species listed in the periodic report "Migratory Nongame Birds of Management Concern in the United States;" priority species identified by established plans; and species listed in 50 CFR 17.11, *Endangered and Threatened Wildlife*.

### 3.3.1 Vegetation Communities

Davis-Monthan AFB falls within the Tucson Basin and is located in the Sonoran Desert, which is considered part of the Tropical-Subtropical Desertlands climatic zone. The Tucson Basin falls at the east central edge of the Arizona Upland Subdivision of the Sonoran Desertscrub Biotic Community and is immediately adjacent to the Semi-desert Grassland biome above and the Lower Colorado River Valley Subdivision of the Sonoran Desert below. As such, DMAFB exhibits slight influences from adjacent subdivisions, in particular the Lower Colorado River Valley Subdivision, and there are few if any influences from the Semi-desert Grassland biome. Approximately 40 percent of the vegetation at DMAFB consists of relatively undisturbed native vegetation. Yet, this region of the Sonoran Desert has shifted in vegetation composition over the last approximately 130 years, primarily due to livestock grazing in the late 1800s and early 1900s. Most of the remaining DMAFB vegetative component is disturbed to highly disturbed and has lost most of its original composition except in those isolated locations where Sonoran Desert native species have been used in landscaping. Grasses in the Sonoran Desert consist of both perennial and annual species. Grazing and other anthropogenic disturbances have altered the vegetative structure and have led to the introductions of non-native plants, in particular some extremely invasive grasses. In developed areas, the historic vegetative cover has been replaced with native and ornamental horticultural species used in landscaping and turf in recreational

areas (Davis-Monthan AFB 2016a).

The landscaped vegetation community is present on the developed portion of the base. Both native and non-native plants have been used to landscape the base. Native plants, yet not all from local vegetation communities, include agaves (Agave sp.); barrel (Ferocactus spp.), hedgehog (Echinocereus spp.), organpipe (Cereus thurberi), prickly pear (Opuntia sp.), saguaro (Cereus giganteus), and senita cacti (Pachycereus schottii); Mexican Washington fan palms (Washingtonia gracilis), blue and foothills palo verde (Parkinsonia spp.), and mesquite (Prosopis juliflora, P. chilensis). Non-native trees and shrubs include: junipers (Juniperus sp.), Mexican palms (Phoenix sp.), oleander (Nerium sp.), and pines (Pinus spp.). The mowed grassland community is found within and/or adjacent to the airfield, base housing, AMARG, munitions storage, recreational fields, and roadways. The grass in these areas is maintained at a height of approximately one to three inches and is composed primarily of Lehmann's lovegrass (Eragrostis lehmanniana) and bermuda grass (Cynodon spp.). Tumbleweed (Salsola kali), desert broom (Baccharis, sarothroides), and globemallow (Sphaeralcea spp.) are scattered along the periphery of this community. Ground coverage varies from zero to approximately 40 percent (Davis-Monthan AFB 2016a).

The semi-desert grassland community is dominated by perennial grass-scrub species. Pure stands of this community are absent from DMAFB because shrubs, cacti, and other forbs have replaced the original grassland species. Those areas where grasses constitute a substantial portion of cover exhibit characteristics of this community. Typical species occurring in this vegetation community include grama (*Bouteloua rothrockii, B. californica, B. radicosa, B. filiformis, B. parryi,* and *B. barbata*), three-awns (*Aristida hamulosa, A. wrighti, A. ternipes,* and *A. aristidoides*), false grama (*Cathestecum erectum*), ganglehead grass (*Heteropogon contortus*), and windmill grasses (*Chloris* spp.). Buffel grass (*Pennisetum ciliare*) is a common invasive plant found in semi-desert grassland and other vegetation communities in the Sonoran Desert (Davis-Monthan Air Force Base 2009a).

The Sonoran desertscrub community is the most common community in the Sonoran Desert but is less common on DMAFB because of the existing developed areas and extent of previously

disturbed areas. Also, the Sonoran desertscrub community is divided into six subdivisions, and DMAFB is located primarily in the Arizona Upland subdivision. Due to the proximity, similarity of habitat, and topography, many elements of the nearby Lower Colorado Valley subdivision are evident as well. Generally, the Arizona Upland subdivision occurs in the more mountainous regions and is the highest and coldest part of the Sonoran Desert. Due to higher rainfall, plant density and diversity are the greatest in this subdivision. Typical plant species include creosote bush (*Larrea tridentata*), foothill palo verde (*Cercidium microphyllum*), staghorn cholla (*Opuntia versicolor*), Engelmann prickly pear (*O. engelmannii*), barrel cactus (*Echinocactus wislizenii*), saguaro, ocotillo, Anderson lycium (*Lycium andersonii*), lotebush (*Condalia lycioides*), desert hackberry (*Celtis pallida*), and velvet mesquite (*Prosopis juliflora* var. *velutina*) (Davis-Monthan Air Force Base 2009a).

The Lower Colorado Valley subdivision is the hottest and driest subdivision occurring in low, broad valleys with few scattered, small mountains, which are mostly barren. The vegetation is distinguished from the Arizona Upland subdivision by its simple floristic composition, especially on gravelly and sandy plains, which are dominated by creosote bush and white bursage (*Ambrosia dumosa*). The diversity and abundance of plant species increases along drainages. Common plant species include burro brush (*Hymenoclea monogyra*), seep willow (*Baccharis glutinosa*), Anderson lycium, and catclaw (*Acacia greggii*). Herbaceous annuals are generally abundant after significant winter rains (Davis-Monthan Air Force Base 2012).

The Sonoran Desert Riparian community is found on DMAFB primarily along Atterbury Wash and comprises a relatively small proportion of the total acreage. Typical species found in the riparian habitat include tomatillo (*Lycium brevipes*), catclaw, desert hackberry, mesquite, desert broom (*Baccharis salicifolia*), seep willow, and mule fat (*B. viminea*). Because of the greater diversity and density of vegetation found in riparian communities, this community provides habitat for many species (Davis-Monthan Air Force Base 2012).

The Preferred Alternative (Swan Gate) is located on the northern edge of DMAFB and has mostly un-vegetative surfaces. East Golf Links Road is located to the north and Swan Road is located to the east to southeast.

### 3.3.2 Common Wildlife

The Base is known to have a diverse wildlife community with more than 120 avian species; numerous mammalian, reptilian, and amphibian species; and hundreds of invertebrate species. This diverse wildlife community is typical of the Sonoran Desert, and the species are typically adapted to extreme temperatures and low precipitation. Species occurring on DMAFB are generally adapted to urban environments because more than half of DMAFB is composed of the landscaped and mowed vegetation community. Grassy and landscaped areas are often watered, attracting a diversity of wildlife species, particularly birds (Davis-Monthan AFB 2012).

The Paloverde-Cacti-Mixed Scrub Series and the Creosote-White Bursage Series at DMAFB supports a wide range of resident and transitory species. Some of the more common bird and mammal species include Gambel's Quail (Lophortyx gambelii), Gila woodpecker (Melanerpes uropygialis) Roadrunner (Geococcyx californianus), curve-billed thrasher (Taxostoma curvirostre), Mourning Dove (Zenaida macroura), Cactus Wren (Campylorhynchus brunneicapillus), black-throated sparrow (Amphispiza bilineata), California leaf-nosed bat (Macrotus californicus), coyote (Canis latrans), bobcat (Felis rufus), black-tailed jackrabbit (Lepus californicus), desert cottontail (Sylvilagus auduboni), Merriams kangaroo rat (Dipodomys merriami), white-throated woodrat (Neotoma albigula), Desert pocket mouse (Perognathus penicillatus) and round tailed ground squirrel (Spermophilous tereticaudus). More than 120 species of birds are present or use the desertscrub community of the base, many of which likely migrate to other locations seasonally, while other species probably reside on or near DMAFB. Common reptile species include regal horned lizard (Phrynosoma solaris), desert spiny lizards (Sceloporous magister), tree lizards (Urosaurus ornatus), greater earless lizards (Cophosaurus texanus), tiger whiptails (Aspidoscelis tigris), banded gecko (Coleonyx variegates), western threadsnake (Leptotyphlops humils), western ground snake (Sonora semiannulata), glossy snake (Arizona elegans), gopher snake (Pituophis catenifer) and western diamondback (Crotalus atrox). Invertebrates, including insects and spiders, are likely extremely species diverse on DMAFB as elsewhere in the Sonoran Desert. The probability of sighting less common species increases during winter months, when many species migrate to lower, warmer areas. Use of DMAFB by birds diminishes during the heat of summer, when species have migrated to more temperate climates, and peaks during winter as migratory species escape the

cold (Davis-Monthan Air Force Base 2016a).

### 3.3.3 Special-Status Species

The USFWS Information for Planning and Conservation (IPaC) Trust Resource Report identified seven endangered species with potential to occur at DMAFB. Table 3.3-1 below provides the general habitat for these seven species (USFWS 2016).

**Table 3.3-1. Endangered Species Potentially Occurring at DMAFB**

| Common Name | Scientific Name | Federal Status | General Habitat Requirements |
|---|---|---|---|
| California Least Tern | Sterna antillarum browni | Endangered | Nests usually on open, flat beaches along lagoon or estuary margins; sometimes on mud or sand flats a distance from the ocean or on artificial islands created from dredge spoils. |
| Yellow-billed Cuckoo | Coccyzus americanus | Threatened | Use wooded habitat with dense cover and water nearby, including woodlands with low, scrubby, vegetation, overgrown orchards, abandoned farmland, and dense thickets along streams and marshes. In the West, nests are often placed in willows along streams and rivers, with nearby cottonwoods serving as foraging sites. |
| Pima Pineapple Cactus | Coryphantha scheeri var. robustispina | Endangered | Alluvial basins and hillsides in semi-desert grasslands, desert scrub and the transition area between the two. |
| Jaguar | Panthera onca | Endangered | Found near water in warm, tropical savannas and forests within core of their range. In the northern portion of the range, found in thornscrub, desertscrub, and grasslands. Vegetation communities used in Arizona range from Sonoran desertscrub at lower elevations to sub-alpine mixed conifer in the mountain ranges. |
| Lesser Long-nosed Bat | Leptonycteris curasoae yerbabuenae | Endangered | Requires caves and mines for roost sites (maternity, male-only, late-summer, and night roosts are used differently) and access to healthy stands of saguaro cactus and paniculate agaves for foraging. The Sonoran desertscrub vegetation community provides the early summer forage base, with bats found in southwestern Arizona. |
| Northern Mexican Gartersnake | Thamnophis eques megalops | Threatened | Strongly associated with permanent water with vegetation, including stock tanks, ponds, lakes, cienegas, cienega streams, and riparian woods. |
| Sonoyta Mud Turtle | Kinosternon sonoriense longifemorale | Proposed Endangered | Permanent aquatic habitats, ponds, pools, or streams. |

The **California Least Tern** nests usually on open, flat beaches along lagoon or estuary margins; sometimes on mud or sand flats a distance from the ocean or on artificial islands created from dredge spoils. Usually nests in same area in successive years; tends to return to natal site to nest. Pima County, Arizona is listed as a US county where it is believed the California Least Tern is found (USFWS 2016).

The **Yellow-billed Cuckoo** generally lives among the canopies of deciduous trees in woodland patches with gaps and clearings. In the Southwest, Yellow-Billed Cuckoos are rare breeders in riparian woodlands of willows, cottonwoods and dense stands of mesquite to breed (USFWS 2016).

The habitat for the **Pima Pineapple Cactus** is found in alluvial basins and hillsides in semi-desert grasslands, desertscrub and the transition area between the two. This cactus is most commonly found on open areas on flat ridge-tops or slopes of less than 10-15 percent. Soils range from shallow to deep and silty to rocky. The distribution of the cactus is patchy, with highly variable densities, and widely distributed across the areas of suitable habitat. Few locations have significant populations, and those tend to be clumped with in a smaller area. Due to topography, hydrology, plant community type, and elevation, there are extensive areas within the overall range of the cactus not qualifying as a habitat. Lands subject to considerable disturbances due to human development or other land uses generally do not support the cactus (USFWS 2016).

The **Jaguar** is found near water in warm, tropical savannas and forests within core of their range. In the northern portion of the range, found in thornscrub, desertscrub, and grasslands. Vegetation communities used in Arizona range from Sonoran desertscrub at lower elevations to sub-alpine mixed conifer in the mountain ranges (USFWS 2016).

The **Lesser Long-nosed Bat** requires caves and mines for roost sites and access to healthy stands of saguaro cactus and paniculate agaves for foraging. The semi-desert grassland and oak woodlands provide the late summer agave resources in the southeastern portion of Arizona (USFWS 2016).

The **Northern Mexican Gartersnake** is strongly associated with permanent water with vegetation, including stock tanks, ponds, lakes, cienegas, cienega streams, and riparian woods. In the northern part of the range, the species is usually found in or near water in highland canyons with pine-oak forest and pinyon-juniper woodland, and it also enters mesquite grassland and

desert areas, especially along valleys and stream courses (USFWS 2016).

The **Sonoyta Mud Turtle** inhabits spring-fed pools, ponds, and stream courses with perennial or near-perennial water (USFWS 2016).

### 3.3.4 Other Sensitive Wildlife Species

Raptors, which are protected under the Migratory Bird Treaty Act, generally nest in trees and shrubs and forage for bird, mammal, and reptile prey in many urban and natural habitats. Suitable habitat occurs in both the developed and undeveloped portions of the Base. Raptors known to occur on the Base include ferruginous hawk (*Buteo regalis*), Swainson's hawk, Cooper's hawk, and great horned owl. Additionally, Swainson's hawk, Cooper's hawk, and great horned owl are known to nest on the Base and are currently monitored by the AZGFD. Suitable nesting habitats for these raptor species are not present in preferred alternative (Swan Gate) project area (Davis-Monthan Air Force Base 2012).

The Arizona Partners in Flight Conservation Plan identifies bird species appearing to be sensitive to loss of undisturbed native habitat associated with urbanization and should be monitored in the Arizona Uplands vegetation subdivision. Of those listed in the plan, only Gambel's quail and greater roadrunner are likely to occur on the Base. The Conservation Plan also lists bird species, which are indicators of Sonoran desertscrub habitat health, including Costa's hummingbird (*Calypte costae*), gilded flicker (*Colaptes chrysoides*), rufous-winged sparrow (*Peucaea carpalis*), Le Conte's thrasher (*Toxostoma lecontei*), and purple martin (*Progne subis*) (Latta et al. 1999). Nesting and foraging habitat for these species is abundant regionally. Due to the abundance of nesting and foraging habitat for these species, they are not considered for further evaluation (Davis-Monthan Air Force Base 2012).

### 3.3.5 Wetlands

Wetlands are protected from development under EO 11990, *Protection of Wetlands*. Guidance from the EO requires federally funded activities associated with wetlands to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural beneficial values of wetlands.

An analysis of potential Waters of the US was conducted in 1996. Areas appearing to contain potential Waters of the US were indicated on Mylar overlays of the color infrared images, and the maps were then used for field delineation in accordance with the Corps of Engineers Wetlands Delineation Manual. All previously identified non-wetland Waters of the US, such as ponds, streams and drainages, were checked during the field survey. Jurisdictional boundaries were defined as the ordinary high water mark indicated by shelving, scouring, vegetation zonation, and debris. Stream channels were drawn on the maps and channel length determined using digital orthophotographs and a geographic information system. The survey identified 141,349 linear feet and 9.49 acres of CWA-protected Waters of the US on DMAFB. The CWA-protected habitats on DMAFB are all ephemeral drainages, and there are no perennial drainages on DMAFB. Several channelized ephemeral drainages carry runoff from the developed portions of DMAFB and exit the base via underground or open drainage systems. Atterbury Wash is the primary ephemeral drainage on the undeveloped portion of the base (Davis-Monthan Air Force Base 2016a). There are no delineated/jurisdictional wetlands located at DMAFB.

## 3.4 AIR QUALITY

Pima County is located in the southern part of Arizona with an area approximately 9,200 square miles. About 95% of the population resides in eastern Pima County. The 2010 Census population count for Pima County was 980,263 with the city of Tucson population at 520,116. The Tucson basin, located in eastern Pima County, has an elevation between 2,000 and 3,000 feet with several mountain ranges surrounding it with elevations exceeding 9,000 feet in the Santa Catalina, Santa Rita and Rincon ranges (PDEQ 2015).

The Tucson basin has abundant sunshine. The summer season is hot and runs from May through September. Tucson has mild winter temperatures and low rainfall averaging about twelve inches per year. The topography of the area, as well as the change of season and time of day, affects wind direction. Airflows generally tend to be down valley (from the southeast) at night and early morning hours, reversing to the up valley direction (from the northwest) during the day. The summer monsoon occurs in the months of June through September with the conditions having a yearly variability both in intensity and timing. The monsoon brings high relative humidity, cloud cover, wind events and frequent, often severe, thunderstorms. Higher levels of pollution can occur in the winter when the air is calmest. Under these conditions, especially during winter

mornings, pollutants become trapped by temperature inversions. The temperature inversions begin after the sun goes down and the air closest to the ground is cooled rapidly by heat radiating out through the clear dry air of the desert. As the sun rises in the morning, the upper air is heated rapidly and becomes warmer than the air closest to the ground. This traps the cold air next to the ground and holds it there until the sun is able to heat the ground and slowly raise the temperature of the trapped air. Once heated, the trapped air is able to rise and mix with the layers of air above and disperse the concentrated pollutants. These conditions, often referred to as temperature inversions, are common during the winter, and are less severe in the summer months (PDEQ 2016).

In 1970, Congress created the USEPA and passed the CAA, giving the federal government authority to clean up air pollution in the US. Since the passing of the CAA, the USEPA and states, tribes, local governments, industry, and environmental groups have worked to establish a variety of programs to reduce air pollution levels across the US (USEPA 2007). Under the authority of the CAA, the USEPA has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants. The six pollutants are carbon monoxide (CO), lead (Pb), nitrogen dioxide ($NO_2$), ozone ($O_3$), particulate matter (PM), and sulfur dioxide ($SO_2$) (USEPA AQPS). These pollutants are called "criteria" air pollutants because the USEPA regulates them by developing human health-based and/or environmentally based criteria (science-based guidelines) for setting permissible levels. The set of limits based on human health is called primary standards, and the set of limits intended to prevent environmental and property damage is called secondary standards. A geographic area with air quality cleaner than the primary standard is called an "attainment" area, while an area not cleaner than the primary standard is called a "nonattainment" area (USEPA 2007). The primary and secondary NAAQS are listed in Table 3.4-1 on the following page, and each NAAQS is discussed after the Table.

**Table 3.4-1. Primary and Secondary NAAQS (USEPA NAAQS)**

| Pollutant | | Primary / Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|---|
| Carbon Monoxide (CO) | | Primary | 8 hours | 9 ppm | Not to be exceeded more than once per year |
| | | | 1 hour | 35 ppm | |
| Lead (Pb) | | Primary and Secondary | Rolling 3 month average | 0.15 μg/m$^3$ (1) | Not to be exceeded |
| Nitrogen Dioxide ($NO_2$) | | Primary | 1 hour | 100 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | | Primary and Secondary | 1 year | 53 ppb (2) | Annual Mean |
| Ozone ($O_3$) | | Primary and Secondary | 8 hours | 0.070 ppm (3) | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| Particulate Matter / Particle Pollution | $PM_{2.5}$ | Primary | 1 year | 12.0 μg/m$^3$ | Annual mean, averaged over 3 years |
| | | Secondary | 1 year | 15.0 μg/m$^3$ | Annual mean, averaged over 3 years |
| | | Primary and Secondary | 24 hours | 35 μg/m$^3$ | 98th percentile, averaged over 3 years |
| | $PM_{10}$ | Primary and Secondary | 24 hours | 150 μg/m$^3$ | Not to be exceeded more than once per year on average over 3 years |
| Sulfur Dioxide ($SO_2$) | | Primary | 1 hour | 75 ppb (4) | 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | | Secondary | 3 hours | 0.5 ppm | Not to be exceeded more than once per year |

(1) In areas designated nonattainment for the lead (Pb) standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards [1.5 micrograms per cubic meters (μg/m$^3$) as a calendar quarter average] also remain in effect.
(2) The level of the annual nitrogen dioxide (NO2) standard is 0.053 parts per million (ppm) and shown in the table in terms of parts per billion (ppb) for the purposes of clearer comparison to the one hour (1-hour) standard level.
(3) Final rule signed October 1, 2015 and effective December 28, 2015. The previous (2008) ozone (O3) standards additionally remain in effect in some areas. Revocation of the previous (2008) O3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
(4) The previous sulfur dioxide (SO2) standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet one year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a State Implemented Plan (SIP) call under the previous SO2 standards [40 CFR 50.4(3)]. A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the require NAAQS.

### 3.4.1 Carbon Monoxide

Carbon monoxide (CO) concentrations in Pima County have declined in the past three decades, which is attributed mostly to the use of cleaner burning oxygenated fuels, catalytic converters, fuel efficient computer controlled vehicles, locally adopted Clean Air and Travel Reduction Programs and various local traffic control measures. The Tucson area generally has higher CO readings in the winter months due to stagnant air conditions in the colder mornings. The CO

cannot mix due to stagnant air and tends to build up, especially near congested intersections. There were no exceedances of the NAAQS for CO in 2015. The national health standard for ambient CO specifies the 1-hour level at 35 ppm and the 8-hour level at 9 ppm. These levels cannot be exceeded more than once per year without incurring a violation of the NAAQS. The PDEQ monitors CO at five locations, and the highest 1-hour reading in 2015 was 2.2 ppm at the 22nd & Alvernon location. The highest 8-hour reading was 1.4 ppm at the Cherry & Glenn location (PDEQ 2015).

### 3.4.2 Ozone

The USEPA strengthened the ozone standard for Ozone effective December 28, 2015. The revised standard is met when the three year average of the annual fourth highest daily eight hour average ozone concentration is less than or equal to 0.070 ppm. Pima County ozone concentrations are just below the standard. Ground level ozone concentrations are the highest in the summer months due to the intense sunlight and heat. Oxides of nitrogen (NOx) and volatile organic compounds (VOCs) are the "precursor" pollutants reacting in the presence of sunlight to form ozone. In the Tucson area, ozone levels generally decline after sunset as the photochemical reactions cease. The highest ozone levels generally are not found near major intersections. Instead, they are found when precursor pollutants are released and travel, due to wind or simple dispersion, away from the area of concentration before reacting with sunlight to form ozone. The highest 8-hour average ozone level in 2015 was 0.066 ppm at the Saguaro National Park location, and there were no violations of the NAAQS for ozone in 2015 (PDEQ 2015).

### 3.4.3 Nitrogen Dioxide and Sulfur Dioxide

The PDEQ has not recorded a significant change in the levels of nitrogen dioxide and sulfur dioxide in the past 20 years. The PDEQ measures nitrogen dioxide at the Children's Park and 22nd & Craycroft. Nitrogen dioxide levels remain low during the summer but act as a precursor to ozone formation, most noticeably during wintertime temperature inversions. Nitrogen dioxide is a contributing factor to urban haze—the "brown cloud," which limits visibility in the Tucson basin. There were no exceedances of nitrogen dioxide in 2015. The PDEQ also measures sulfur dioxide at the Children's Park. Tucson has no significant sources of sulfur dioxide, and the levels of sulfur dioxide remain extremely low (PDEQ 2015).

### 3.4.4 Particulate Matter ($PM_{10}$ and $PM_{2.5}$)

Particulate matter with an aerodynamic diameter of 10 microns or less is referred to $PM_{10}$ and particulate matter with an aerodynamic diameter of 2.5 microns or less is referred to $PM_{2.5}$. Particulate matter is a health concern because the particles are able to pass through the protective filtration system of the body and enter the lungs when inhaled.

Particulate matter concentrations are often higher near unpaved roads, during localized activities such as construction, during extended dry periods, and when strong winds are present. Pima County violated the $PM_{10}$ standard in 1999 with four recorded exceedance at the Orange Grove location. High winds and unusually long periods without rain are considered factors contributing to the high particulate readings. A Natural Events Action Plan (NEAP) was submitted to ADEQ and the USEPA, and a resulting ordinance was adopted in December 2002. The NEAP included measures to minimize contributing controllable sources using the Best Available Control Measures, increased enforcement and education to help protect public health and welfare on days with high levels of $PM_{10}$. Pima County currently follows the Exceptional Events Rule instituted by the USEPA in November 2008 for exceedances of the standard. Pima County will issue a particulate matter advisory to the public when there are elevated levels recorded, and one advisory was issued in 2015 (PDEQ 2015).

Particulate matter 2.5 microns or smaller travels deeper into the lungs and can be more harmful than $PM_{10}$. Also, $PM_{2.5}$ can be composed of toxic substances such as metals and organic compounds and has been linked to health problems including respiratory and heart problems, as well as contributing to poor visibility and urban haze. There have been no exceedances of $PM_{2.5}$ at the Rose Elementary location (PDEQ 2015).

### 3.4.5 Lead

In October 2008, the USEPA mad the lead standard more stringent. Research and technology has revealed an adverse health effect occurs at much lower levels of lead in blood than previously thought, and children are particularly vulnerable to the effects of lead. According to the 2005 National Air Emissions Inventory from the USEPA, Pima County has no sources of lead of one tone or more. Therefore, Pima County is required to perform only area monitoring at the Children's Park location (PDEQ 2015).

### 3.4.6 Base Air Emissions

Emissions of regulated air pollutants at DMAFB are generated by a wide variety of industrial and commercial activities and equipment. Training exercises and other activities associated with aircraft refueling and maintenance comprises the greatest portion of air pollutant emissions from the base. Emission sources can be broadly categorized as mobile sources, non-road engines, or stationary sources. Mobile sources include aircraft, highway vehicles, and off-road vehicles, while non-road sources include aerospace ground equipment, portable (trailer mounted) generators, welders, and grounds-maintenance equipment. Activities and energy consumption of government-owned vehicles are tracked for the purpose of recording progress toward energy use reduction goals. However, because mobile sources and non-road engines are not regulated under the CAA or the State of Arizona, criteria pollutant emissions from these sources were not included in the 2010 base-wide emissions totals. Mission-related stationary sources include jet engine test cells, fuel storage and distribution equipment, corrosion control facilities, fuel cell maintenance activities, solvent cleaning, and abrasive cleaning. Non-mission or support-related stationary sources of air emissions include boilers and other external combustion devices, emergency generators, heaters, and gasoline service stations. Other support-related emissions sources include soil vapor remediation, utilities, woodworking, welding, and surface coating activities by the 355th Civil Engineering Squadron (355 CES). Table 3.4-1 below summarizes the results of an air pollution emissions inventory for stationary sources at DMAFB for calendar year (CY) 2010 (Davis-Monthan AFB 2010).

**Table 3-4.1. Summary of Air Pollutant Emissions from Stationary Sources at DMAFB**

| Regulated Pollutant | CY2010 Actual Emissions (tons per year) | Potential Emissions (tons per year) |
|---|---|---|
| **Criteria Pollutants** | | |
| Volatile Organic Compounds | 13.8 | 80.4 |
| Carbon Monoxide | 27.3 | 110 |
| Nitrogen Dioxide | 35.9 | 125 |
| Particulate Matter <10mm | 5.44 | 15.9 |
| Sulfur Oxides | 1.67 | 14 |
| **Hazardous Air Pollutants (HAPs)** | | |
| Methyl Isobutyl Ketone | 0.383 | 0.796 |
| Xylene (mixed isomers) | 0.372 | 0.994 |
| Toluene | 0.186 | 1.45 |
| Formaldehyde | 0.239 | 2.4 |
| Hexane | 0.166 | 0.552 |
| Ethylene Glycol | 0.16 | 0.745 |
| All Other HAPs | 0.705 | 6.13 |

Davis-Monthan AFB operates under Hazardous Air Pollutants Permit Number 1701, which contains voluntary limits on activity emissions for all major types of hazardous air pollutants (HAPs) on the Base. The permit allows DMAFB to be categorized as a *Synthetic Minor* source of HAPs, and the emission thresholds in the permit allow the Base to avoid the operational constraints and emission control requirements associated with the federal Aerospace National Emission Standards for Hazardous Air Pollutants (NESHAPs). Since the permit was issued, the HAP emissions have been less than half of the permitted levels, leaving substantial operating flexibility under the thresholds for future changes in mission and increases in activities, which may emit air pollutants (Davis-Monthan AFB 2009a).

## 3.5 Climate Change

Climate change refers to any significant change in the measures of climate lasting for an extended period of time and includes major changes in temperature, precipitation, or wind patterns occurring over several decades or longer. Over the past century, human activities have released large amounts of greenhouse gases (GHGs) into the atmosphere. Greenhouse gases act like a blanket around Earth, trapping energy in the atmosphere and causing it to warm. This phenomenon is called the *greenhouse effect* and is natural and necessary to support life on Earth. However, the buildup of GHGs can change the climate of the Earth and result in dangerous effects to human health and welfare and to ecosystems. The primary sources of GHG emissions in the US are electricity production, transportation, industry, commercial and residential, agriculture, and land use and forestry (USEPA 2016e).

### 3.5.1 Impacts on Water Resources of the Southwest United States

A reliable water supply is crucial for sustaining the people, agriculture, energy production, and ecosystems in the dry region of the SW. The SW relies on the slow melt of mountain snowpack throughout the spring and summer, when water demands are highest. Snowpack helps keep the ground and soil moist by covering it longer into the spring and summer, which delays the onset of the fire season and influences the prevalence and severity of wildfires. Increasing temperatures will increase evaporation, causing river-flow reductions and dwindling reservoirs. Rapid population growth will increase the competition for water resources across sectors, states, tribes, and even between the US and Mexico. Climate change will likely stress groundwater-based systems and result in decreased groundwater recharge (USEPA 2016e).

### 3.5.2 Impacts on Native Americans of the Southwest United States

The SW is home to 182 federally recognized Native American tribes and communities. These communities face some of the highest poverty rates in the nation and often lack adequate food, infrastructure, transportation and access to health and community services. Some communities, including the Navajo Nation, are already experiencing drought impacts. Some shallow wells have run dry and have reduced drinking water supplies. There have been reported losses of agricultural crops and livestock, as well as, important medicinal and cultural plants and animals. As climate change impacts worsen, Native American populations will likely be limited in their ability to respond to increasing hardships, making them especially vulnerable (USEPA 2016e).

### 3.5.3 Impacts on Human Health of the Southwest United States

In the SW, more than 90% of the population lives in cities, the highest percentage of any US region. Pavement and buildings retain heat creating urban heat islands making cities warmer than surrounding areas causing residents to be more vulnerable to heat-related illnesses. Heat stress is the leading cause of weather-related death in the SW, with a greater number of deaths expected as heat waves increase in number, length, and intensity. Changes in the climate affect the air quality both indoors and outdoors. Warmer temperatures and shifting weather patterns can worsen air quality, which can lead to asthma attacks and other respiratory and cardiovascular health effects (USEPA 2016e).

### 3.5.4 Greenhouse Gas Emissions and the Effects of Climate Change

The CEQ released final guidance for Federal agencies on how to consider the impacts of their actions on global climate change in NEPA reviews. The final guidance provides a framework for agencies to consider both the effects of a proposed action on climate change, as indicated by its estimated GHG emissions, and the effects of climate change on a proposed action. The final guidance applies to all types of proposed Federal agency actions subject to NEPA analysis and guides agencies on how to address the GHG emissions from Federal actions and the effects of climate change on their proposed actions within the existing NEPA regulatory framework

Direct GHG emissions resulting from the Proposed Action are discussed in Section 4.5 of this EA.

## 3.6 NOISE

Noise is unwanted sound, which interferes with normal activities or otherwise diminishes the quality of the environment. Noise can be intermittent or continuous, steady or impulsive, stationary or transient. Stationary sources are normally related to specific land uses, such as housing tracts or industrial plants. Transient noise sources move through the environment, either along established paths (e.g., highways, railroads, airports) or randomly. Responses to noise vary widely as a result of the type of noise and the characteristics of the sound source, as well as the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., person, animal).

The physical characteristics of noise, or sound, include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves traveling through a medium, like air, and is sensed by the eardrum. This may be likened to the ripples produced in water when a stone is dropped into it. As the acoustic energy increases, the intensity or amplitude of these pressure waves increase, and the ear senses louder noise. The unit used to measure the intensity of sound is the decibel (dB). Sound intensity varies widely (from a soft whisper to a jet engine), and different sounds contain different frequencies. Sound levels are easily measured, but the physical response to sound complicates the analysis of its effect on people. People judge the relative magnitude of sound sensation by subjective terms such as “loudness” or “noisiness.”

Noise (sound) is measured in units of sound pressure called decibels (dB). Decibels are measured on a logarithmic scale: a small change in the number of decibels indicates a huge change in the amount of noise and the potential damage to a person's hearing. The decibel scale is convenient because it compresses sound pressures important to human hearing into a manageable scale. By definition, 0 dB is set as the reference sound pressure (20 micropascals at 1,000 Hz). At the upper end of human hearing, noise causes pain, which occurs at sound pressures of about 10 million times the threshold of hearing. On the decibel scale, the threshold of pain occurs at 140 dB. This range of 0 dB to 140 dB is not the entire range of sound, but is the range relevant to human hearing. Figure 3.6-1 below lists typical sound levels (OHSA 2016).

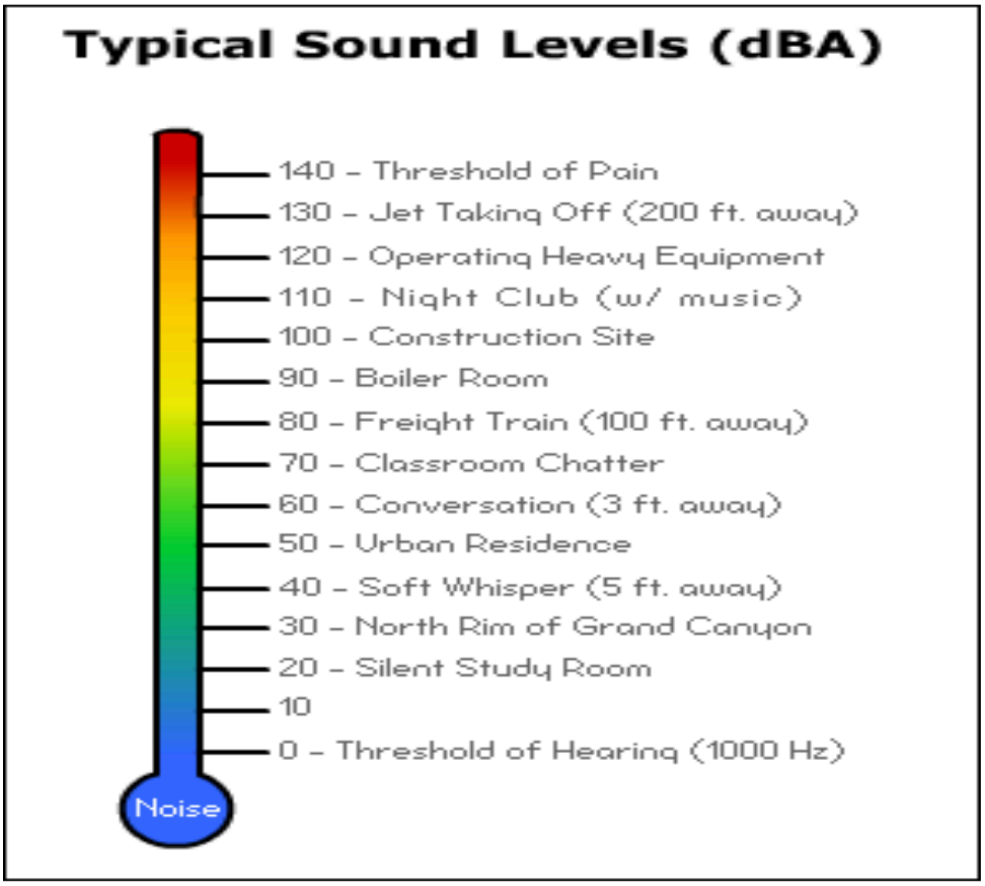



**Figure 3.6-1. Typical Decibel Levels**

The word "metric" is used to describe a standard of measurement. As used in environmental noise analysis, many different types of noise metrics exist. Each metric has a different physical meaning or interpretation, and researchers attempting to represent the effects of environmental noise developed each metric. The day-night average sound level (DNL) was developed to evaluate the total daily community noise environment and is the average A-weighted acoustical energy for a 24-hour period with a 10 dB upward adjustment added to the nighttime levels (10:00 p.m. to 7:00 a.m.). This adjustment is an effort to account for the increased sensitivity of most people to noise in the quiet nighttime hours. The day-night average sound level has been adopted by federal agencies including the USEPA, the Federal Aviation Administration, and the Department of Housing and Urban Development as the accepted unit for quantifying human annoyance to general environmental noise.

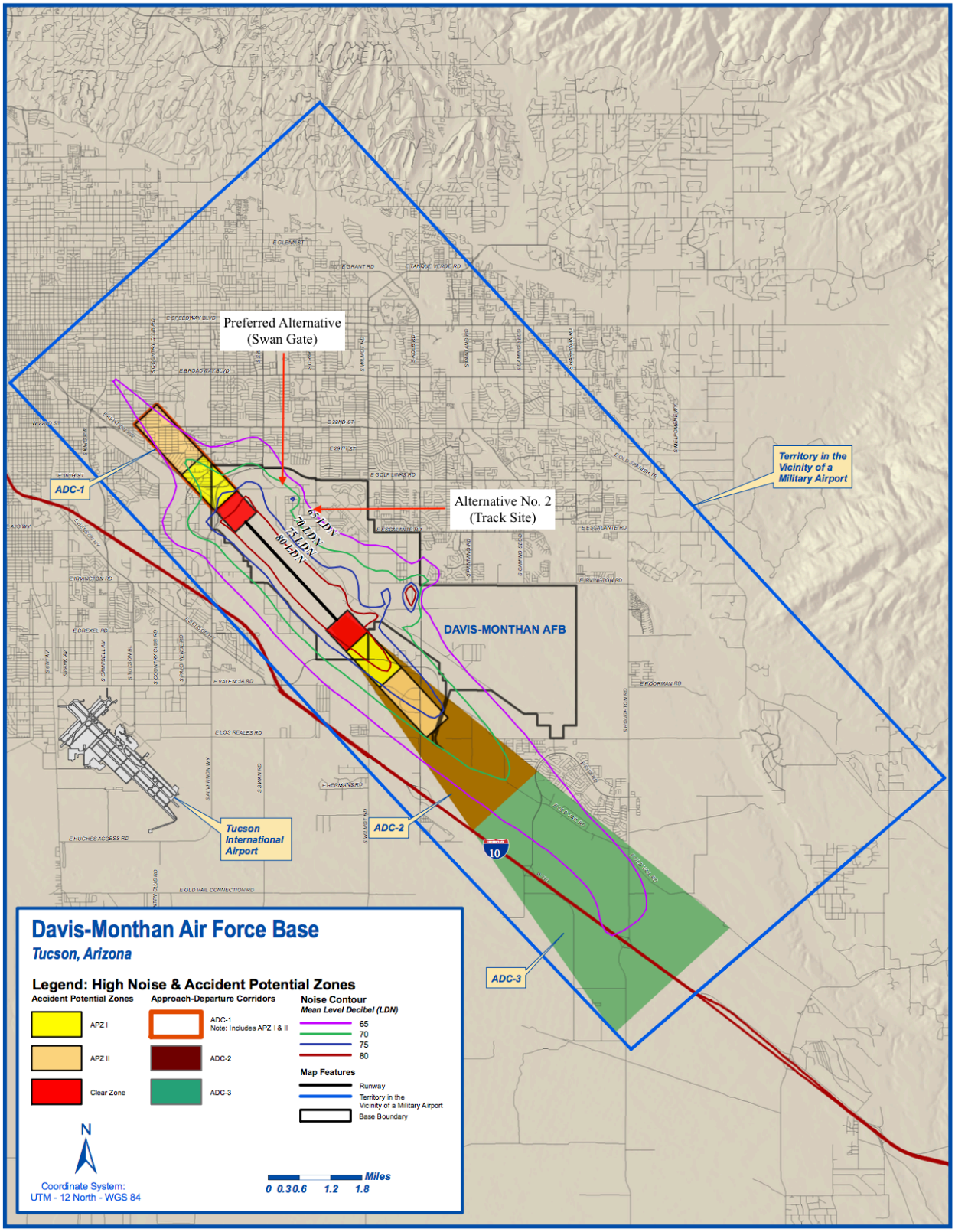
Noise associated with activities at DMAFB is characteristic of noises associated with most Air

Force installations with a flying mission. During periods of no aircraft activity, noise results primarily from maintenance and shop activities, ground traffic movement, explosives detonation, occasional construction, and similar sources. The resultant noise is almost entirely restricted to the DMAFB and is comparable to noise levels in adjacent community areas. Due to airfield operations, existing noise levels are typical of an urban residential area near a major airport. Land use guidelines identified by the Federal Interagency Committee on Urban Noise are used to determine compatible levels of noise exposure for various types of land use surrounding airports. Sixty-five to greater than 85 dB (DNL) noise contours are frequently used to help determine compatibility of aircraft operations with local land use. Figure 3.6-2 at the end of this Section depicts the baseline DNL 65 to 85 dB noise contours in 5 dB increments surrounding the DMAFB airfield. Table 3.6-1 below presents the baseline land acreage exposed to noise levels greater than 65 dB (DNL) at DMAFB.

**Table 3.6-1. Noise Contour Acreage, Baseline Conditions**

| Noise Contour (DNL) | Acres |
|---|---|
| 65–70 dB | 3,506 |
| 70–75 dB | 1,293 |
| 75–80 dB | 642 |
| 80+ dB | 564 |
| **TOTAL** | **6,005** |

Source: Davis-Monthan AFB 2012




Source: Arizona Department of Real Estate

**Figure 3.6-2. Noise Contours at Davis-Monthan Air Force Base**

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## 3.7 LAND USE AND VISUAL RESOURCES

Land use is the classification of either natural or human-modified activities occurring at a given location. Natural land use includes rangeland and other open or undeveloped areas. Human-modified land use classifications include residential, commercial, industrial, airfield, recreational, and other developed areas. Land use is regulated by management plans, policies, and regulations determining the type and extent of land use allowable in specific areas and protection specially designated for environmentally sensitive areas. Visual resources consist of the natural elements (e.g., vegetation, water bodies, mountains) and the man-made structures which typically make up the viewing environment. Visual resources are reviewed to determine the compatibility of construction projects within a surrounding environment.

### 3.7.1 Land Use

Davis-Monthan AFB occupies 10,587 acres, of which approximately 2,200 acres are developed or otherwise improved, approximately 3,500 acres are semi-improved, and approximately 4,800 acres are unimproved. Acreage is constantly subject to change due to development and mission changes. An additional 274 acres are under easement to, and maintained by, Pima County (Davis-Monthan 2016a).

Several entities, including the City of Tucson, the State of Arizona, the federal government, as well as private landowners, have ownership of the lands comprising the Base. The City of Tucson deeded a large portion of land to DMAFB in 1948 with a clause stating land ownership would revert to the City of Tucson, if the federal government ceases using the land for military purposes. Two other portions of land are leased to DMAFB by the City of Tucson with the lease terms lasting until the Year 2052. Overall, the City of Tucson owns approximately 4,349 acres, and the Air Force owns 5,074 acres. The State of Arizona owns 133 acres, and private landowners own 99 acres, which are leased to DMAFB. The remaining 958 acres are considered public domain (Davis-Monthan AFB 2012).

Tucson is one of the most rapidly growing metropolitan areas in the U.S. When originally constructed, the Base was located several miles from the Tucson urbanized area. However, development associated with the city has expanded in recent decades to surround DMAFB on

most sides, with the most highly developed areas located immediately north and west. Land uses adjacent to the north side are primarily suburban residential, with a mix of office, retail, and business services. Land uses to the east and south comprise primarily undeveloped rangeland, along with pockets of planned mixed uses including light industrial, scientific and research, and single- family residential subdivisions. Land uses to the west comprise residential, office retail, business services, and light industrial. Encroachment is a primary land use concern at DMAFB as 3,139 acres outside of DMAFB are considered to be affected by DMAFB operations, with 471 acres considered to be incompatible with DMAFB aircraft operations. The primary conflicts between DMAFB operations and off-base land uses are safety risks related to military over flights and noise exposure (Arizona Department of Commerce 2004).

Twelve land-use categories currently exist at DMAFB (see Table 3.7-1) and are depicted in Figure 3.7-1 at the end of this Section. As shown in Table 3.7-1, Open Space is the most prevalent land use type on base, followed by Industrial and Airfield uses, respectively (Davis-Monthan AFB 2012).

**Table 3.7-1. Land Use Categories at Davis-Monthan AFB**

| Land Use Category | Acres | Example |
|---|---|---|
| Airfield | 1,453 | Runway, overruns, taxiways, aprons |
| Aircraft Operations and Maintenance | 444 | Hangars, maintenance shops, aircrew facilities, etc. |
| Industrial | 3,470 | Supply, CE facilities, vehicle maintenance facilities, etc. |
| Administrative | 85 | Headquarters facilities, base support, security, etc. |
| Community Commercial | 68 | AAFES, commissary, credit union, dining hal, etc. |
| Community Services | 31 | Schools, post office, library, chapel, etc. |
| Medical | 31 | Health care center, dental clinic, veterinarian facility, etc. |
| Accompanied Housing | 291 | Family housing, temporary housing, trailer courts |
| Unaccompanied Housing | 30 | Dormitories, visiting officers quarters, visiting Airman quarters |
| Outdoor Recreation | 332 | Golf course, swimming pool, playing fields, etc. |
| Open Spaces | 4.209 | Conservation areas, safety clearance zones, etc |
| Water | 13 | Storm drainage collection ponds |

In order to address land use conflicts related to the encroachment of urban development adjacent to DMAFB, the *Davis-Monthan Air Force Base/Tucson/Pima County Joint Land Use Study* was completed in February of 2004. This study was completed as a collaborative effort between the

DMAFB and local agencies including the City of Tucson and Pima County, which have jurisdiction over land use in the vicinity of the Base. The purpose of the study was to protect the ability of DMAFB to continue its military flying mission (and the associated economic benefits derived by the local community) from surrounding development, while continuing to increase economic diversity in the area surrounding DMAFB in a manner consistent with the DMAFB mission. Among the primary goals of this study were (Arizona Department of Commerce 2004)

- Assess existing plans and studies to gather data and data needs, and identify areas of consistency and conflict in these documents as they relate to addressing encroachment of the Base;
- Determine which land uses are compatible, acceptable, and feasible with the constraints presented by the Base, including high-noise zones, APZs, etc.; and
- Prepare an implementation plan to prevent urban encroachment impacting the Base's mission.

The Pima County Planning and Zoning Commission passed a major plan amendment in 2004 to implement the Joint Land Use Study and associated changes to zoning and planned land uses in the vicinity of DMAFB. The Tucson Working Group and Policy Advisory Committee and the DMAFB Tucson Joint Land Use Study Advisory Committee identify resolutions to possible land use compatibility issues associated with DMAFB. Residents, landowners, business owners, and developers, along with representatives from the DoD Office of Economic Adjustment, the Arizona Department of Commerce, the Arizona State Land Department, the University of Arizona, DMAFB, Pima County, the City of Tucson, and the Tucson Chamber of Commerce meet to discuss compatible noise and safety land use criteria in the vicinity of DMAFB (Davis-Monthan AFB 2009a).

### 3.7.2 Visual Resources

The visual character of DMAFB features a mixture of architectural styles and varying degrees of landscaping, with little uniformity. The varying architectural styles of buildings on DMAFB include split-block, southwestern, and utilitarian, and the style generally depends on when the building was constructed. A common theme of building exteriors throughout the Base is sand-colored paint accented with darker shades. Davis-Monthan AFB landscaping ranges from areas highly landscaped to areas generally lacking any landscaping (Davis-Monthan AFB 2009a).

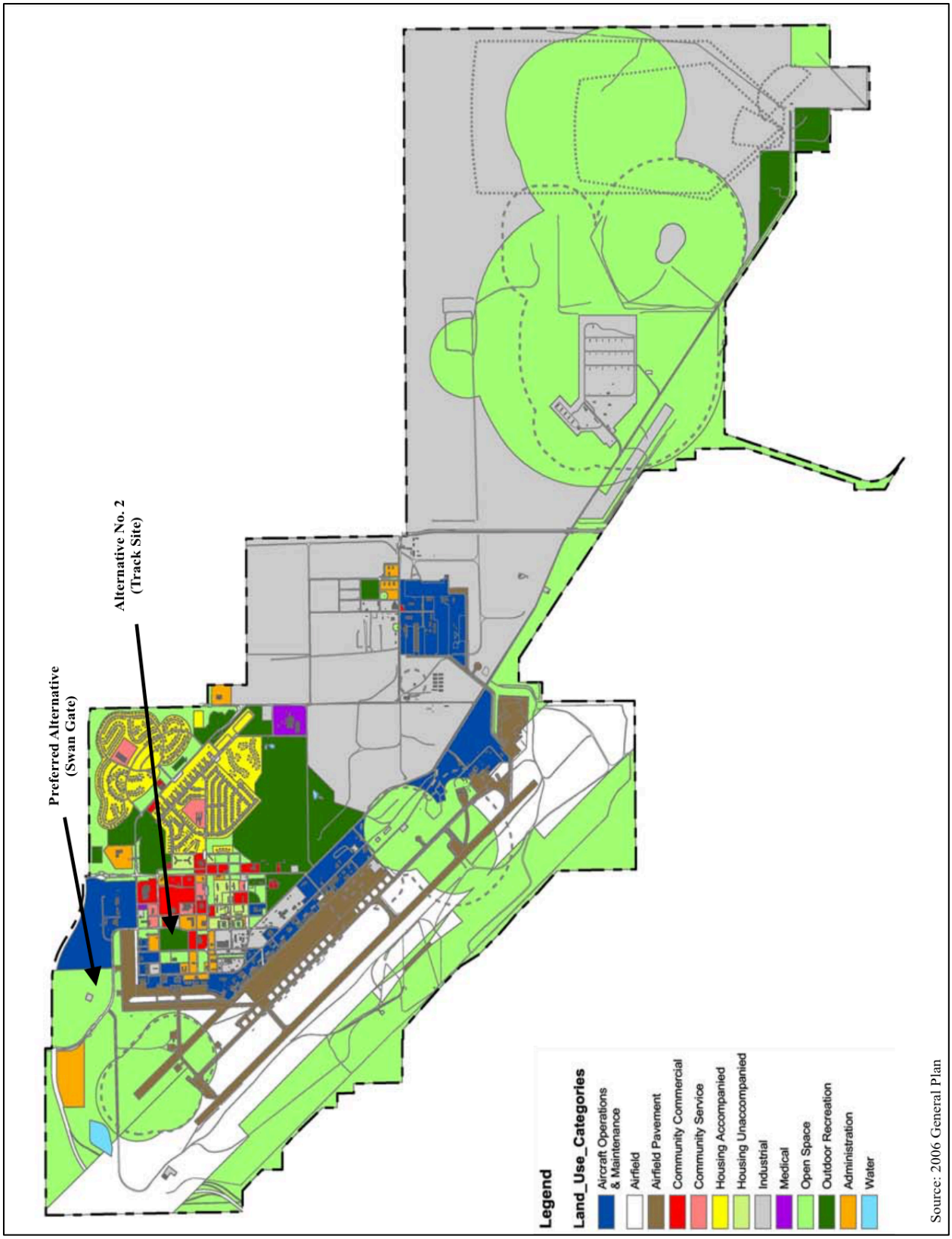


**Figure 3.7-1. Land Use Categories at Davis-Monthan Air Force Base**

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## 3.8 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICES

Socioeconomic resources are defined as the basic attributes associated with the human environment, particularly population and economic activity. Population is described by the change in magnitude, characteristics, and distribution of people. Economic activity is typically composed of employment distribution, personal income, and business growth. Any impact on these two fundamental socioeconomic indicators can have ramifications for secondary considerations, like housing availability and public service provision.

Environmental justice is the fair treatment of all people regardless of race, color, national origin, or income, and no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, tribal, and local programs and policies. Children are also considered under environmental justice to ensure they do not suffer disproportionately from environmental health and safety risks.

### 3.8.1 Population and Employment

The populations of Arizona and Pima County have been steadily increasing over the past two plus decades by approximately 46 percent and 34 percent, respectively (see Table 3.8-1). The estimated population of Pima County as of 01 July 2016 was 1,010,025, which includes the Tucson metropolitan area, DMAFB, and outlying unincorporated areas. The military population at DMAFB is approximately 7,500 personnel (Davis-Monthan AFB 2015).

**Table 3.8-1. Population Trends for Arizona and Pima County**

| Area | 1990 | 2000 | 2010 | 2015 (as of Jul 1) | Percent Change (1990–2015) |
|---|---|---|---|---|---|
| Pima County | 666,880 | 843,746 | 980,263 | 1,010,025 | 34% |
| Arizona | 3,665,228 | 5,130,632 | 6,392,017 | 6,828,065 | 46% |
| US | 248,709,873 | 281,421,906 | 308,745,538 | 323,889,854 | 23% |

Source: US Census Bureau 2015

According to the 2014 American Community Survey, Economic Characteristics, the "Educational services, and health care and social assistance" industry employed the largest percentage of the civilian population over 16 years of age in both Arizona (22.3%) and Pima

County (14.0). The second largest employment industry in Pima County was "retail trade" at 11.7 percent (US Census Bureau 2014).

Davis-Monthan AFB employed approximately 7,500 military and 3,100 civilian workers with a combined payroll of $597 million in fiscal year (FY) 2015. Also, the DMAFB combined operations and maintenance outlays totaled more than $199 million. Additionally, there were approximately 4,600 indirect jobs created by DMAFB with an estimated annual dollar value of $196 million. In addition to the above listed payrolls, there were approximately 19,500 military retirees residing in the Tucson metropolitan area during FY2015 amounting a yearly income of over $522 million. The total economic impact of DMAFB during FY2015 was approximately $1.5 billion (Davis-Monthan AFB 2015).

### 3.8.2 Environmental Justice

In order to present a thorough environmental justice evaluation, particular attention is given to the distribution of race, poverty, and legal (under age 18) status. The comparative statistics for race identification in Pima County are presented in Table 3.8-2 (US Census Bureau 2015).

**Table 3.8-2. Profile of Demographic Characteristics, Year 2015**

| Race | Pima County | Arizona | US |
|---|---|---|---|
| White Alone | 85.3% | 83.5% | 77.1% |
| African American alone | 4.1% | 4.8% | 13.3% |
| American Indian & Alaskan Native Alone | 4.3% | 5.3% | 1.2% |
| Asian Alone | 3.2% | 3.4% | 5.6% |
| Native Hawaiian & Other Pacific Islander | 0.2% | 0.3% | 0.2% |
| Two or More Races | 2.9% | 2.7% | 2.6% |
| Hispanic or Latino | 36.4% | 30.7% | 17.6% |
| White Alone not Hispanic or Latino | 52.9% | 55.8% | 61.6% |

The geographic comparison areas have relatively the same percent of persons under age 18, as seen in Table 3.8-3 on the next page. Individual poverty rates are greater than the national level (see Table 3.8-4 on the next page). The per capita income in Pima County for the period of 2010–2014 was $25,524, while the median household income for the same period was $46,233

(US Census Bureau 2015).

**Table 3.8-3. Persons Under Age 18, Year 2015**

| Geographic Area | Percent Under Age 18 |
|---|---|
| Pima County | 21.6% |
| Arizona | 23.8% |
| US | 22.9% |

**Table 3.8-4. Individuals in Poverty, Year 2015**

| Geographic Area | Percent Individuals |
|---|---|
| Pima County | 18.7% |
| Arizona | 17.4% |
| US | 13.5% |

## 3.9 CULTURAL RESOURCES

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural resources, and traditional resources. Archaeological resources are locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles).

Historic architectural resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Traditional resources are associated with cultural practices and beliefs of a living community rooted in its history and are important in maintaining the continuing cultural identity of the community. These resources are evaluated for their significance and may be determined eligible for listing based on criteria identified in the National Historic Preservation Act; cultural resources are called "historic properties" if they are determined to be eligible for listing or are already listed in the NRHP.

### 3.9.1 Historical Setting

The Tucson Basin was likely first inhabited approximately 12,000 years ago when the climate of the American southwest was cooler and moister than today. Many of the basins in the southwest were occupied by shallow lakes and wetlands and supported a variety of wildlife, such as birds, mammoth, musk ox, giant beaver, mastodon, and sloth. The first human inhabitants are believed to have been big game hunters living around the edges of the wetlands who probably

supplemented their diet by gathering various plants. As the climate gradually became warmer and drier, the vegetation in the Tucson Basin came to resemble the conditions of today. People continued to rely on hunting smaller game, but also used a wide range of plant resources as indicated by a marked increase in ground stone processing tools. Eventually some groups adopted the cultivation of domesticated plants and became less mobile as they relied increasingly on agriculture, particularly maize production. People developed sophisticated irrigation technologies, elaborately decorated ceramics, and solar calendars. They created social and political systems to manage the higher population densities associated with a successful agriculture-based economy. The Hohokam culture of the Tucson Basin had large population centers, agricultural irrigation, ball courts, and a highly developed ceramic tradition. Toward the end of the 1200s, a major drought occurred throughout the southwest. By the mid 1400s, all major Hohokam village locations were abandoned, and areas continuously occupied for 10,000 years were vacated (Davis-Monthan AFB 2012).

In 1690, Spanish explorers recorded contact with the Piman-speaking peoples of the Gila and Salt Rivers. Spaniards were the first Europeans to make contact with the Tohono O'odham people (formerly known as the Papago). The Jesuits under Father Eusebio Francisco Kino established a series of missions for them in what is now southern Arizona. In the early 1800s, the Tohono O'odham began moving into the Tucson Basin. Today, the Tohono O'odham Nation covers more than 2.8 million acres in the Sonoran Desert, including an Industrial Park near Tucson and San Xavier Reservation, which encompasses 71,095 acres just south of Tucson (Davis-Monthan AFB 2012).

The Pascua Yaqui people originally lived in southern Sonora, Mexico, where they farmed and hunted. After the Mexican War of Independence in 1821, the Yaqui gradually moved northward into Arizona. The Yaqui village of Old Pascua was located on the outskirts of Tucson. The village of New Pascua, the seat of Yaqui tribal government, was established after acquisition of reservation land in 1978 (Davis-Monthan AFB 2012).

The Tucson Presidio was established in 1775, and Tucson became part of Mexico in 1821. After the war between the U.S. and Mexico in 1846, most of New Mexico and Arizona was ceded to

the US American military forts were established by the early 1860s to defend routes of travel through the region. Cattle ranching began after 1865, with American ranchers establishing extensive operations during the 1880s. Most settlement occurred after 1882 and the arrival of the Southern Pacific Railroad. Ranching continued to be important into the 20th century (Davis-Monthan AFB 2012).

Tucson's aviation history began with the establishment of the nation's first municipally owned airfield in 1919 on what is now the Tucson Rodeo Grounds. Charles Lindbergh flew his *Spirit of St. Louis* to Tucson to dedicate Davis-Monthan Field in 1927. The field was named for two World War I pilots killed in aviation accidents. Standard Airlines (now American Airlines) began air service to Tucson in 1928. A year later the Army began negotiations with the City of Tucson regarding the construction of an air base. After nearly 12 years and a series of improvements to the facility, the Base was officially activated in 1941. During World War II, DMAFB served as a training location for medium and heavy bomber operations. After World War II, DMAFB became the final resting place of decommissioned B-29 (Super Fortress) long-range heavy bombers and C-47 (Gooney Bird) transport aircraft, among others due to the arid climate. Today, the facility contains more than 5,000 aircraft, providing a stockpile of rare parts for airframes. Davis-Monthan Field was officially renamed DMAFB in 1948 shortly after it was placed under the jurisdiction of the Strategic Air Command. Davis-Monthan AFB was also used throughout the Cold War Period (1946-1989) for various support functions and still contains structures and facilities associated with the past uses (Davis-Monthan AFB 2012).

### 3.9.2 Identified Cultural Resources

The only NRHP-listed property associated with DMAFB is the Titan II Museum, Missile Site 571-7, which is maintained by the Pima Air and Space Museum and is located south of Tucson off the Base in Green Valley, Arizona. Once part of a 54-missile network on constant alert throughout the Cold War Period, the missile site is the last remaining Titan facility. The property was included on the NRHP in 1992 and was listed as a National Historic Landmark in 1994 (Davis-Monthan AFB 2012). The Proposed Action preferred alternative location (Swan Gate) is not located within the area of the missile site.

Archaeological surveys at DMAFB began in the 1980s. A survey of 4,675 semi-improved and

unimproved acres at the Base took place in 1993. The area surveyed represents approximately 45 percent of the total Base acreage and nearly 66 percent of its undeveloped areas. The results of the 1993 survey indicated a low probability of discovering subsurface deposits in the western portion of the Base or in previously developed areas. The eastern portion of the Base, which is less developed, has a higher potential to contain subsurface deposits, and all of this area was surveyed, resulting in recordation of eight archaeological sites and 139 isolated artifacts. Only one of the recorded sites (AZ BB:13:392) was determined to be eligible for listing in the NRHP. This site has been completely excavated since the survey and is no longer eligible (Davis-Monthan AFB 2012).

An inventory of Base facilities in 2003 identified 474 facilities more than 50 years old, but some of these facilities have been demolished since the inventory. A more recent inventory identified 328 facilities currently more than 50 years old (Davis-Monthan AFB 2012).

Two noteworthy facilities at DMAFB are associated with the Cold War Era: a fighter alert facility (Building 128) and a ground-launched cruise missile headquarters (Building 70). In addition, Building 8030, the Heritage Hangar, was built in 1932 and is the oldest historic building on DMAFB. These facilities were recommended for stewardship and potential NRHP listing. Facilities having not been formally evaluated and are more than 50 years old are treated as eligible for inclusion in the NRHP until they are determined ineligible (Davis-Monthan AFB 2012). The Proposed Action preferred alternative location (Swan Gate) is not located within the area of these facilities.

No traditional cultural properties or other traditional resources have been identified at DMAFB. The Base maintains contact with the nearby Tohono O'odham Nation and the Pascua Yaqui Tribe, and only formally consults with the tribes on proposed actions, if requested by the tribes (Davis-Monthan AFB 2012).

## 3.10 SAFETY

The ground and explosives safety sections below consider issues involving day-to-day operations and maintenance activities of personnel at DMAFB.

### 3.10.1 Ground Safety

Day-to-day operations and maintenance activities conducted by the 355 Fighter Wing (FW) are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health requirements. The DoD stipulates certain safety restrictions on land uses in the immediate vicinity of aviation operations around military airfields. Davis-Monthan AFB has established clear zones and APZs to control development and restrict land uses around the airfield and runway. The clear zones at DMAFB are within Base boundaries; however, APZs I and II extend outside of the Base (see Figure 3.10-1 at the end of this Chapter). Despite the restrictions, 24 structures are present in the restricted zones. Three of the structures have the required waivers, nine are authorized deviations to airfield criteria, and five are exempt from waivers (Davis-Monthan AFB 2012).

The small arms firing range and skeet range are associated with Surface Danger Zones (SDZs). SDZs are areas subjected to elevated risk of direct hit or ricochet while firing is under way. In DoD guidelines, activities in SDZs are severely restricted (Davis-Monthan 2009a).

### 3.10.2 Explosives Safety

Air Force Manual 91-201, *Explosives Safety Standards*, presents the Air Force guidelines for complying with explosives safety. Explosives include ammunition, propellants (solid and liquid), pyrotechnics, explosives, warheads, explosive devices, and chemical agents and associated components presenting real or potential hazards to life, property, or the environment.

Siting requirements for munitions and ammunition storage and handling facilities are based on safety and security criteria. Air Force Manual 91-201 requires defined distances be maintained between munitions storage areas and a variety of other types of facilities. These distances, called quantity-distance (QD) arcs, are determined by the type and net explosive weight of explosive material to be stored. No inhabited facilities are allowed within the QD arcs. Each explosive material storage or handling facility has QD arcs extending outward from its sides and corners for a prescribed distance. The activities with QD arcs at DMAFB include the munitions storage area, the Explosive Ordinance Disposal (EOD) area, the alert hangar and apron, combat aircraft parking areas, hot cargo pad, aircraft explosives cargo area, the arm/de-arm aprons on the

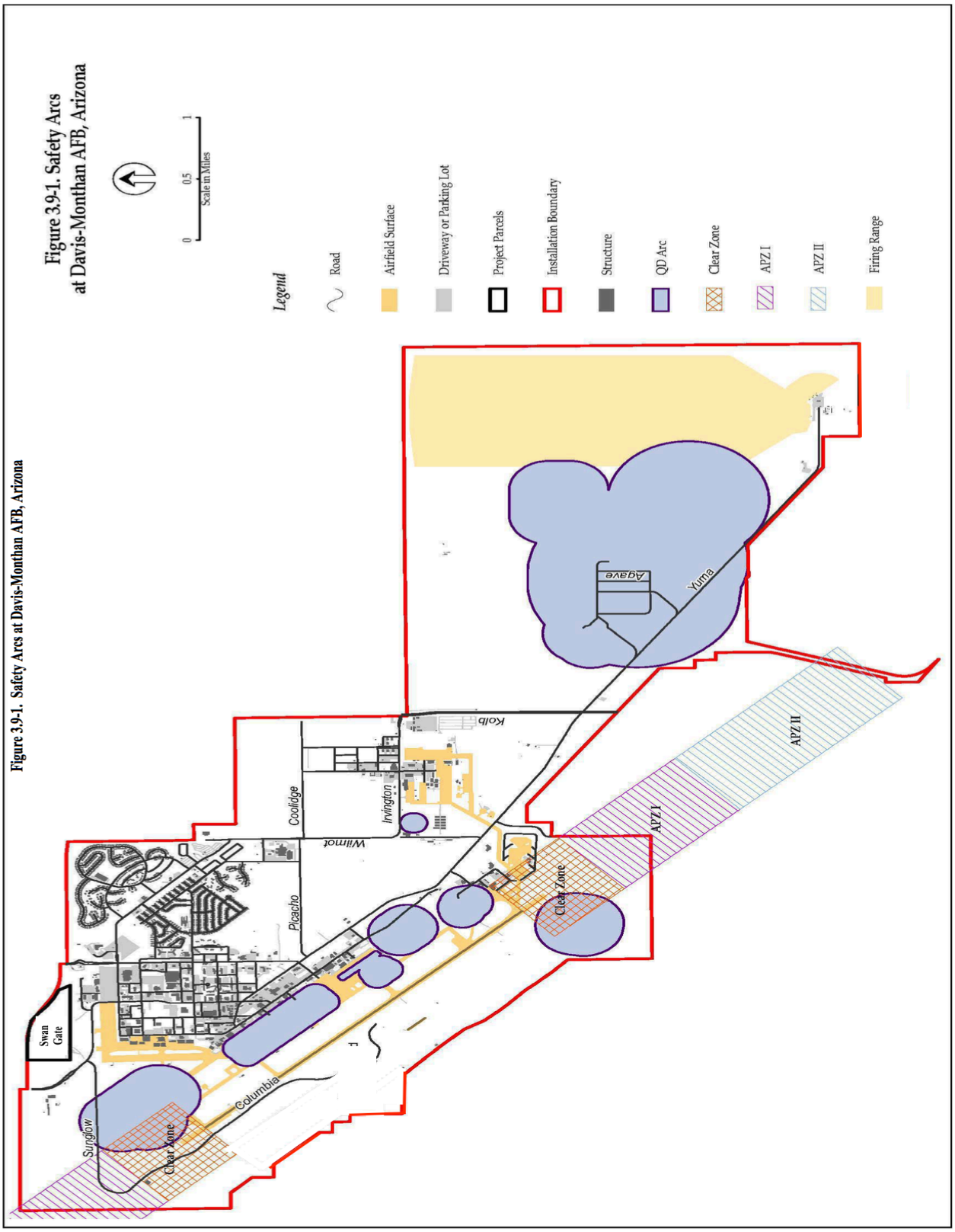
airfield, the AMARG EOD area, and the AMARG ammunition shipping/inspection/storage facilities (Davis-Monthan 2009a).

Within these QD arcs, development is either restricted or prohibited altogether in order to ensure safety of personnel and to minimize potential for damage to other facilities in the event of an accident. In addition, explosive material storage and handling facilities must be located in areas where security of the munitions can be maintained at all times. Identifying the QD arcs ensures construction does not occur within these areas. The locations of QD arcs at DMAFB are depicted in Figure 3.10-1 at the end of this Chapter.

### 3.10.3 Anti-Terrorism/Force Protection (AT/FP)

As a result of terrorist activities, the DoD and the Air Force have developed a series of AT/FP guidelines for military installations. These guidelines address a range of considerations including access to the installation, access to facilities on the installation, facility siting, exterior design, interior infrastructure design, and landscaping (DoD 2012). The intent of this siting and design guidance is to improve security, minimize fatalities, and limit damage to facilities in the event of a terrorist attack.

Many military installations, such as DMAFB, were developed before such considerations became a critical concern. Thus, under current conditions, the unit is not able to comply with all present AT/FP standards; however, as new construction occurs, it would incorporate these standards, and as facilities are modified, AT/FP standards would be incorporated to the maximum extent practicable.




Source: Davis-Monthan AFB 2009a

**Figure 3.10-1. Safety Zones at Davis-Monthan Air Force Base**

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## 3.11 SOLID AND HAZARDOUS MATERIALS AND WASTE

This section describes the affected environment associated with solid waste management, hazardous materials and wastes, storage tanks, and the Environmental Restoration Program (ERP) sites associated with the proposed construction areas.

Municipal solid waste management and compliance at Air Force installations is established in Air Force Instruction (AFI) 32-7042, *Solid and Hazardous Waste Compliance*. In general, AFI 32-7042 establishes the requirements for installations to have a solid waste management program to incorporate a solid waste management plan; procedures for handling, storage, collection and disposal of solid waste; record- keeping and reporting; and pollution prevention. AFI 32-7080, *Pollution Prevention Program*, addresses source reduction, resource recovery, and recycling of solid waste.

The terms "hazardous materials" and "hazardous waste" refer to substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA). In general, hazardous materials include substances, which may present substantial dangers to public health or the environment when released into the environment, due to quantity, concentration, or physical, chemical, or infectious characteristics. Hazardous wastes regulated under the RCRA are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes exhibiting either one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or are listed as a hazardous waste under 40 CFR Part 261.

The ERP is an Air Force program, which identifies, characterizes, and remediates environmental contamination from past activities at Air Force installations. Solid waste includes non-hazardous waste or materials, such as household waste, construction debris, or other waste not having the chemical properties or other characteristics to make it a hazardous substance.

Issues associated with hazardous material and waste typically center around waste streams; underground storage tanks (USTs); aboveground storage tanks (ASTs); and the storage,

transport, use, and disposal of pesticides, fuels, lubricants, and other industrial substances. When such materials are improperly used in any way, they can threaten the health and well being of wildlife species, habitats, and soil and water systems, as well as humans.

### 3.11.1 Solid Waste Management

Solid waste generated by residential sources and mission activities on DMAFB is removed by a licensed contractor or the City of Tucson and taken to the Los Reales Landfill, which is operated by the City of Tucson. The Los Reales Landfill is being expanded to provide disposal service for the city through 2067. In calendar year 2006, DMAFB generated 4,381 tons of solid waste and 17 tons of construction and demolition debris and diverted 2,694 tons for recycling. The Arizona Training Program at 139 buildings picks up Recyclables across the Base. The proper management and recycling or disposal of construction and demolition debris is the responsibility of construction contractors (Davis-Monthan AFB 2009a).

### 3.11.2 Hazardous Materials and Waste

Hazardous wastes are managed in accordance with the DMAFB Hazardous Waste Management Plan. Hazardous wastes are generated from a variety of functions, including aircraft, vehicle, weapons, equipment, and facility maintenance. Davis-Monthan AFB is regulated under the RCRA as a large quantity generator of hazardous waste because it generates more than 2,200 pounds of hazardous waste per month. Wastes include sealants, paints, solvents, blasting media, wastewater and sludge, petroleum products (oil, grease, gasoline, diesel, JP-8, etc.), antifreeze, batteries, fluorescent lamps, polychlorinated biphenyls, asbestos, and various other chemical process wastes.

Wastes are stored in Hazardous Waste Satellite Accumulations Areas where the waste is initially generated, then transferred to the HAZMART (Building 5227) for storage up to 90 days prior to shipment to off-site USEPA-permitted facilities for recycling, treatment, or disposal. Many types of petroleum products, solvents, antifreeze, fluorescent lamps, batteries, and dental amalgam are recycled instead of disposed.

### 3.11.3 Storage Tanks

Davis-Monthan AFB has 107 ASTs and 19 USTs (correspondence with Mr. Wakefield, 355 CES/CEIE). These tanks are used for refueling, as well as, storage of fuels and used oil. All

storage tanks at DMAFB are inspected and maintained by Civil Engineering Power Production and the Liquid Fuels Section, and the users verify the integrity and condition of the associated piping. None of the USTs are in the vicinity of the Proposed Action preferred alternative location (Swan Gate).

### 3.11.4 Asbestos

Asbestos-containing materials (ACMs) are materials containing greater than one percent asbestos. Friable, finely divided, and powdered wastes containing greater than one percent asbestos are subject to regulation. A "friable" waste is one, which can be reduced to a powder or dust under hand pressure when dry. Non-friable ACMs, such as floor tiles, are considered to be non-hazardous, except during removal or renovation, and are not subject to regulation.

An asbestos management plan provides guidance for the identification of ACMs and the management of asbestos. The 355 Civil Engineering Squadron (CES) maintains an asbestos facility register. The designs of building alteration projects and requests for self-help projects are reviewed to determine if ACMs are present in the proposed work area. ACM wastes are removed by licensed contractors and disposed of in accordance with state and federal regulations (Davis-Monthan AFB 2009b).

### 3.11.5 Environmental Restoration Program

The DoD developed the ERP to identify, investigate, and remediate potentially hazardous material disposal sites existing on DoD property prior to 1984. Six ERP sites have been identified at DMAFB (correspondence with Mr. Wakefield, 355 CES/CEIE). The *Davis-Monthan AFB Environmental Restoration Program Site Status Summaries* present a comprehensive strategy for implementing actions necessary to protect human health and the environment. This strategy integrates activities under the ERP and the associated environmental compliance programs supporting full restoration of DMAFB. The Air Combat Command (ACC) policy requires a construction waiver be obtained through the DMAFB ERP Manager for any proposed project on or near a DMAFB ERP site.

### 3.11.6 Military Munitions Response Program (MMRP)

In recent years, the management of military munitions and military ranges has come under increased regulatory and public scrutiny as evidenced by new regulations, increased enforcement

and public involvement, litigation, and range use restrictions and closures. In an effort to manage these ranges, DoD installations have begun to inventory closed, transferred, and transferring ranges to facilitate planning and implementation of associated regulations as part of their MMRP.

Davis-Monthan AFB has a rifle range and three MMRP sites (correspondences with Mr. Wakefield 355 CES/CEIE). All former range areas have potential to contain ordnance and explosive contamination. Until these areas are formally cleared, any proposed activities in them should be coordinated through the 355 Civil Engineering Squadron/Environmental Restoration Element point of contact. Training or a waiver for construction may be required.

## 3.12 INSTRASTRUCTURE

The infrastructure elements at DMAFB include transportation and utility systems, which service all areas of the Base. Transportation refers to roadway and street systems as well as parking areas. Utilities include potable water supply, wastewater collection and treatment, a storm drainage system, an electrical system, heating and cooling systems, and liquid fuels.

### 3.12.1 Transportation

Davis-Monthan AFB, located within the city limits of Tucson in Pima County, Arizona, is in close proximity to Interstate 10 (I-10), just west of the installation, and Interstate 19 (I-19), southwest of the installation. Interstate 10 provides east-west access to Phoenix, Arizona and El Paso, Texas, while I-19 connects Tucson with the Mexican border. Access to the Base includes the Main Gate Access on Craycroft Road, additional gate access off Swan, Wilmot, and Irvington Roads. The four major primary roads on DMAFB are as follows:

- Craycroft Road runs generally north/south through the main base, and provides the main entry point to the Base.
- Wilmot Road is a short artery, which connects the Wilmot Gate at the east end of the Base and provides access to the Base hospital and AMARG.
- The intersection of Sunglow Road, 5$^{th}$ Street, and Yuma Street begins at the Swan Gate and runs north/south through the Base. The Yuma Street extension of these combined arteries intersects with Craycroft Road and Picacho Street.
- Picacho Street runs east/west and connects with the Yuma Street extension and with

Wilmot Road.

The major secondary roads on the main base area include Quijota Road, Arizola Street, Comanche Street, Granite Street, Ironwood Street, First Street, and Third Street. Irvington Road, the Wilmot Road extension, Coolidge Street, and Wickenberg Street serve the AMARG area of Davis-Monthan AFB.

Valencia Road borders the south side of DMAFB from Alvernon Way to South Houghton Road. Between Alvernon Way and Kolb Road, Valencia Road is a four-lane divided road. After Kolb Road, Valencia Road becomes a two-lane road. East Golf Links Road is a divided six-lane road located along the north and northwest boundary of DMAFB.

The City of Tucson does not provide mass transit on DMAFB, although there are nearby bus stops, including service to the main gate. There are officially designated bike paths, as well as, two major pedestrian routes on Kachina and Sixth streets serving the dormitory area. Additional pedestrian paths are planned for the airman living areas.

Tucson International Airport provides air passenger service to several cities where airline hubs provide access worldwide including direct international flight service to Mexico. The airport is located approximately 10 miles from the DMAFB main gate and can be reached in approximately 15 minutes by car or by airport shuttle bus. The Military Air Passenger Terminal Building (Building 4819) and the Air Cargo Terminal (Building 4822) serves military passengers and military cargo. Additionally, east of the Air Cargo Terminal is a cargo marshaling area for cargo handling (Davis-Monthan AFB 2012).

Generally, parking is adequate on DMAFB; however, as is the case with many installations, parking at high use customer-oriented locations can be problematic. The DMAFB Commissary parking lot experiences parking problems during peak use, especially from 10:30 a.m. to 3 p.m. daily. Another area of concern is the Blanchard Golf Course. The current parking area is not adequate to handle the golfing patrons, as well as those who visit the Eagle's Nest Restaurant for breakfast and lunch (Davis-Monthan AFB 2012).

### 3.12.2 Utilities

**Potable Water.** Potable water is obtained from eight groundwater wells at DMAFB to serve the various uses at the Base. The eight wells have capacity to supply 5.8 million gallons per day (MGD). Davis-Monthan AFB also has three non-operational wells and six wells having insufficient flow to support production. Average daily demand from 2001 to 2003 ranged from 0.6 MGD to 1.78 MGD, with an average daily demand of 1.1 MGD. Demand tends to be highest in summer and early fall and can increase to as much as 2.37 MGD (Davis-Monthan AFB 2012).

Davis-Monthan AFB has two separate distribution systems—the Upper and Lower Water Supply Systems. The Upper Water Supply System supplies water to the AMARG area, the hospital, Palo Verde Village, the 41st and 43rd Squadron areas, and the munitions storage area. The Lower Water Supply System supplies the remaining areas. Water is chlorinated at the wellheads and pumped into storage tanks. The tanks include four elevated storage tanks and two ground storage tanks with an approximate capacity of 1.5 million gallons. Also, DMAFB has two 500,000-gallon raw water cut-and-cover storage tanks, which are belowground steel tanks covered by soil to resemble reservoirs. A well and a 2,000-gallon storage tank separately supply the small arms range and horse stables. Davis-Monthan AFB does not have any interconnection with the City of Tucson or other water supply source (Davis-Monthan AFB 2012).

Water supply pipelines generally follow the roads on DMAFB and provide water to all buildings and facilities housing or providing office or administrative space for people. Water supply lines are located in or near the Proposed Action alternatives, but wells and storage are not.

**Wastewater.** The Base discharges approximately 1 MGD of wastewater into the Pima County sanitary sewer system. The City of Tucson uses two major facilities to handle wastewater from the metropolitan Tucson area, which includes DMAFB. The two facilities are the Agua Nueva Water Reclamation Facility (WRF) and the Tres Rios WRF.

The DMAFB sanitary sewer collection system exits the Base in the extreme northwest corner, where it crosses Golf Links Road. Davis-Monthan AFB has five lift stations, two in the AMARG area and three along the flightline. No capacity issues with the lift stations have been identified.

However, none of the lift stations provide redundancy, and the entire sewer line is down if one station fails. The system is in need of upgrading to meet AF regulations to provide at least double redundancy. Like the water supply pipelines, wastewater collection pipelines generally follow roads and provide service to most buildings and facilities on the Base (Davis-Monthan AFB 2012).

**Storm Drainage System.** Stormwater runoff on DMAFB is managed through a storm drainage system consisting of a combination of swales, culverts, and pipes with adequate capacity to handle most flows. Davis-Monthan AFB has three large underground collector pipes: one along Fifth Street, one for the runway and apron areas, and the other beneath the northern airfield apron. The system has one retention pond on the edge of the AMARG area just south of the golf course. Generally, runoff flows toward the northwest (Davis-Monthan AFB 2012).

The storm drainage system is generally adequate for the arid climate. However, during the rainy season from July through September, storms can lead to flooding in portions of the Base. Excessive storm water flows have degraded the security grates at outfall locations where the flow exits the Base (Davis-Monthan AFB 2012).

**Electrical System.** Tucson Electric Power provides electrical service to the Base through two 46-kilovolt (kV) lines. A substation, with the capacity to handle loads of 25 megavolt-amperes, steps the power down to 13.8 kV and distributes it to eight circuits. Transformers feeding facilities step down 13.8 kV to 480 volts before reducing the load to 120/208 volts. Separate power lines enter the Base from the southwest to supply the control tower, building 8030, and Navigation Aids west of the airfield. Davis-Monthan AFB consumes approximately 100,000-megawatt hours on an annual basis (Davis-Monthan AFB 2012).

**Heating and Cooling Systems.** Natural gas is used primarily for heating facilities, space heating, hot water for the main Base and multi-family housing, and comfort heating in multi-family housing. Southwest Gas Company provides natural gas via a commercial line entering the northwest corner of the Base. The AMARG and hospital areas are supplied separately from a line entering the Base from the south. These two separate supply systems are linked at the family

campground (FAMCAMP) area and have a delivery capacity of 3.4 million cubic feet per day. Maximum consumption between 1995 and 2005 was 2.5 million cubic feet per day or approximately 74 percent of the delivery capacity (Davis-Monthan AFB 2012).

Davis-Monthan AFB does not have a central heating and cooling system for the Base. Two mini-systems supply chilled or heated and chilled air to some facilities. Chilled air is provided to the airmen's dormitories and some other facilities by a chiller facility (Building 5101). This facility is capable of producing about 1,200 tons of chilled air. Heated and chilled air is provided to the hospital by a second system (Building 401) (Davis-Monthan AFB 2012).

The chiller facility has two natural gas-fired engines coupled to centrifugal compressors connecting to two main loops currently supplying chilled air to 11 facilities, including three dormitories. The northern loop is also tied to the Fitness Center heating loop. The Fitness Center has five water-to-water heat pumps capable of producing 100 tons of chilled water for the northern chilled water loop. On the heating side, the chiller facility provides hot water year-round for the domestic hot water and pool water systems at the Fitness Center (Davis-Monthan AFB 2012).

**Liquid Fuels System.** Davis-Monthan AFB functions as a distribution center in the DoD Fuels System for all military installations in the region and receives fuel within the Defense Fuels Region - South and distributes it to other consumers, including Fort Huachuca (Army), Arizona National Guard, Yuma Proving Grounds, Sky Harbor Airport (Phoenix), and Tucson ANG at Tucson International Airport, as a Defense Fuels Support Point (Davis-Monthan AFB 2012).

Davis-Monthan AFB supports a large number of flying operations, and most of its fuel handling consists of JP-8 aviation fuel. The Base receives JP-8 via commercial pipeline and highway tanker truck. The Base receives, stores, and distributes a variety of fuels, including JP-8, DL-2 diesel fuel, BDI bio-diesel, Mogas unleaded regular, and two kinds of cryogenics fuel: liquid oxygen and liquid nitrogen (Davis-Monthan AFB 2012).

The Kinder-Morgan Pipeline routinely delivers JP-8 to one of three 60,000-barrel storage tanks.

This 6-inch pipeline has the capability to deliver 579,600 gallons per 24-hour period. In the event of pipeline failure, the storage tanks can receive 3,456,000 gallons per day via tanker truck. JP-8 can be dispensed to flightline fuel hydrants at a rate of 1,100 gallons per minute using the pumps or 450 gallons per minute using gravity flow in the event of pump failure (Davis-Monthan AFB 2012).

The flightline uses four locations as hot refueling pits; Pump House J-4 services two of these and Pump House J-3 services two. Pump Houses J-1 and J-2 are not currently active. An underground pipeline connects these four pump houses. In addition, on the West Ramp, Pump House A-2 can dispense fuel; however, it is resupplied by tanker truck. On the West Ramp, Pump House A-1 is inactive (Davis-Monthan AFB 2012).

Other features of the JP-8 fueling system include mobile units to increase the number of simultaneously fueled aircraft during surge operations, berms and a dedicated fire system for the tank farm, and a series of underground tanks at each pump house. The hush house project area is near the refueling pit locations and several fuel tanks, and the 214 RG headquarters facility project area is near a couple of fuel tanks. None of the liquid fuel tanks are in the project areas, but pipelines between pit locations may be under roads, which are part of the pavement plan (Davis-Monthan AFB 2012).

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# 4.0 ENVIRONMENTAL CONSEQUENCES

This section of the EA assesses potential environmental consequences associated with the Proposed Action and the No Action Alternative. Potential impacts are addressed in the context of the scope of the Proposed Action as described in Section 2.0 and in consideration of the potentially affected environment, as characterized in Section 3.0.

## 4.1 EARTH RESOURCES

Protection of unique geologic features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards and soil limitations are considered when evaluating impacts to earth resources. Generally, impacts can be avoided or minimized, if proper construction techniques, erosion control measures, and structural engineering designs are incorporated into project development.

Analysis of potential impacts to geologic resources typically includes identification and description of resources potentially affected, examination of the potential effects an action may have on the resource, assessment of the significance of potential impacts, and provision of mitigation measures in the event potential significant impacts are identified. Analysis of impacts to soil resources resulting from proposed activities examines the suitability of locations for proposed operations and activities. Impacts to soil resources can result from earth disturbance, which would expose soil to wind or water erosion.

### 4.1.1 Proposed Action

Under the Proposed Action, up to approximately 15 acres of surface area would be disturbed as a result of construction of the GIB and the associated infrastructure at the preferred alternative location (Swan Gate). The proposed construction activities would occur on the Mohave soils and Urban Land soil-mapping unit (Figure 3.1-1).

This soil-mapping unit is generally acceptable for construction or urban development, but some considerations for any potential limitations for soil type should be a component of any planned activities. Impacts to soil in these parcels would primarily result from ground disturbances associated with land development. The potential for soil erosion and sediment transport could be

a factor during the initial grading portion of construction due to the moderate potential for wind and water erosion.

Implementation of construction best management practices (BMPs) would be employed to minimize impacts associated with erosion. These BMPs would include, but would not be limited to, installation of silt fencing and sediment traps, application of water sprays to keep soil from becoming airborne, and re-vegetation of disturbed areas as soon as possible, as appropriate. Therefore, potential impacts to earth resources would be minimal, and no significant impacts would occur as a result of implementation of the Proposed Action.

### 4.1.2 No-Action Alternative

Under the No Action Alternative, none of the proposed construction would occur, and there would be no new impacts to earth resources. The existing conditions to the DMAFB earth resources would remain as described in Section 3.1.

## 4.2 WATER RESOURCES

Land development changes the physical, chemical, and biological conditions of water resources. When land is developed, the hydrology, or the natural cycle of water, can be altered. Impacts on hydrology can result from land clearing activities, disruption of the soil profile, loss of vegetation, introduction of pollutants, new impervious surfaces, and an increased rate or volume of runoff after major storm events. Without proper management controls, these actions can adversely impact the quality and/or quantity of water resources.

### 4.2.1 Proposed Action

The primary concerns associated with the Proposed Action include effects on water quality during construction of the proposed GIB and the conversion of existing pervious ground to impervious surfaces (e.g. parking lots). The impervious surfaces have the potential of affecting the water quality through the discharge of pollutants into surface waters. Also, the impervious surfaces have the potential of increasing the surface water runoff into the DMAFB storm drainage system, which could result in insufficient capacity and potentially lead to localized flooding.

Prior to construction, the contractor would be required to obtain coverage under the ADEQ

construction general permit (Permit No. AZG2013-001) by filing a Notice of Intent for the construction activity with ADEQ and preparing an SWPPP to manage stormwater associated with the construction activity. The SWPPP must include BMPs to minimize the potential for exposed soils or other contaminants from construction activities reaching surface waters. Also, the construction contractor should work with the DMAFB environmental office to ensure compliance with the DMAFB SWMP for pre- and post-construction activities. Adherence to the requirements of the ADEQ construction general permit and the DMAFP SWMP would minimize impacts to water resources.

Neither of the Alternatives for the Proposed Action are within the 100-year floodplain. Therefore, no impacts to the 100-year floodplain would be expected to occur as a result of implementation of the Proposed Action.

No significant impacts from the Proposed Action are expected due to the addition of impervious surfaces. The implementation of construction BMPs and adherence to both the ADEQ construction general permit and DMAFB SWMP would minimize the potential for exposed soils or other contaminants from the construction activities reaching surface waters.

### 4.2.2 No-Action Alternative

Under the No Action Alternative, construction activities would not occur, and no changes to impervious surfaces or impacts on water quality would occur. The existing conditions to the DMAFB water resources would remain as described in Section 3.2.

## 4.3 BIOLOGICAL RESOURCES

Evaluation of impacts is based upon 1) the importance (legal, commercial, recreational, ecological, or scientific) of the resource, 2) the rarity of a species or habitat regionally, 3) the sensitivity of the resource to proposed activities, and 4) the duration of the impact. Impacts to biological resources are considered to be greater if priority species or habitats are adversely affected over relatively large areas and/or disturbances cause reductions in population size or distribution of a priority species.

### 4.3.1 Proposed Action

#### 4.3.1.1 Vegetation

The construction of the GIB at the preferred location (Swan Gate) would result in disturbance of approximately 15 acres of soils and potentially vegetation. During construction, soil surfaces, to include any existing vegetation, would have to be cleared, graded, trenched, and leveled before construction of the GIB could occur. Before construction, the contractor would be required to implement both pre-construction BMPs to limit the disturbances of soils and any native plants, which may exist. A biological resources survey in December 2016 of the Swan Gate area revealed no significant impacts of concern. Therefore, implementation of the Proposed Action is not expected to result in significant impacts to vegetation.

#### 4.3.1.2 Wildlife

Construction activities associated with the Proposed Action could temporarily disturb wildlife, which may inhabit the area in and adjacent to the preferred alternative site (Swan Gate). However, the existing busy roadway and the runways located nearby generate a level of ambient activity and noise likely deterring most species. Smaller, less mobile, and fleeing resident wildlife species may be impacted as a result of construction activities; however, should mortalities occur, they would likely be isolated instances and would not result in long-term impacts to wildlife populations. Most of the wildlife species found at DMAFB are fairly common, non-native, and well adapted to rural or semi-urban settings, and these species are expected to continue to utilize the project area following project construction. A biological resources survey in December 2016 of the Swan Gate area revealed no significant impacts of concern. Therefore, implementation of the Proposed Action is not expected to cause significant impacts to wildlife species or their associated habitat.

#### 4.3.1.3 Special-Status Species

The USFWS IPaC Trust Resource Report listed seven endangered species with potential to occur at DMAFB (see Section 3.3.3). Specific steps taken to minimize impacts to sensitive species would depend on site-specific factors. Measures taken may include scheduling ground disturbance or noisy events to avoid breeding/nesting season. In some cases, individuals of sensitive species may be physically relocated to new suitable habitats. Table 4.3-1 below lists the exclusion justifications for the seven endangered species with potential to occur at DMAFB as

identified by the USFWS IPaC Trust Resource Report (SWCA 2014).

**Table 4.3-1. Exclusion Justifications for Identified Endangered Species at DMAFB**

| Species | Federal Status | General Habitat Requirements | Exclusion Justification |
|---|---|---|---|
| California Least Tern | Endangered | Forms nesting colonies on barren to sparsely vegetated areas. Nests in shallow depressions on open, sandy beaches, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, and drainage systems. Found in Maricopa, Mohave, and Pima Counties. | Unlikely to occur due to the absence of open, sandy beaches, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, and drainage systems. |
| Yellow-billed Cuckoo | Threatened | Typically found in riparian woodland vegetation (cottonwood, willow, or saltcedar) at elevations below 6,500 feet above mean sea level. Dense understory foliage appears to be an important factor in nest site selection. The highest concentrations in Arizona are along the Agua Fria, San Pedro, upper Santa Cruz, and Verde River drainages and Cienega and Sonoita Creeks. | Unlikely to occur due to the absence of riparian woodland vegetation with dense understory foliage. |
| Pima Pineapple Cactus | Endangered | Found on alluvial bajadas in sand or rocky loam soils sloped with less than 10 percent grade within desert grassland and Sonoran desertscrub at elevations between 2,800 and 3,500 feet above mean sea level (amsl). In Arizona, found in the Santa Cruz and Altar Valleys and Patagonia Mountains. | Unlikely to occur. Harris Environmental Group surveyed the preferred alternative location (Swan Gate) in December 2016 and did not discover any of the species. |
| Jaguar | Endangered | Jaguars were once prominent in southern Arizona and were found in Sonoran desertscrub up through subalpine conifer forest at elevations between 1,600 and 9,000 feet. Based on 25 historical (from 1902 to 2001) reliable and spatially accurate jaguar sighting records in Arizona, the majority of jaguars were observed in scrub grasslands (56%) and Madrean evergreen forests (20%), all were within 6.2 miles of a water source, and most occurred in moderately rugged to extremely rugged terrain. Additionally, river valleys and other drainage features likely provide travel corridors for jaguars, along with higher prey densities, cooler air, and denser vegetation than surrounding habitats. | Unlikely to occur. The Proposed Action is neither located in scrub grasslands or Madrean evergreen forests nor moderately rugged to extremely rugged terrain. |
| Lesser Long-nosed Bat | Endangered | Found in southern Arizona from the Picacho Mountains southwesterly to the Agua Dulce Mountains and southeasterly to the Galiuro and Chiricahua Mountains at elevations between 1,600 and 11,500 feet. Roosts in caves and abandoned mines where agave (*Agave* spp.), saguaro (*Carnegiea gigantea*), or organ pipe cacti (*Stenocereus thurberi*) are present. Forages at night on nectar, pollen, and fruit of columnar cacti and pollen and nectar of agaves. The foraging radius of *Leptonycteris* bats may be 30 to 60 miles or more. | Unlikely to occur. The Proposed Action alternative sites do not support saguaros or other suitable roosting or foraging habitats. |

**Table 4.3-1. Exclusion Justifications for Identified Endangered Species at DMAFB (con't)**

| Species | Federal Status | General Habitat Requirements | Exclusion Justification |
|---|---|---|---|
| Northern Mexican Gartersnake | Threatened | This species is most abundant at elevations between 3,000 and 5,000 feet above mean sea level (amsl) but occurs between 130 and 8,500 feet amsl in densely vegetated habitat surrounding cienegas, streams, and stock tanks, in or near water, and along streams in valley floors and generally open areas, but not in steep mountain canyon stream habitat. Suitable Mexican gartersnake habitat contains a stable native prey base of native fish and adult and larval native ranid frogs and possibly earthworms and vertebrates such as lizards, small rodents, salamanders, and hylid frogs. Considered extant in fragmented populations within the middle to upper Verde River drainage, middle to lower Tonto Creek, Cienega Creek, and a small number of isolated wetland habitats elsewhere in southeastern Arizona. | Unlikely to occur due to the absence of a suitable habitat at DMAFB. |
| Sonoyta Mud Turtle | Proposed Endangered | In Arizona, found only in pond and stream habitats at 1,100 feet above mean sea level at Quitobaquito Springs in Organ Pipe Cactus National Monument. This subspecies of the more common Sonora mud turtle (*Kinosternon sonoriense sonoriense*) also occurs in Rio Sonoyta, Mexico. | Unlikely to occur due to the absence of a suitable habitat at DMAFB. |

#### 4.3.1.4 Wetlands

A survey conducted in 1996 identified 141,349 linear feet and 9.49 acres of CWA-protected Waters of the US on DMAFB. The CWA-protected habitats on DMAFB are all ephemeral drainages, and there are no perennial drainages on DMAFB. Several channelized ephemeral drainages carry runoff from the developed portions of DMAFB and exit the base via underground or open drainage systems. Atterbury Wash is the primary ephemeral drainage on the undeveloped portion of the base (Davis-Monthan Air Force Base 2016a).

The preferred alternative (Swan Gate) is not located near the Atterbury Wash. In the event wetland indicators are observed during construction activities, work would stop and the DMAFB Environmental Manager would be contacted immediately. There no impacts to wetlands anticipated with implementation of the Proposed Action.

### 4.3.2 No-Action Alternative

Under the No Action Alternative, construction activities would not occur, and therefore, not impact vegetation, wildlife, or special status species.

## 4.4 AIR QUALITY

Construction activities associated with the Proposed Action would emit air pollutants and could potentially contribute to regional air quality impacts. Equipment and vehicle use during these activities would emit pollutants into the air, and ground disturbance would result in fugitive dust. Most construction and vehicle emissions would be confined to the project area and remain on DMAFB, but some pollutants could be transported off base during high winds and contribute to air quality impacts in the Tucson metropolitan area, which is under a second 10-year carbon monoxide (CO) maintenance plan by the USEPA.

Due to the maintenance status of the Tucson area for CO, DMAFB must evaluate the Proposed Action estimated emissions against the *de minimis* threshold for CO (100 tons per year) and conduct a conformity determination, if the threshold would be exceeded. Best management practices should be implemented to minimize construction-related emissions and fugitive dust and reduce the potential for regional air quality impacts.

### 4.4.1 Proposed Action

Construction emissions for the Proposed Action was estimated using emission factors and formulas published in the *CEQA Air Quality Handbook* prepared by the South Coast Air Quality Management District (1993). Emission factors for volatile organic compounds (VOCs) (formerly ROC), CO, nitrogen oxide / nitrogen dioxide ($NO_x$), and $PM_{10}$ emissions from construction of various types of facilities were used to estimate project emissions. The construction emission factors account for on-site construction equipment as well as worker travel to the site. The applicable factors were used to calculate annual emissions for each project activity, and the resulting emissions are identified in Table 4.4-1. The estimate is conservative, and actual emissions would likely be lower than the totals presented because of the use of construction measures, such as frequent spraying of water on exposed soil, proper soil stockpiling methods, and prompt replacement of ground cover or pavement, to reduce pollutants.

**Table 4.4-1. Estimated Emissions for Proposed Action at Davis-Monthan AFB**

| Proposed Action | Assumption | Emissions (tons per year) | | | |
|---|---|---|---|---|---|
| | | VOC | $NO_x$ | CO | $PM_{10}$ |
| Construct a GIB | 52,000 square feet; 1 year construction; government office | 1.44 | 21.18 | 4.61 | 1.50 |

Construction activities would produce approximately 4.61 tons of CO emissions, which would not exceed the *de* minimis threshold of 100 tons per year. Therefore, a conformity determination is not needed for the Proposed Action. The total emissions of the other pollutants (VOCs, NOx, and PM10) would be less than the values recorded in CY2010 (see Table 3-4.1). Construction activities would result in temporary emissions of greenhouse gases (GHGs) from construction equipment, but the emissions would contribute minimally to regional GHG emissions. Emissions would be expected to dissipate within several hundred feet of the source and are not likely to be transported off the Base. Construction measures would be implemented to minimize fugitive dust and control equipment emissions in compliance with federal, state, and local laws.

Construction-related emissions associated with the Proposed Action would result in insignificant impacts on air quality. Longer-term operational emissions after construction is completed would be similar to current conditions because the Proposed Action is not intended to dramatically increase use of DMAFB. Operational emissions, including GHG emissions, are not expected to increase from implementation of the Proposed Action.

### 4.4.2 No-Action Alternative

Under the No Action Alternative, construction activities would not occur, and therefore, air quality would not change from baseline levels.

## 4.5 Climate Change

The CEQ issued the final guidance on GHG emissions and the effects of the climate change in August 2016. The guidance was developed to facilitate compliance with existing NEPA requirements. The guidance recommends federal agencies consider both the potential effects of a proposed action on climate change as indicated by assessing GHG emissions (direct and indirect) and the effects of climate change on a proposed action. Also, the guidance emphasizes agency employ appropriate quantitative or qualitative analytical methods to ensure useful information is available to inform the public and the decision-making process. However, the guidance does not establish any particular quantity of GHG emissions as "significantly" affecting the quality of the human environment or give greater consideration to the effects of GHG emissions and climate change over other effects on the human environment (CEQ 2016).

### 4.5.1 Proposed Action

The USEPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* in October 2009. The Rule requires the reporting of annual emissions of carbon dioxide ($CO_2$), methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, perfluorocarbons, and other fluorinated gases. Under the Rule, facilities emitting 25,000 metric tons or more per year of $CO_2$ equivalent are required to submit annually to the USEPA (74 FR 56260).

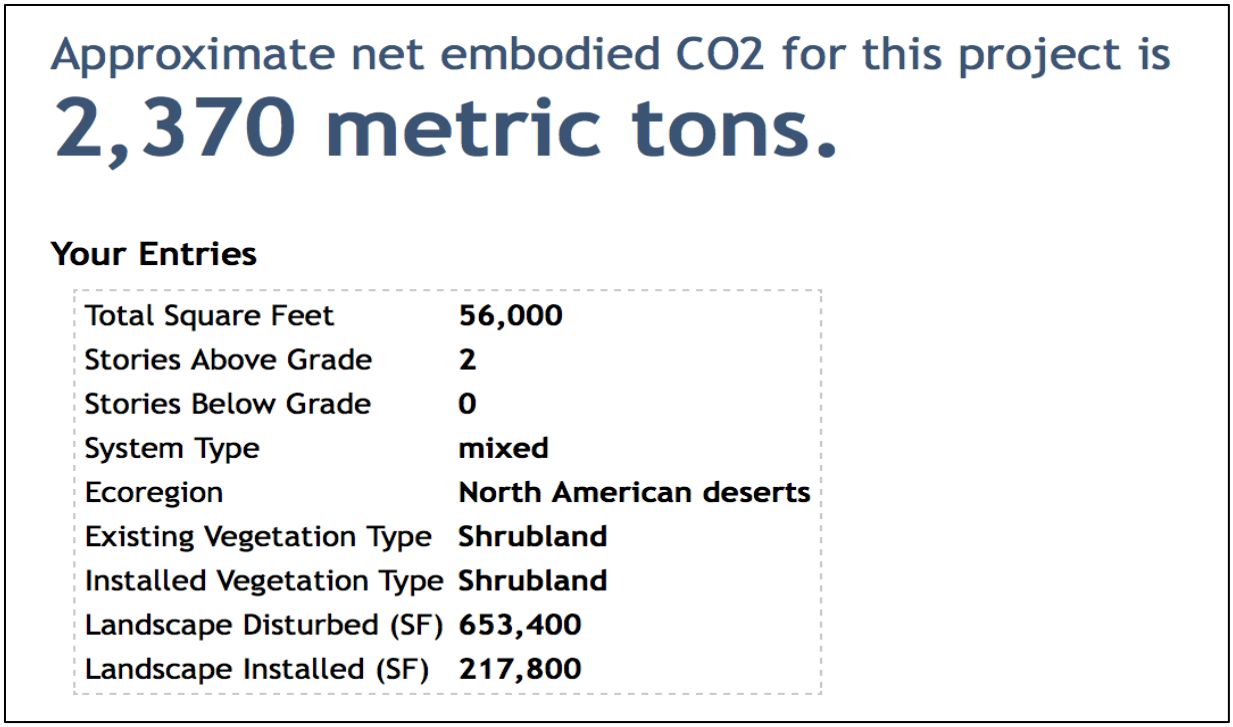
The direct GHG emissions resulting from constructing the Proposed Action were calculated using the *Construction Carbon Calculator* developed by Build Carbon Neutral (BCN 2017). Based on the criteria found in Section 2.1 of this EA, the Proposed Action could result in approximately 2,370 metric tons of carbon dioxide ($CO_2$) emissions (see Figure 4.5-1 at the end of this Section).

The indirect GHG emissions resulting from the annual operation of the Proposed Action were calculated using the USEPA *Power Profiler* (USEPA 2016f). Based on the square footage of the GIB (56,000 ft^2), the calculated annual $CO_2$ emissions from electricity usage are approximately 372 metric tons (819,366 pounds) of $CO_2$ (see Figure 4.5-2 at the end of this Section.)

The USEPA mandatory reporting threshold of 25,000 metric tons of $CO_2$ is equivalent to the amount of $CO_2$ generated by approximately 5,263 passenger vehicles. Comparatively, the calculated direct and indirect GHG emission levels are equivalent to the amount of $CO_2$ generated by approximately 501 and 79 passenger vehicles, respectively. Based on this comparison, the impacts of the Proposed Action on GHG concentrations are not anticipated to be significant.

### 4.5.2 No Action Alternative

Under the No Action Alternative, construction activities would not occur and existing climate change conditions would not be affected.




Note: The assumptions used for the calculation are found at http://buildcarbonneutral.org/assumptions.php.

**Figure 4.5-1. Calculated Direct Greenhouse Gas Emissions**

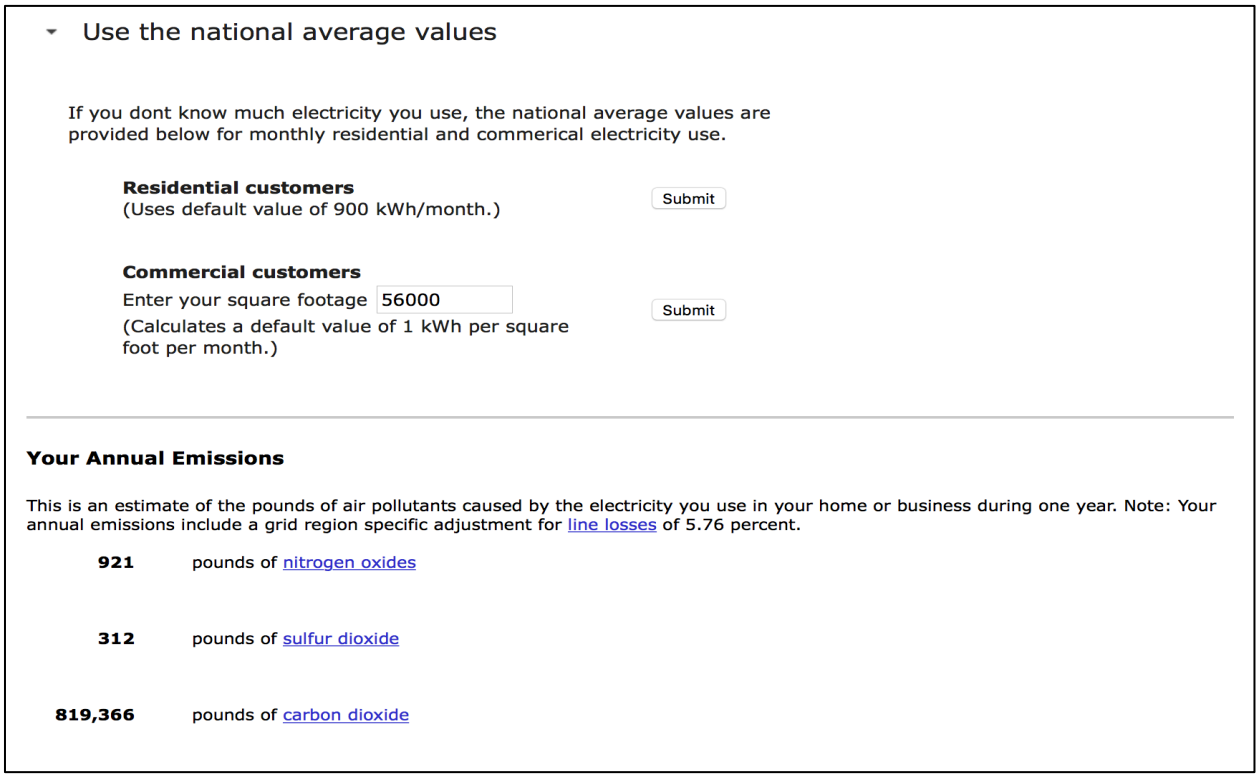



**Figure 4.5-2. Calculated Indirect Greenhouse Gas Emissions**

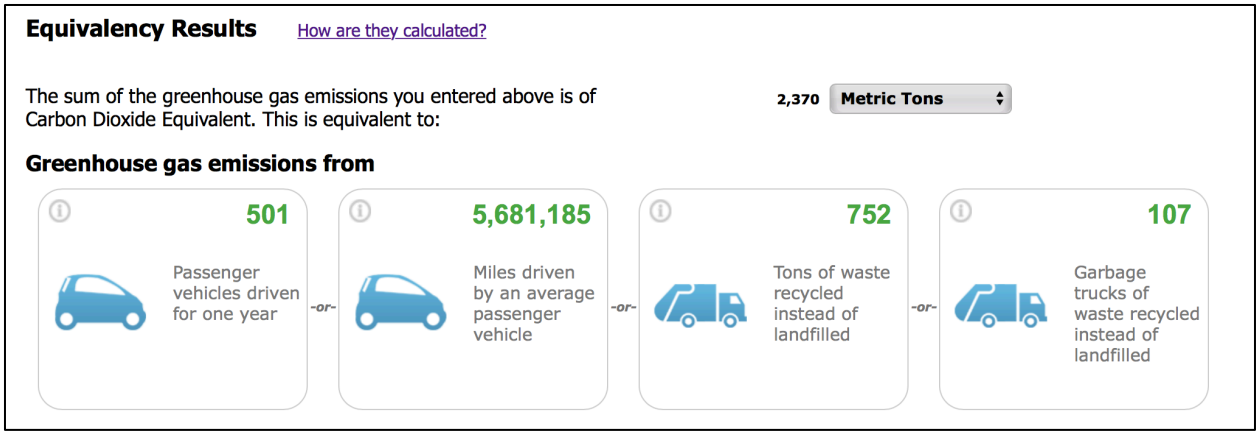



**Figure 4.5-3. Direct Greenhouse Gas Emissions Equivalencies**

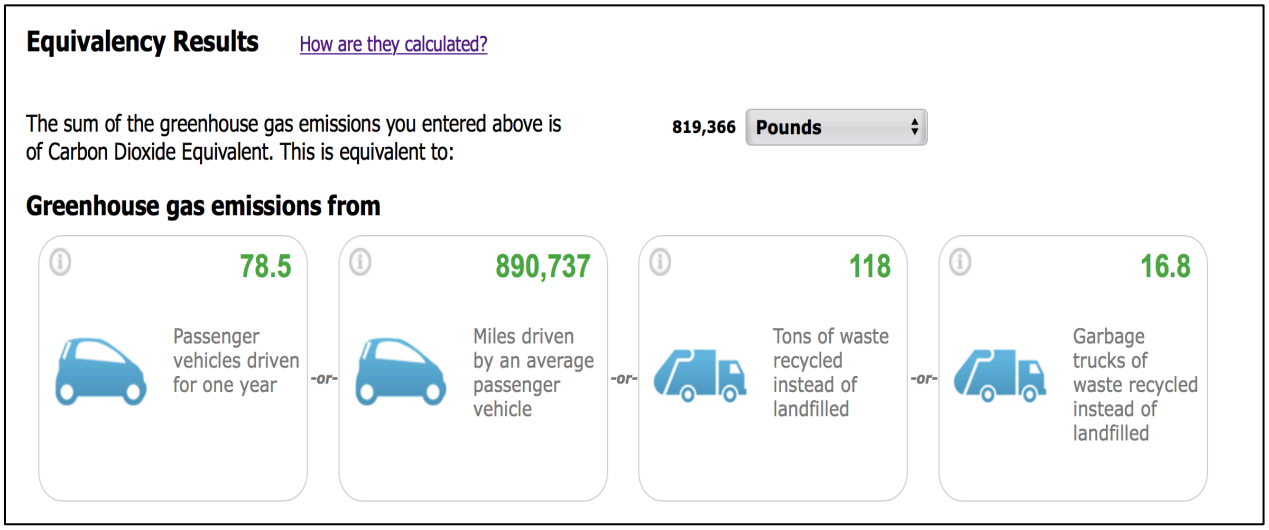



**Figure 4.5-4. Indirect Greenhouse Gas Emissions Equivalencies**

## 4.6 NOISE

Noise impact analyses typically evaluate potential changes to existing noise environments resulting from proposed construction activities. This consists of changes in noise levels or the exposed human population, as well as noise impacts on wildlife. Potential changes in the noise environment can be beneficial, negligible, or adverse.

### 4.6.1 Proposed Acton

Vehicles and equipment involved in facility construction and finishing work would generate the primary noise from the Proposed Action. The typical noise levels generated by these activities range from 75 to 89 dBA at 50 feet from the source (see Table 4.6-1 below). Noise levels attenuate (decrease in intensity) the further they are from the source, and a decrease of 6 dB for each doubling of distance is typical in an area without structures reflecting sound.

**Table 4.6-1. Heavy Equipment Noise Levels at 50 feet**

| Equipment Type | Generated Noise Levels, $L_P$ (dBA) |
|---|---|
| Scraper | 89 |
| Bulldozer | 88 |
| Trenching Machine | 85 |
| Backhoe (rubber tire) | 80 |
| Concrete Finisher | 80 |
| Front Loader (rubber tire) | 80 |
| Concrete Truck | 75 |
| Crane | 75 |
| Dump Truck | 75 |
| Flatbed Truck (18 wheel) | 75 |

Source: American Industrial Hygiene Association 1986

The preferred alternative (Swan Gate) is not located near any noise sensitive areas. Construction noise would be intermittent during the Proposed Action and would cease once the Proposed Action is completed. Therefore, the noise impact would not be significant.

### 4.6.2 No-Action Alternative

Under the No Action Alternative, the proposed construction project would not occur, and noise levels would remain as described in Section 3.5.

## 4.7 LAND USE AND VISUAL RESOURCES

The methodology to assess impacts on individual land uses requires identifying those uses, as well as affected land use planning and control policies and regulations, and determining the degree to which they would be affected by the proposal. Similarly, visual impacts are assessed by determining how, and to what extent, the Proposed Action would alter the overall visual character of the area.

### 4.7.1 Proposed Action

The implementation of the Proposed Action would result in neither significant impacts to on-base or off-base land uses nor changes to the Base operations or personnel levels. The preferred alternative location (Swan Gate) takes into account facility siting issues such as adjacent land uses (both on and off the Base), the noise environment, and airfield safety criteria.

The Swan Gate location is categorized as aircraft operations, and the construction of the GIB in this area would not be incompatible with the surrounding land uses. While designated as aircraft operations, the Swan Gate location does not currently have an active role in the aircraft operations at DMAFB. Therefore, the GIB would not be incompatible with current aircraft operations. Also, the Proposed Action is not anticipated to result in incompatible land use issues with adjacent, off-base land uses since the preferred alternative is located with the DMAFB boundary. Additionally, the GIB would be painted consistent with the DMAFB design compatibility standards and would have exteriors similar to the facilities in nearby areas of the Base with appropriate landscaping to help improve the visual setting of the area.

The impacts to land use and visual resources are anticipated to be insignificant.

### 4.7.2 No-Action Alternative

Under the No Action Alternative, the GIB would not be constructed, and land would remain as described in Section 3.6.

## 4.8 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

In order to assess the potential socioeconomic and environmental justice impacts of the Proposed Action, employment, race, ethnicity, poverty status, and age characteristics of populations were analyzed. Potential socioeconomic impacts are assessed in terms of the direct effects of the

proposal on the local economy and related effects on population and socioeconomic attributes. With regard to environmental justice issues, community and county figures are compared to regional and state demographics to determine proportional differences.

### 4.8.1 Proposed Action

The Proposed Action would add approximately 159 permanent staff and approximately 126 transient students to the DMAFB population; however, the population increase is not expected to have any significant adverse impacts on local services, such as, schools, police, or fire protection. Also, the construction activities associated with the Proposed Action would provide the temporary employment of workers and the purchasing of supplies and materials from the surrounding area. The economic impact associated with the Proposed Action would be primarily beneficial and insignificant.

The Proposed Action is not expected to create significantly adverse environmental or health impacts. Also, the construction areas would be restricted, to effectively bar any person, including children, from unauthorized access.

Impacts to socioeconomics and environmental justice would not be significant.

### 4.8.2 No-Action Alternative

Under the No Action Alternative, the existing facility located on DMAFB being used for training mission would continue to be utilized even though the facility is undersized (18,000 square feet). The existing facility was originally designed for Air Force (AF) billeting and is scheduled to be demolished by the AF as part of the AF "2020" facility reduction initiative. Also, the design, security, and information technology of the existing facility is insufficient to support the entire training mission to one centralized location.

## 4.9 CULTURAL RESOURCES

Analysis of potential impacts to cultural resources considers direct impacts occurring by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment contributing to the resource's significance; introducing visual or audible elements out of character with the property or alter its setting; or neglecting the resource to the extent it deteriorates or is destroyed. Direct impacts are assessed by identifying the types

and locations of proposed activity and determining the exact location of potentially affected cultural resources. Indirect impacts generally result from increased use of an area.

### 4.9.1 Proposed Action

Impacts to cultural resources and architectural resources are not expected under the Proposed Action as the preferred alternative (Swan Gate) site has been either surveyed or disturbed by previous Base activities, such as the Solar Power System Project (Davis-Monthan AFB 2009a). Further, a field survey conducted by Harris Environmental Group on 08 December 2016 confirmed there are no significant cultural resources concerns located at the preferred alternative location.

In the event of inadvertent discoveries of cultural resources during construction, all activities would be halted until a qualified professional archaeologist evaluates the find in compliance with the DMAFB Integrated Cultural Resources Management Plan and federal regulation.

During the 2009 Solar Power System project at DMAFB, consultation with the Arizona SHPO, the nearby Tohono O'odham Nation, and the Pascua Yaqui Tribe was conducted through the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process to identify any traditional resource-related concerns, and no traditional resources concerns were identified (Davis-Monthan AFB 2009a). Therefore, impacts to traditional resources are not expected under the Proposed Action.

### 4.9.2 No-Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. Cultural resources would continue to be managed in compliance with federal law, Air Force regulation, and the DMAFB *Integrated Cultural Resources Management Plan*.

## 4.10 SAFETY

Impacts to safety are assessed according to the potential to increase or decrease safety risks to personnel, the public, and property. Proposal-related activities are considered to determine if additional or unique safety risks are associated with their undertaking. If any proposal-related activity indicated a major variance from existing conditions, it would be considered a safety impact.

### 4.10.1 Proposed Action

Construction activities associated with the Proposed Action could expose workers to health and safety risks. All activities must comply with Occupational Safety and Health Administration (OSHA) standards to protect workers, and all construction contractors would need to coordinate with DMAFB prior to any activities. Contractors may be required to prepare Safety Plans detailing safety protocols for all aspects of work, identify safe practices on construction sites, and describe required occupational protective gear, emergency procedures, and construction traffic routes. Following DMAFB protocols, temporary fencing would be erected around construction sites to restrict access.

Implementation of the Proposed Action would involve safety risks associated with construction activities but would not conflict with safety zones identified at DMAFB. Construction activities would have a low risk of worker fatalities or other injuries because all activities would comply with OSHA standards and Air Force occupational safety requirements. No explosives would be used or handled during construction activities. Safety risks during construction activities would be insignificant for the Proposed Action.

### 4.10.2 No-Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and potential safety risks associated with construction activities would not occur. Management of safety programs and safety zones would continue under existing DMAFB programs and guidance.

## 4.11 SOLID AND HAZARDOUS MATERIALS AND WASTE

The qualitative and quantitative assessment of impacts from hazardous materials and solid waste management focuses on how and to what degree the alternatives affect hazardous materials usage and management, hazardous waste generation and management, and waste disposal. A substantial increase in the quantity or toxicity of hazardous substances used or generated would be considered potentially significant. Significant impacts could result if a substantial increase in human health risk or environmental exposure was generated at a level, which could not be mitigated to acceptable standards.

### 4.11.1 Proposed Action

#### 4.11.1.1 Solid and Hazardous Waste

Construction of the Proposed Action would involve the use of hazardous materials (e.g., fuel, oil) by the construction personnel and generate minimal solid wastes.

Construction of the GIB complex may require the use of hazardous materials by contracted personnel. Any hazardous materials generated by the construction would be handled, stored, and disposed of in accordance with federal, state, and local regulations and laws. Permits for handling and disposal of hazardous materials are the responsibility of the contractor conducting the work. In the event of fuel spillage, the contractor would be responsible for its containment, clean up, and related disposal costs. No significant hazardous waste impacts are anticipated.

The potential solid wastes generated include the typical wastes generated by the construction of a building with associated parking lots. The contractors would be directed to recycle materials to the maximum extent possible, in order to reduce the amount of debris disposed of in landfills. The proper management and recycling or disposal of construction debris would be the responsibility of construction contractors. The amount of waste generated by the Proposed Action would not have a significant impact to the operating life of the landfill. No environmental impacts to solid waste management would be expected from the implementation of the Proposed Action.

#### 4.11.1.2 Hazardous Sites

Neither of the Proposed Action alternative locations is located near ASTs, USTs, or in active ranges. As for ERP and Military Munitions Response Program (MMRP) sites, the preferred alternative (Swan Gate) would not be located near either; however, Alternative No. 2 (Track Site) is located in the proximity of both ERP (SS-09) and MMRP (TM-553) sites.

No further action with regard to hazardous sites would be required for the Swan Gate; however, a waiver from the Air Combat Command environmental office would need to be required for the Track Site.

### 4.11.2 No-Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and potential environmental and human hazards would remain in their current conditions as described in Section 3.10. Management of solid waste, hazardous wastes, or materials would continue under existing DMAFB programs.

## 4.12 INFRASTRUCTURE

For this analysis, potential infrastructure impacts associated with implementation of the Proposed Action were evaluated. Potential infrastructure impacts would be related to construction activity and facility operations after completion.

### 4.12.1 Proposed Action

Implementation of the Proposed Action would result in temporary increases in traffic during the construction period and potentially increase the demand for various utilities.

#### 4.12.1.1 Transportation

Construction activities associated with the Proposed Action would temporarily increase traffic to DMAFB and on roads within the Base. Traffic management measures would be implemented around the project area to alert drivers to the construction activities and any necessary lane closures or detours. Traffic to DMAFB would include construction contractors and trucks for hauling equipment and materials, which may increase congestion at the commercial/contractors gate. Operational traffic on DMAFB would be similar to current conditions.

#### 4.12.1.2 Utilities

Implementation of the Proposed Action may increase the demand for utilities and could result in temporary disruptions to service during construction. The newly constructed GIB would require potable water, wastewater treatment (sanitary), electricity, and telecommunications services, which will require new pipelines and other service lines. The installation of these new pipelines and service lines could result in the temporary disruption of services in the immediate area of the GIB project. If any services need to be turned off during construction, DMAFB personnel would notify all affected parties and attempt to schedule the activities during off-peak times. Few disruptions to existing services are anticipated, and impacts would be insignificant.

### 4.12.2 No-Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and traffic

conditions and utility demands would be the same as the current conditions described in Section 3.11.

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# 5.0 CUMULATIVE IMPACTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

## 5.1 CUMULATIVE IMPACTS

Cumulative impacts to environmental resources result from incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. In accordance with NEPA, a discussion of cumulative impacts resulting from proposed projects (or anticipated over the foreseeable future) is required.

### 5.1.1 Past, Present, and Reasonably Foreseeable Actions

Davis-Monthan AFB is an active military installation undergoing continuous changes in mission and training requirements in response to US defense policy requiring the Air Force be ready to respond to threats to American interests throughout the world. Davis-Monthan AFB, like any other major military installation, requires occasional new construction, facility improvements, and infrastructure upgrades. As such, DMAFB updates facilities on a continual basis. While it is not practical to catalog all projects occurring over the short-term, the Base Comprehensive Asset Management Plan (BCAMP) identifies priority projects to implement in response to key issues of concern at the Base. The latest BCAMP, approved on November 2, 2011, lists various facility improvements, housing needs, and infrastructure upgrades. These types of projects are typical of ongoing Base improvements, and other projects are periodically implemented to improve Base operations. This analysis of cumulative impacts considers typical project types, which might be implemented over the next 3 to 5 years at the DMAFB and could contribute to cumulative impacts in combination with the proposed action (Davis-Monthan AFB 2012).

### 5.1.2 Analysis of Cumulative Impacts

**Earth Resources.** Construction activities associated with the proposed action and the planned and reasonably foreseeable actions have the potential to increase the likelihood of erosion by exposure of soils through mechanical grading, removal of vegetation, and increasing impervious surfaces. The use of standard construction practices and techniques regarding construction activities and soil loss prevention, as well as compliance with applicable Air Force, federal, state,

and local regulations and/or requirements would minimize any impacts to soil.

**Water Resources.** Construction activities associated with the Proposed Action have the potential to increase the likelihood of erosion by exposure of soils through mechanical grading, removal of vegetation, and increasing impervious surfaces. The GIB construction contractor would be required to obtain, as appropriate, coverage under Construction General Permit AZG2008-001 for stormwater. Adherence to the requirements of the permit would include implementation of BMPs to minimize the potential for exposed soils or other contaminants from construction activities reaching nearby surface waters. While the planned and foreseeable actions may also result in an increase in the likelihood of erosion by exposure of soils which have the potential to impact surface waters, the use of stormwater and spill prevention BMPs would minimize the potential impact associated with those construction activities. Thus, there would be no significant cumulative impacts to water resources.

**Biological Resources.** In general, the Proposed Action and the projects listed in Section 5.1.1 are at sites highly altered by man. Foreseeable activities would be anticipated to occur within these same areas. There are no sensitive plant species known to occur on the Base, and animal species found in specific project areas are well adapted to the human environment. Davis-Monthan AFB will coordinate with AZGFD regarding burrowing owls and cave myotis bats should there be a need. Impacts to biological resources are not expected to be significant.

**Air Quality.** Planned and foreseeable activities within DMAFB would likely have minor and/or temporary impacts on air quality during construction phases. Construction typically results in a short-term increase in particulate matter, vehicle emissions, and an increase in wind-borne dust. These actions as well as the proposed action would not result in any long-term impacts on the air quality of Pima County. Therefore, there would be no significant cumulative impacts to air quality.

**Noise.** Construction noise emanating off-site as a result of the Proposed Action and the activities described in Section 5.1.1 would probably be noticeable in the immediate site vicinity, but would not be expected to create adverse impacts. The acoustic environment on and near DMAFB is

expected to remain relatively unchanged from existing conditions. Areas impacted by noise generated by the proposed action would not be expected to overlap with areas affected by noise generated by other known projects. Therefore, no significant cumulative noise impacts would occur as a result of implementation of the proposed action.

**Land Use/Visual Resources.** The construction associated with the Proposed Action, as well as, those described in Section 5.1.1, are expected to enhance the Base planning and compatibility of functions located on base. The majority of proposed site locations for planned and foreseeable activities would likely occur within similar operational areas in order to improve the functional efficiency of DMAFB. Any existing incompatibilities would be corrected. Land use off base is not expected to be impacted. Construction activities for on-going projects and planned projects would consist of the development of new roads and parking lot access points to the new buildings. Following construction, landscaping would be completed and visual resources would be expected to improve. Furthermore, new buildings would be consistent with the base architectural style. As such, there would be no significant cumulative impacts to visual resources.

**Socioeconomics/Environmental Justice.** The construction of the Proposed Action or the projects described in Section 5.1.1 are not expected to generate any long-term changes in the Base population or local employment. Also, these projects are not expected to create adverse environmental or health effects. Therefore, no disproportionately high or adverse impacts to minority, low-income, or youth populations are expected.

**Cultural Resources.** Activities associated with the Proposed Action and the projects described in Section 5.1.1 are not expected to impact archaeological or traditional resources. All construction will be coordinated with the Base Cultural Resource Manager and the SHPO, and have been determined to be ineligible for inclusion in the NRHP. Impacts to cultural resources are not expected to be significant.

**Safety.** Planned and foreseeable activities would involve ground activities, which may expose workers performing the required construction to some risk. However, strict adherence to all applicable occupational safety requirements would minimize the relatively low risk associated

with these construction activities. No significant cumulative impacts to safety are anticipated.

**Hazardous Materials and Waste Management.** Planned and foreseeable construction, renovation, and demolition activities within DMAFB would cause short-term increases in the volume of hazardous wastes generated. Wastes generated by military activities are managed in accordance with applicable regulations and approved plans. Compliance with AFI 32-7042 requires contractors to recycle materials to the maximum extent possible, which would minimize construction / renovation debris disposed in landfills. Planned and foreseeable construction, renovation, and demolition activities within DMAFB could cumulatively impact available landfill capacity. However, due to the existing landfill capacity, there would be no significant cumulative impacts to solid wastes.

Hazardous materials and wastes would be handled, stored and disposed of in accordance with applicable regulations. If the contractor encounters contamination, they would stop work and contact DMAFB. Any contaminated soils associated with ERP sites would be removed and disposed of per applicable regulations.

Cumulative impacts to hazardous materials and waste management are not expected to be significant.

**Infrastructure.** Activities associated with the Proposed Action and the projects described in Section 5.1.1 would result in some temporary planned interruption of utility services with minor hindrance of transportation and circulation during construction activities. These impacts would be temporary, occurring only for the duration of the construction period. Cumulative impacts to infrastructure are not expected to be significant.

## 5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The National Environmental Policy Act CEQ regulations require environmental analyses to identify "...any irreversible and irretrievable commitments of resources that would be involved in the proposal should it be implemented" (40 CFR Section 1502.16). Irreversible and irretrievable

resource commitments are related to the use of nonrenewable resources and the resulting effects on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy, minerals), which cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource, which cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

The Proposed Action would not have irreversible impacts on the land because the affected parcel could be used for other activities in the future. The vast majority of DMAFB is undeveloped, and the Proposed Action would only lead to a slight increase in the amount of newly developed land. Future uses may include restoring native habitat or developing other facilities.

The primary irretrievable impact of the proposed action is from the use of energy, labor, materials, funds, and the conversion of undeveloped lands through the construction of the GIB. Irretrievable impacts would result from the use of fuel for construction equipment; energy and other nonrenewable resources for facility operation; and fuel, energy, and other nonrenewable resources for maintenance activities. Direct losses of biological productivity and the use of natural resources for the CIP projects would be inconsequential.

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# APPENDIX A

# Interagency and Intergovernmental Coordination for Environmental Planning (IICEP)