Davis-Monthan Air Force Base
Tucson, Arizona

Environmental Assessment for a Solar Power System

September 2009

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ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
°F	Degrees Fahrenheit
µg/m^3	Micrograms per Cubic Meter
55 ECG	55th Electronic Combat Group
355 FW	355th Fighter Wing
563 RQG	563rd Rescue Group
563 OSS	563rd Operations Support Squadron
AAQS	Ambient Air Quality Standards
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos-Containing Material
ADEQ	Arizona Department of Environmental Quality
AFB	Air Force Base
Air Force	U.S. Air Force
AIRFA	American Indian Religious Freedom Act
AMARG	Aerospace Maintenance and Regeneration Group
ANG	Air National Guard
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
AST	Aboveground Storage Tanks
AT/FP	Anti-terrorism/Force Protection
AZGFD	Arizona Game and Fish Department
AZPDES	Arizona Pollutant Discharge Elimination System
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
CES/CEAN	CES/Environmental Analysis Element
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CSAR	Combat Search and Rescue
CWA	Clean Water Act
CZ	Clear Zone
dB	Decibel
dBA	A-Weighted Decibel
DDESB	Defense Department Explosives Safety Board
DNL	Day-night Average Sound Level
DoD	Department of Defense
DOL	United States Department of Labor
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPAct	Energy Policy Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAMCamp	Family Camping
FONSI	Finding of No Significant Impact
FY	Fiscal Year
HAP	Hazardous Air Pollutant
I-10	Interstate 10
I-19	Interstate 19
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
kV	Kilovolt
LBP	Lead-Based Paint
MCF	Million Cubic Feet
MGD	Million Gallons per Day
MLRA	Major Land Resource Area
MMRP	Military Munitions Response Program
MSGP	Multi-sector General Permit
MSL	Mean Sea Level
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	Ozone
Pb	Lead
PDEQ	Pima County Department of Environmental Quality
PM_{10}	Particulate Matter Less Than Or Equal To 10 Microns In Diameter
$PM_{2.5}$	Particulate Matter Less Than Or Equal To 2.5 Microns In Diameter
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
QD	Quantity-distance
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SAA	Satellite Accumulation Area
SDZ	Surface Danger Zone
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SWDA	Solid Waste Disposal Act
SO_x	Sulfur Oxide

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FINDING OF NO SIGNIFICANT IMPACT

1.0 NAME OF THE PROPOSED ACTION

Environmental Assessment (EA) for a Solar Power System (SPS) at Davis-Monthan Air Force Base (AFB), Tucson, Arizona.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The United States Air Force (USAF) proposes to allow the construction of a SPS at Davis-Monthan AFB, Tucson, Arizona. The Air Force would lease 3 non contiguous parcels (Chevron Parcel (54 acres), West Airfield Parcel (155 acres), and the Valencia Road Parcel (38 acres) of land to a private contractor, who would be required to construct and maintain the facility. The SPS would generate a minimum of 1 megawatt (MW) of electricity for use by Davis-Monthan AFB. This would reduce electricity expenses paid by the base, and also comply with the Energy Policy Act (EPAct) of 2005 and Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* of 2007.

The USAF also analyzed the No Action alternative. Under the No Action alternative, the USAF would not lease the parcels and construction of a SPS would not occur.

3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

. Eleven resource categories were thoroughly assessed in the EA to identify potential impacts that could result from implementation of the proposed action or the No Action alternative. Under the No Action alternative, the Air Force would not lease the parcels nor would the SPS be constructed. As a result, there would be no effect to the human or natural environments under the No Action alternative The following summarizes impacts which would occur under the Proposed Action by resource category:

Earth Resources: Under the Proposed Action, up to 247 acres of surface disturbance would occur over a 3 year period. Because the proposed construction would occur in previously disturbed area, soil condition would not be substantially altered. Best Management Practices (BMP), to include installation of silt fencing and sediment traps, water spray application, disturbed area revegatation, would be used to limit soil movement, stabilize runoff, and control sedimentation. Impacts to earth resources would not be significant.

Water Resources: There would be no significant impact from the Proposed Action as the increase in stormwater runoff associated with the additional impermeable surface of the SPS would be minor. The implementation of BMPs and adherence to the Arizona Pollutant Discharge Elimination System Permit would minimize the potential for exposed soils or other

contaminants from construction activity to reach surface waters. There are no wetlands or floodplain in the proposed construction sites. Impacts to water resources would not be significant.

Biological Resources: The parcels proposed for the SPS are areas that in general, have been altered by man. There are no federally listed threatened or endangered species or sensitive plan species know to occur on the Base. A biological survey conducted by the Arizona Game and Fish Department (AZGFD) surveyed for western burrowing owl, Pima pineapple cactus, and the Tucson shovel-nosed snake. The first two species are considered special status and the Tucson shovel nosed snake is under U.S. Fish and Wildlife Service review for endangered species listing. No Tucson shovel-nosed snakes or Pima pineapple cacti were found. One western burrowing owl was observed in one of the parcels. If this parcel were used as part of the SPS, AZGFD would relocate the owl to another location outside the construction area. Impacts to biological resources would not be significant.

Air Quality: Davis Monthan AFB is located in an area that is in maintenance for carbon monoxide 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. Combustive and fugitive dust emissions form construction would produce localized air emission increase, however they would be short in duration and not result in any long-term impact to Pima County air quality. . Prior to construction, the contractor would obtain an air activity permit from Pima County Dept of Environmental Quality. Air quality impacts would not be significant.

Noise: Construction noise emanating off site would likely be noticeable in the immediate site vicinity, but would not be expected to create adverse impacts. The acoustic environment on and near Davis-Monthan AFB would remain relatively unchanged from existing conditions. Noise impacts would not be significant.

Land Use/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/Environmental Justice: There would be no long-term changes in the Base population and/or employment under the Proposed Action. The proposed construction and operation of the SPS would not be expected to create adverse environmental or health effects and therefore no disproportionately high or adverse impact to minority, low-income, or youth populations are expected. Impacts to socioeconomics and environmental justice would not be significant.

Cultural Resources: Archaeological surveys at the Base have been accomplished, including all of the Valencia Road parcel and portions of the West Airfield parcel. The Chevron parcel was not included in the surveys, however it has been preiously disturbed by construction and remediation activities. No archaeological sites or artifacts were discovered on the proposed parcels. Therefore, activities from construction of the SPS would not be expected to impact archaeological or traditional resources. Consultation with Arizone State Historic Preservation

Office, the Tohono O'Odham Nation and the Pascua Yaqui Tribe was completed. Impacts to cultural resources would not be significant.

Safety: Implementation of the Proposed Action would involve ground activities that would expose workers performing site preparation, grading, and building construction to some risk. Strict adherence to all applicable occupational safety requirements would minimize the relatively low risk associated with these activities. All proposed SPS parcels are located outside any quantity-distance arcs, as appropriate. Additional the proposed SPS would include measures to enhance anti-terrorism/force protection (AT/FP) efforts as part of the facility designs. Impacst to safety would not be significant.

Solid and Hazardous Materials and Waste: The Proposed Action would generate construction waste that would be recycled and/or taken to the local landfill, as appropriate. There are no capacity issues with the existing landfills. Hazardous materials and wastes would be handled, sorted, and disposed of in accordance with applicable regulations. There are no known asbestos containing materials (ACM) or lead base paint (LBP) on any of the parcels being proposed for the SPS. In addition the SPS would not contain ACMs or LBPs. Impacts from solid and hazardous materials and waste would not be significant.

Infrastructure: The proposed SPS would result in some temporary interruption of utility services and minor hindrance of transportation and circulation during construction activities. The utility service interruptions would be planned and occur while the SPS is brought online. These impacts would be temporary, occurring only during the construction period. Impacts to infrastructure would not be significant.

4.0 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 is warranted, and an Environmental Impact Statement is not required for this action.

25 Sep 2009

DIMASALANG F. JUNIO
Colonel USAF
Chief, Programs Division
HQ ACC

Date

FINAL
ENVIRONMENTAL ASSESSMENT
FOR A SOLAR POWER SYSTEM
AT

DAVIS-MONTHAN AIR FORCE BASE
TUCSON, ARIZONA

United States Air Force

355th Fighter Wing

September 2009

PRINTED ON RECYCLED PAPER

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EXECUTIVE SUMMARY

Pursuant to the Council on Environmental Quality (CEQ) regulations for implementing procedural provisions of the National Environmental Policy Act of 1969 (NEPA) (40 Code of Federal Regulations [CFR] Part 1500-1508), and 32 CFR Part 989, the United States Air Force (Air Force) completed an Environmental Assessment (EA) to assess the potential environmental impacts associated with the construction of a solar power system (SPS) at Davis-Monthan Air Force Base (AFB), Tucson, Arizona.

PROPOSED ACTION

In order to comply with the Energy Policy Act (EPAct) of 2005 and Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* of 2007, and to reduce the cost of electricity consumed at Davis-Monthan AFB, the Air Force proposes to construct a photovoltaic SPS on Base property.

PURPOSE AND NEED OF THE PROPOSED ACTION

The EPAct of 2005 and EO 13423 set an objective for federal agencies to pursue renewable energy sources. Under the EPAct of 2005, federal agencies are directed to ensure that at least half of the required renewable energy consumed in a fiscal year (FY) comes from new renewable resources and, to the extent feasible, generate renewable energy on agency property for agency use. The EPAct of 2005 goal for renewable energy consumption is 7.5 percent of the total electricity consumed by the federal government in any FY would be generated from renewable resources by 2013. The SPS proposed for Davis-Monthan AFB would be constructed to generate a minimum of 1 megawatt (MW) of electricity for the Base's use contributing to the Federal Government's EPAct 2005 goal and reducing the cost of electricity that Davis-Monthan AFB currently purchases from the Tucson Electric Power (TEP) Company.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Three non-contiguous parcels on Davis-Monthan AFB were proposed for the construction of the SPS: Chevron Parcel (54 acres), West Airfield Parcel (155 acres), and the Valencia Road Parcel (38 acres) for a total of 247 acres (Figure ES-1). These parcels were identified by the Base as being available for development, compatible land use, and are located near the Base's existing electrical distribution system.

The Air Force would lease the parcels to a private contractor. The private contractor would determine the optimum system size for Davis-Monthan AFB over the required 1 MW based on tariffs, the historic electricity consumption for Davis-Monthan AFB, the sun's angle of declination, proposed equipment specifications, terrain, and available land. The private contractor would be required to construct and maintain the SPS and Davis-Monthan AFB would purchase the electricity generated by the SPS from the private contractor. The private contractor would be responsible for all of the necessary inverters and transformers required to make the SPS compatible with the existing electrical distribution system. The SPS could include fixed arrays facing to the south, tracking arrays that would automatically swivel from east to west, two-axis arrays that would directly follow the path of the sun through all seasons, or some combination of the three variations.

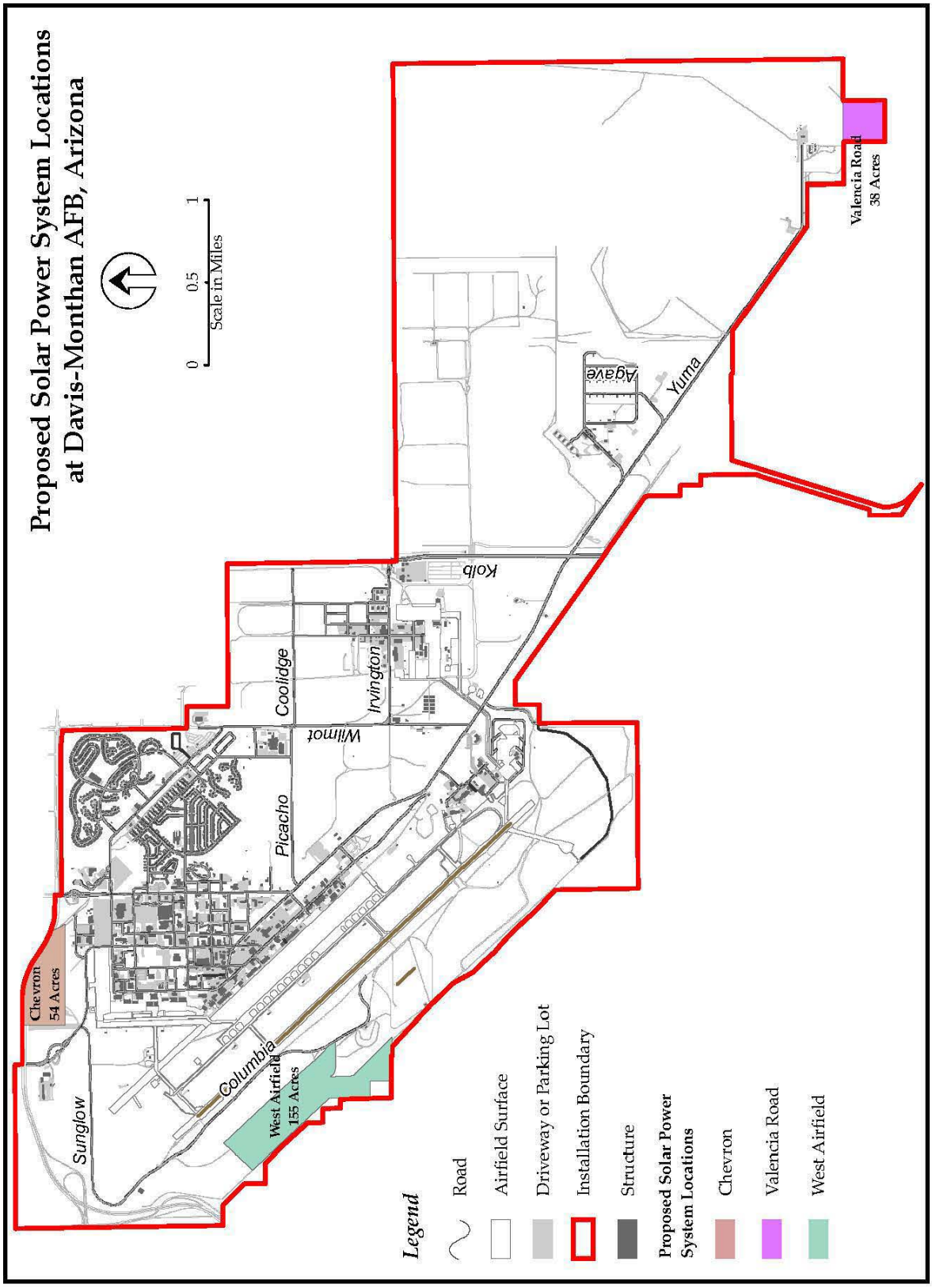

Figure ES-1. Proposed Solar Power System Locations at Davis-Monthan AFB, Arizona

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The EA identifies, describes, and evaluates the potential environmental effects associated with the Proposed Action and alternatives. Resources assessed 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, infrastructure, and cumulative impacts. As discussed in Chapter 4.0, Environmental Consequences, under the No Action Alternative, the Air Force would not lease the parcels or contract for the construction of an SPS. As a result, there would be no effect to the human and natural environments under the No Action Alternative.

Earth Resources. Under the Proposed Action, up to 247 acres of surface disturbance would occur over the course of the 3-year construction program associated with the SPS. The grading of existing soils for the SPS would not substantially alter existing soil conditions at the Base, because to a large extent, the proposed construction is planned in areas where surface disturbance has previously occurred. Best Management Practices (BMPs) would be used to limit soil movement, stabilize runoff, and control sedimentation. Impacts to earth resources would not be significant.

Water Resources. With implementation of the SPS, the contractor would prepare a Stormwater Pollution Prevention Plan (SWPPP) and 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 to reach nearby surface waters. The Valencia Road Parcel contains small tributaries to the Atterbury Wash. While the Atterbury Wash is designated as a "jurisdictional water of the United States (U.S.)," the legal status of the tributaries is unknown at this time. If the contractor were to decide to construct the SPS in a way that would impact the tributaries, then the contractor would need to consult with the United States Army Corps of Engineers (USACE) to delineate which portions of the tributaries, if any, are jurisdictional "waters of the U.S." The contractor would acquire all applicable federal, state, and local permits prior to taking any action that would impact jurisdictional waters of the U.S. No impacts to the 100-year floodplain would be expected to occur. Impacts to water resources would not be significant.

Biological Resources. In general, the parcels proposed for the SPS are areas that have been altered by man. There are no federally listed threatened or endangered species or sensitive plant species known to occur on the Base, and animal species that would be found in specific project areas are well-adapted to the human environment. A biological survey conducted by the Arizona Game and Fish Department (AZGFD) surveyed for western burrowing owl, Tucson shovel-nosed snake, and Pima pineapple cactus. No Tucson shovel-nosed snakes or Pima pineapple cacti were found. One western burrowing owl was observed in the Chevron parcel. If the Chevron parcel is selected by the contractor for the SPS, the AZGFD recommends relocating the western burrowing owl to another location. The AZGFD would be able to relocate the western burrowing owl to an artificial burrow. The AZGFD currently has U.S. Fish

and Wildlife Service (USFWS) permits to relocate the owls and additional permits would not be required. Impacts to biological resources would not be significant.

The Base would coordinate with appropriate state and federal agencies regarding western burrowing owls, cave myotis, peregrine falcon, lesser long-nosed bat, and Pima pineapple cactus, should there be a need. Additionally, the Base would comply with the Arizona Native Plant Law regarding all sensitive native plants.

Air Quality. In general, combustive and fugitive dust emissions from proposed SPS construction activities would produce localized, elevated air pollutant concentrations that would occur for a short duration and which would not result in any long-term impacts on the air quality of Pima County (Air Quality Control Region [AQCR] 015). Pima County is in attainment for all criteria pollutants and maintenance for carbon monoxide (CO). CO emissions would be below the required *de minimis* threshold; therefore, conformity determination is not required. Prior to construction activities, an air activity permit would be obtained by the contractor from Pima County Department of Environmental Quality (PDEQ). The private contractor would be responsible for implementing dust control measures throughout the life of the project in accordance with federal and state air quality regulations. Impacts to air quality in the county would not be significant.

Noise. Construction noise emanating off-site as a result of the proposed construction would probably be noticeable in the immediate site vicinity, but is not be expected to create adverse impacts. The acoustic environment on and near Davis-Monthan AFB is expected to remain relatively unchanged from existing conditions. Impacts from noise would not be significant.

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

Socioeconomics/Environmental Justice. There are no long-term changes in the Base population and/or employment as a result of implementation of the SPS. Additionally, this project is not expected to create adverse environmental or health effects and 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. Archaeological surveys at Davis-Monthan AFB were conducted through the 1980s and early 1990s surveying 4,675 semi-improved and unimproved acres at the Base. The area surveyed represents approximately 45 percent of the total base acreage and nearly 66 percent of its undeveloped areas. These areas include the Valencia Road parcel and portions of the West Airfield parcel. The Chevron parcel was not included in the surveys; however the site has been disturbed by previous construction and remediation activities. No archaeological sites or artifacts were discovered in the proposed parcels. Therefore, activities associated with the construction of the SPS are not expected to impact archaeological or traditional resources. Impacts to traditional cultural resources are not expected. Consultation with Arizona SHPO and the Tohono O'Odham Nation, and the Pascua Yaqui Tribe was conducted and no

notification of non-concurrence was received by the Air Force. Impacts to cultural resources would not be significant.

Safety. Implementation of the proposed SPS does involve ground activities that may expose workers performing the required site preparation, grading, and building construction to some risk. Strict adherence to all applicable occupational safety requirements would minimize the relatively low risk associated with these construction activities. All SPS parcels have been sited outside any quantity-distance (QD) arcs, as appropriate. Additionally, the proposed SPS would include measures to enhance anti-terrorism/force protection (AT/FP) efforts as part of the facility designs. Impacts to safety would not be significant.

Solid and Hazardous Materials and Wastes. The proposed SPS would generate construction waste that would be recycled and/or taken to the local landfill, as appropriate. There are no capacity issues with the existing landfills. Hazardous materials and wastes would be handled, stored, and disposed of in accordance with applicable regulations. If the contractor encounters contamination, they are to stop work and contact Davis-Monthan AFB. Any contaminated soil encountered during construction activities would be tested and disposed of in accordance with appropriate Arizona Department of Environmental Quality (ADEQ) regulations. Impacts to hazardous materials and waste management would not be significant.

Infrastructure. The proposed SPS would result in some temporary interruption of utility services and minor hindrance of transportation and circulation during construction activities. The interruptions in utility services would be planned interruptions occurring while the SPS is brought online. These impacts would be temporary, occurring only for the duration of the construction period. In general, infrastructure at Davis-Monthan AFB would improve under these actions. Impacts to infrastructure would not be significant.

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1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

Davis-Monthan Air Force Base (AFB) is located in Tucson, Arizona. The 355th Fighter Wing (355 FW) is the host unit at Davis-Monthan AFB providing medical, logistical, and operational support to all Davis-Monthan AFB units and is composed of four Groups: the 355th Operations Group, the 355th Maintenance Group, the 355th Medical Group, and the 355th Mission Support Group. The mission of the 355 FW is to deliver decisive airpower and combat support to ground forces worldwide.

Davis-Monthan AFB proposes to construct a Solar Power System (SPS) using photovoltaic solar technology. The system would be constructed, owned, and operated by a private contractor on up to 247 acres in three non-contiguous parcels located on Davis-Monthan AFB. The United States Air Force (Air Force) would lease the land to the private contractor and contract to purchase the electricity produced from the SPS.

This environmental assessment (EA) has been prepared to analyze the potential environmental consequences associated with the Proposed Action and the No Action Alternative at Davis-Monthan AFB 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 Davis-Monthan AFB. 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 that 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 that may be implemented in the region of influence (ROI).

1.2 BACKGROUND

Davis-Monthan AFB borders the southeastern edge of the City of Tucson in Pima County, Arizona and falls within the city limits of Tucson (Figure 1.2-1). The Base occupies approximately 10,613 acres of land, of which 5,700 acres are developed or semi-improved, 4,700 acres are undeveloped, and 300 acres are under easement to and maintained by Pima County. The land occupied by Davis-Monthan AFB is owned by a combination of the Air Force, the State of Arizona, the City of Tucson, and several private owners. Approximately 5,074 acres are owned by the Air Force, 133 acres are state-owned, 4,349 acres are owned by the City of Tucson, 99 acres are owned by private land owners, and 958 acres are public domain. The Air Force has lease agreements with the landowners that are renewed as the lease terms end.

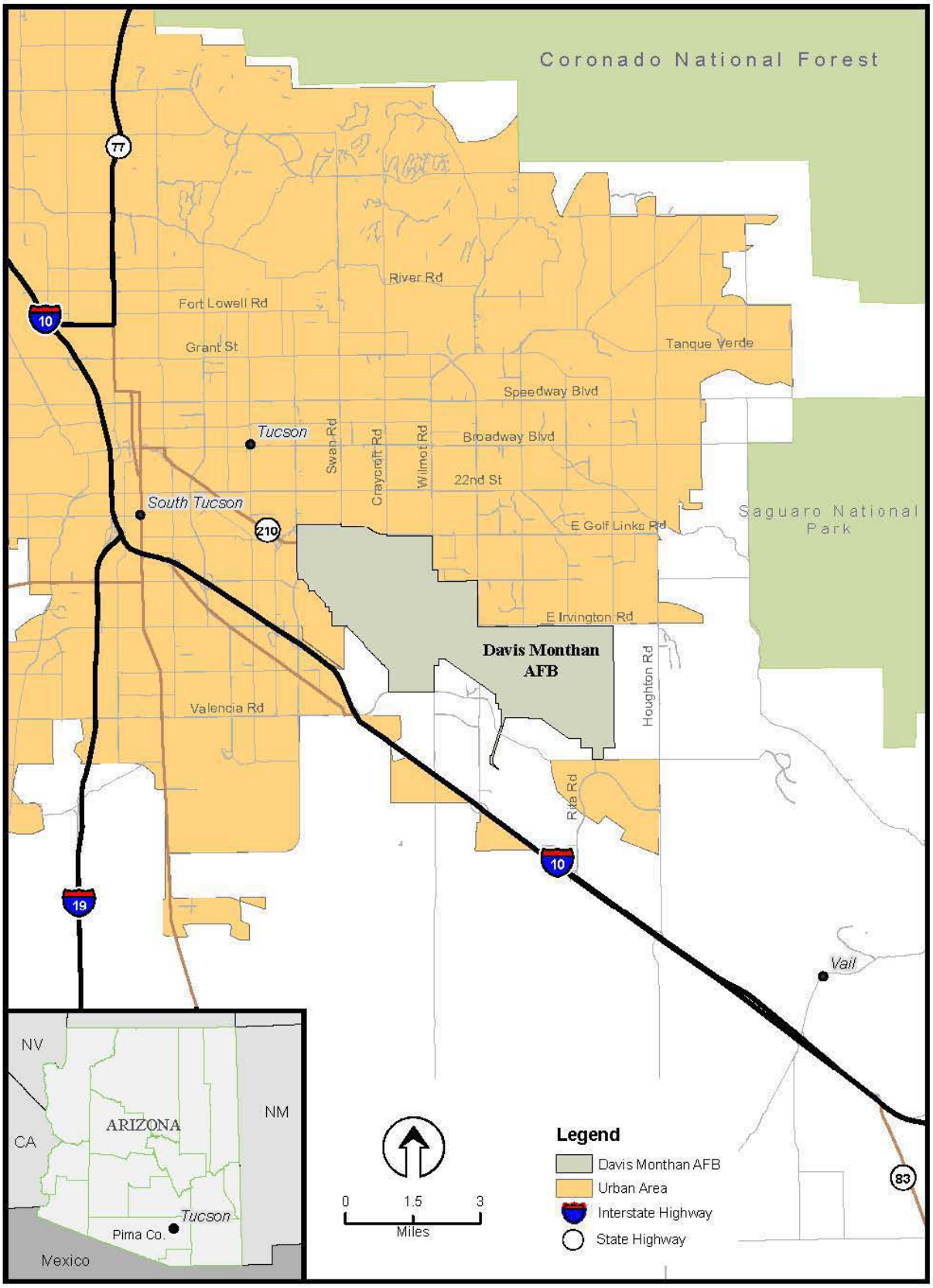


Figure 1.2-1. Regional Location of Davis-Monthan Air Force Base, Tucson, Arizona

The 355 FW missions are to train A-10 and OA-10 pilots and to provide A-10 and OA-10 close air support and forward air control to ground forces worldwide. In addition, 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-130H aircraft, provide airborne command, control, and communications capabilities for managing tactical air operations worldwide.

In addition to the 355 FW, nearly every major air command, the Air Force Reserve, and the Air National Guard (ANG) are represented at Davis-Monthan AFB. Major associate units at Davis-Monthan AFB include Headquarters, 12th Air Force; 55th Electronic Combat Group (55 ECG); the 563rd Rescue Group (563 RQG); the Aerospace Maintenance and Regeneration Group (AMARG); and several other units and agencies such as the United States (U.S.) Customs and Border Protection. The 12th Air Force is charged with commanding, administering, and supervising tactical air forces west of the Mississippi River and operates combat-ready forces and equipment for air superiority. The 55 ECG provides combat-ready EC-130H Compass Call aircraft, crews, maintenance, and operational support to combatant commanders. The group also plans and executes information operations, including information warfare and electronic attack, in support of their mission. The 563 RQG directs flying operations for the Air Force's only active duty rescue wing dedicated to Combat Search and Rescue (CSAR). The group is responsible for training, readiness, and maintenance of one HC-130 squadron, two HH-60 squadrons, two pararescue squadrons, two maintenance squadrons, and an operations support squadron.

AMARG is responsible for more than 5,000 aircraft stored at Davis-Monthan AFB. An Air Force Materiel Command unit, AMARG is responsible for the storage of excess Department of Defense (DoD) and Coast Guard aircraft. The center in-processes approximately 400 aircraft annually for storage and out-processes approximately the same number for return to the active service, either as remotely controlled drones or sold to allied forces.

1.3 PURPOSE AND NEED

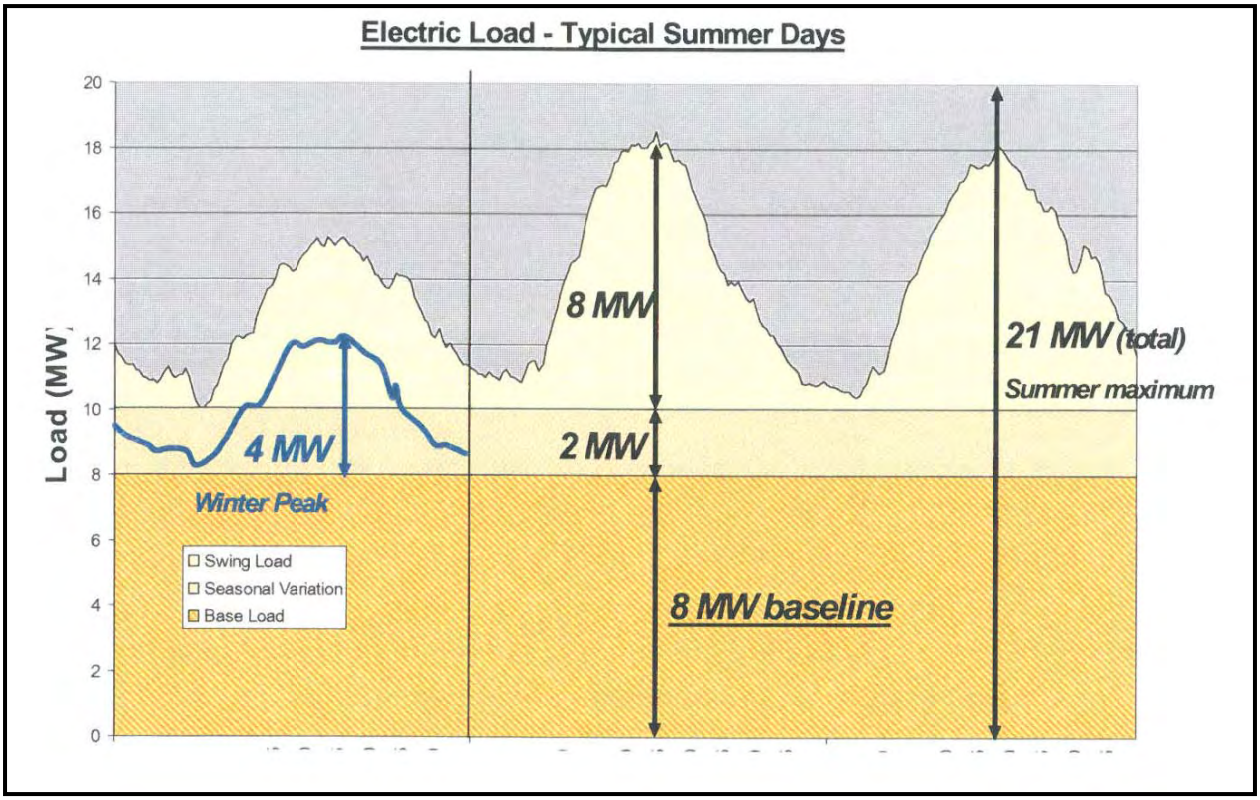
The purpose of the project is to construct a photovoltaic SPS in order to generate a minimum of 1 megawatt (MW) of electricity for use by Davis-Monthan AFB, to comply with the Energy Policy Act (EPAct) of 2005 and Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* of 2007, and to reduce the cost of electricity at Davis-Monthan AFB. The SPS would contribute to the EO 13423 objective for federal agencies ensuring that at least half of the required renewable energy consumed in a fiscal year comes from new renewable resources and to the extent feasible, implementation of renewable energy generation occurs on agency property for agency use. The SPS would also contribute to the EPAct 2005 goal of the total amount of electric energy consumed by the federal government during any fiscal year shall be greater than 7.5 percent by 2013. In addition, the proposed SPS would reduce the cost of electricity for Davis-Monthan AFB that is currently purchased from the Tucson Electric Power (TEP) Company.

Davis-Monthan AFB is continuously operational and consumes electric energy constantly throughout the year. With the privatization of the Base's military family housing, the housing's

electrical system was severed from the Main Base in spring 2009. An estimated minimum of 5.8 MW of power would be required to continuously operate the facilities and operations of the Base after the systems' separation. Peak hours are typically between 1 p.m. and 4 p.m. On a hot afternoon in the summer, peak energy use reached up to 21 MW (Source: City of Tucson 2008b

Figure 1.3-1). After housing separation, the estimated peak demand will reach up to 16.5 MW. During the winter, energy use can peak up to 12 MW (City of Tucson 2008b) and 11 MW after housing separation.

All of the electric energy is currently supplied to Davis-Monthan AFB by TEP from a combination of coal-fired power plants; a photovoltaic solar array in Springerville, Arizona; landfill gas from the Los Reales landfill; natural gas-fired power plants; and some market purchases. After the construction of the SPS, Davis-Monthan AFB would purchase the energy produced by the SPS from the private contractor responsible for the construction and maintenance of the system. Any remaining energy requirements for the Base would be met by purchasing energy from TEP. It is anticipated that purchasing energy generated by the SPS would provide a cost savings as compared to purchasing power from TEP. A similar solar plant system constructed at another western Air Force base has an estimated annual cost savings of $1 million.



Source: City of Tucson 2008b

Figure 1.3-1. Davis-Monthan AFB Seasonal Energy Requirements

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

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

2.1 PROPOSED ACTION

The Proposed Action involves the construction of an SPS on one or more of three alternative parcels located on Davis-Monthan AFB. Figure 2.1-1 identifies those areas affected by the Proposed Action. The Air Force would lease the parcels to a private contractor. The private contractor would be required to construct and maintain the SPS and Davis-Monthan AFB would purchase the electricity generated by the SPS from the private contractor. At this time, the private contractor has not been chosen and the total costs associated with the project have not been identified. It is expected that construction cost would be approximately $5 to $6 million per MW of electricity generated and will be the responsibility of the contractor. Davis-Monthan AFB would require the SPS to generate a minimum of 1 MW; however, it is estimated that if all three parcels are utilized, the SPS would be capable of generating up to 24 MW. The private contractor shall determine the optimum system size for Davis-Monthan AFB over the required 1 MW based on tariffs, the historic electricity consumption for Davis-Monthan AFB, the sun's angle of declination, proposed equipment specifications, terrain, and available land.

Clearing land and drilling footings

Trenches for underground conduits

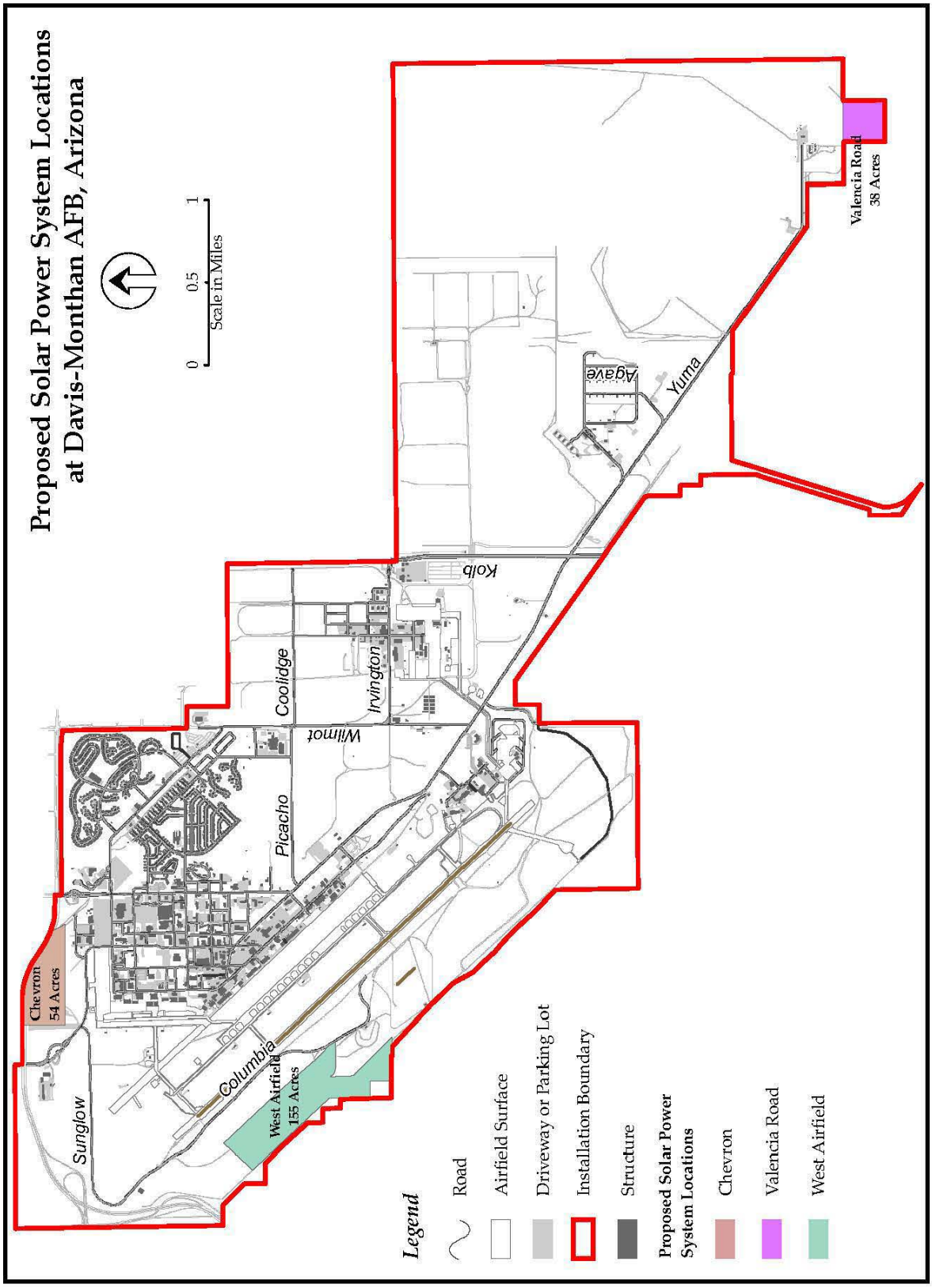


Figure 2.1-1. Proposed Solar Power System Locations at Davis-Monthan AFB, Arizona

The total land available for the SPS is 247 acres among the three parcels. This system would produce power that would be inverted and transformed to be compatible with the 13.8 kilovolt (kV) three-phase base electrical distribution system. The private contractor would be responsible for all of the necessary inverters and transformers required to make the SPS compatible with the existing electrical distribution system. The SPS could include fixed arrays facing to the south, tracking arrays that would automatically swivel from east to west, two-axis arrays that would directly follow the path of the sun through all seasons, or some combination of the three variations. A typical solar panel is supported by a steel frame and concrete footings. The solar panels could range between 10 and 12 feet tall at the highest point. Solar panels are designed to absorb solar radiation and convert it into usable power. The generated power is then transformed and inverted in order to be compatible and integrated with the main electric grid. At each parcel, the construction would require the following actions:

Concrete footings of the solar panels.

Completed solar power system with single-axis tracking arrays.

- Clearing and leveling of land as required at each parcel.
- Construction of a chain link fence line around the parcels for security reasons.
- Construction and installation of photovoltaic solar panels potentially including digging trenches approximately 3-feet deep for underground conduits and laying concrete footings.

For the construction sites located near the Base boundary fencing, the fence design would allow vehicular access along the Base boundary fence line. During construction and throughout the life of the project, the contractor will be responsible to implement dust control practices in accordance with federal and Arizona air quality regulations. The contractor will also be responsible to stabilize the grounds beneath the system to reduce any soil erosion and the generation of dust. The private contractor would be required to obtain appropriate permits for compliance with all federal, state, county, and city regulations.

The sites proposed for the SPS are as follows: the Chevron Parcel (54 acres), West Airfield Parcel (155 acres), and the Valencia Road Parcel (38 acres).

The Chevron Parcel, Figure 2.1-2, is located on the northernmost section of the Base between the Base boundary fence and East Gafford Way. The solar panels would be visible to motorists on East Golf Links Road. The area has been heavily disturbed and contains old asphalt taxiways and is located near a main electrical distribution line. Because the area is located along the Base boundary fence line, the design of the SPS would have to be adjusted so as to allow security vehicular access along the Davis-Monthan fence line.

Chevron Parcel

West Airfield Parcel

The West Airfield Parcel, Figure 2.1-3, is located directly west of the flightline and extends south with the southern boundary parallel to East Irvington Road. The area is adjacent to a capped Base landfill and contains piles of construction debris such as asphalt and concrete. Under another action, the Base will be leveling the ground adjacent to the taxiway and adding approximately 140,000 cubic yards of fill to this parcel. Approximately 8 acres in the southwestern corner of the parcel, along the Base boundary, will be leased to the U.S. Border Patrol and would not be included as part of the West Airfield Parcel. As with the Chevron Parcel, the West Airfield Parcel is along the Davis-Monthan AFB boundary fence line; therefore, the design of the SPS would have to be adjusted so as to allow security vehicular access to the Base boundary fence line. Additional construction is being planned to install an electrical distribution line from the flightline, under the runway, to a point about 100 feet northeast of the Control Tower.

Valencia Road Parcel

The Valencia Road Parcel, Figure 2.1-4, is located in the southwestern corner of the Base along Valencia Road near the intersection of Valencia Road and South Nexus Drive. This area is leased from the City of Tucson and is located along the Base boundary fence line. Fort Huachuca currently leases a portion of the land for training. A residential housing development, Rita Ranch, is located along the south side of Valencia Road. The solar panels would be visible to motorists on Valencia Road. The design of the SPS would need to be adjusted to allow security vehicular access along the Base boundary fence line. The area is near a main electric distribution line; however, the existing electrical distribution lines would need to be upgraded to allow for electrical output of greater than 1 MW.

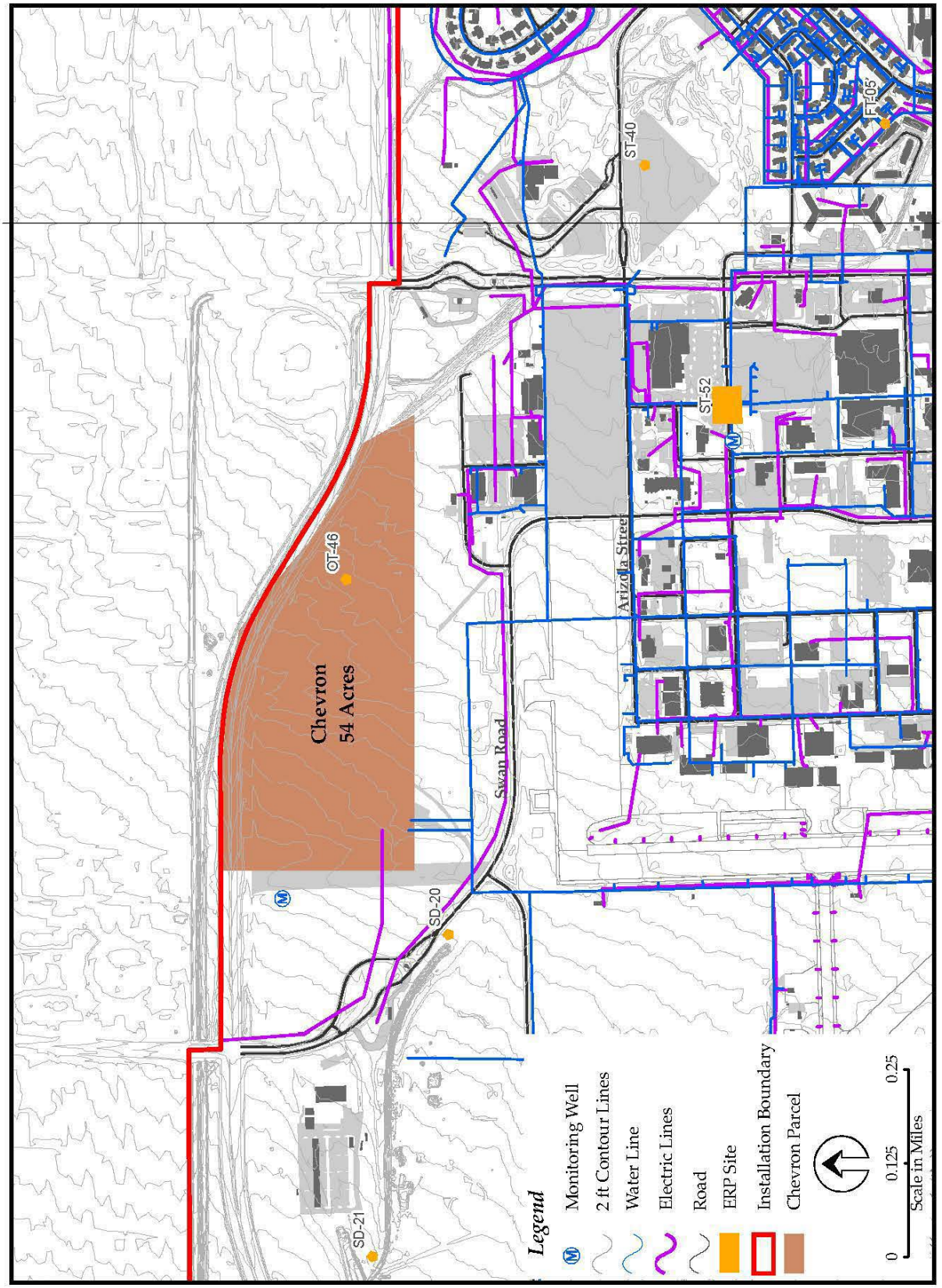


Figure 2.1-2. Chevron Parcel

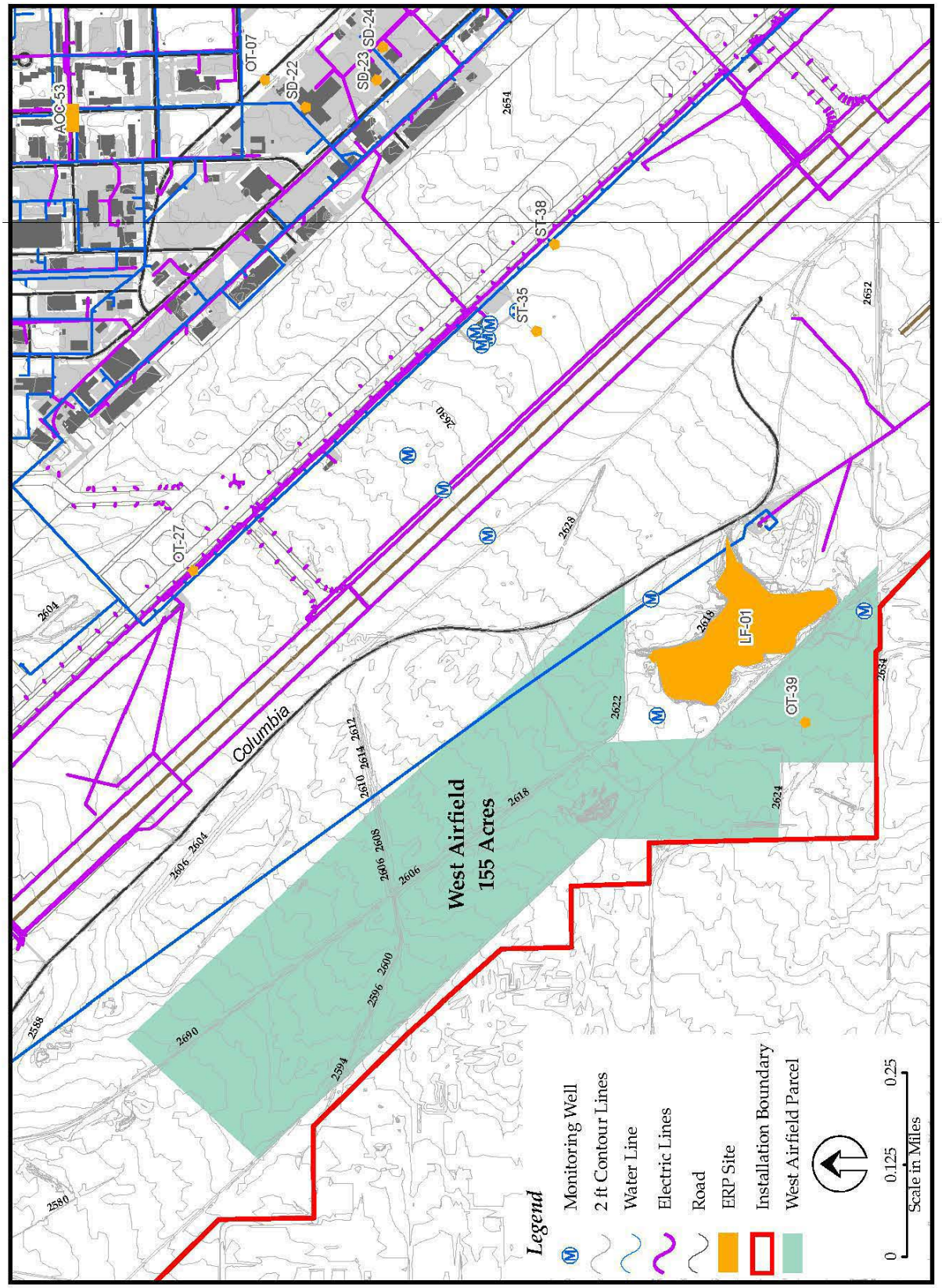


Figure 2.1-3. West Airfield Parcel

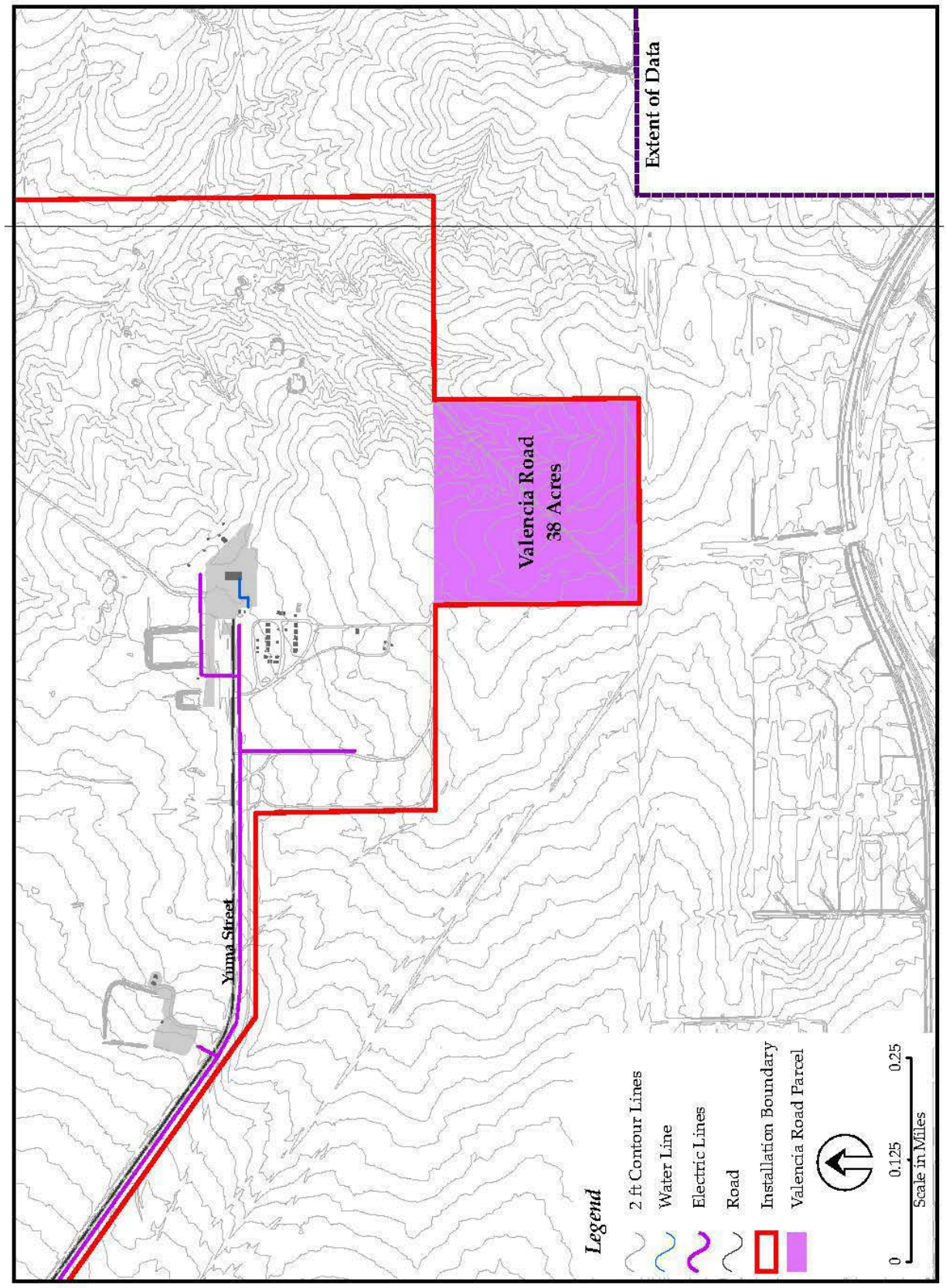


Figure 2.1-4. Valencia Road Parcel

2.2 SELECTION CRITERIA

Several selection criteria were identified for use in evaluating various sites at Davis-Monthan AFB for the SPS. These selection criteria are identified below, including references to the Base studies or regulations.

Compatible Land Use: 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.

There are 12 land use categories at Davis-Monthan AFB (Table 2.2-1). Although land uses within the Base are considered to be generally compatible, most of the Base's existing land use pattern was developed during and shortly after World War II, prior to the establishment of current Air Force guidelines for airfield land use patterns. As such, some anomalies and conflicts with land use patterns exist at Davis-Monthan AFB. Primary on-base conflicts are associated with airfield related uses such as structures that are located within airfield clear zones (CZs) and incompatible use near the firing range. There are no land use conflicts associated with the Proposed Action for this project.

Table 2.2-1. 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
Industrial	3,470	Supply, Civil Engineering facilities, vehicle maintenance facilities
Administrative	85	Headquarters facilities, Base support, security
Community Commercial	68	Army and Air Force Exchange Service, commissary, credit union, dining hall
Community Services	31	Schools, post office, library, chapel
Medical	31	Health care center, dental clinic, veterinarian facility
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
Open Space	4,209	Conservation areas, safety clearance zones
Water	13	Stormwater detention basin

Force Protection and Security Compliance: The DoD and the Air Force have developed a series of anti-terrorism/force protection (AT/FP) guidelines for military installations. These

guidelines address a range of considerations that include access to the installation, access to facilities on the installation, facility siting, exterior design, interior infrastructure design, and landscaping (Unified Facilities Criteria [UFC] 4-010-01, 2002). 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. All facilities within the Proposed Action will be constructed in accordance with UFC 4-010-01.

Available Utilities and Infrastructure: Facility location has utilities and infrastructure nearby and/or the capacity to readily extend to any portion of the Proposed Action.

Presence of Special Environmental Resources:

"Waters of the U.S." The Clean Water Act (CWA) of 1977 (33 USC § 1251 *et seq.*) regulates pollutant discharges that could affect aquatic life forms or human health and safety. The U.S. Army Corps of Engineers (USACE), and EO 11990, *Protection of Wetlands*, regulates the discharge of dredged and/or fill material into "waters of the U.S." including wetlands under Section 404 of the CWA. "Waters of the U.S." 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. Section 404 requires a permit from the USACE for dredging and filling in "waters of the U.S." The Valencia Road Parcel, which could potentially be developed under the Proposed Action, includes small tributaries of the Atterbury Wash. The Atterbury Wash has been designated as a "water of the U.S.," as defined in the CWA, but the legal status of the tributaries is not known at this time. Further discussion is included in Section 4.2.

100-year Floodplain. EO 11988, *Floodplain Management*, 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. There are no projects in the Proposed Action that occur within 100-year floodplains (Figure 3.2-1).

Environmental Restoration Program (ERP) and Military Munitions Response Program (MMRP) Sites. The DoD developed the ERP to identify, investigate, and remediate potentially hazardous material disposal sites that existed on DoD property prior to 1984. Fifty-three ERP sites have been identified at Davis-Monthan AFB and are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Fifty of the ERP sites require No Further Action and three sites are in Remedial Action Operation/Long-term monitoring status. A portion of the fifty sites designated as No Further Action/Site Closed are still undergoing review from the Arizona Department of Environmental Quality (ADEQ). The Davis-Monthan AFB Management Action Plan summarizes the current status of the Base ERP, and presents 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 that support full restoration of the Base. Continuing efforts to comply with

applicable laws and regulations ensure that present resource and waste management practices are performed in a manner that protects human health and the environment. Air Combat Command (ACC) policy requires that any proposed project on or near a Davis-Monthan AFB ERP site be coordinated through the Davis-Monthan AFB ERP Manager.

The MMRP was initiated by the DoD in 2001 to respond appropriately to all munitions-contaminated sites in the U.S. Seven MMRP sites have been identified and evaluated.

Historic and Archaeological Resources. Historic properties (as defined in 36 Code of Federal Regulations [CFR] 60.4) are significant archaeological, architectural, or traditional resources that are either eligible for listing, or listed in, the National Register of Historic Places (NRHP). Historic properties are evaluated for potential adverse impacts from an action, as are significant traditional resources identified by American Indian tribes or other groups. In 1999, the DoD promulgated its American Indian and Alaska Native Policy, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. The policy requires an assessment, through consultation, of the effect of proposed DoD actions that may have the potential to significantly affect protected tribal resources, tribal rights, and Indian lands before decisions are made by the services. There are no impacts to historic and archaeological resources within the Proposed Action.

No Conflicts with Safety Zones: The Defense Department Explosives Safety Board (DDESB) 6055.9-STD and Air Force Manual 91-201, Explosives Safety Standards, defined distances that need to 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 quantity of explosive material to be stored. Each explosive material storage or handling facility has QD arcs extending outward from its sides and corners for a prescribed distance. In order to ensure safety of personnel and minimize potential for damage to other facilities in the event of an accident, development is either restricted or prohibited altogether within these QD arcs.

The DoD identifies Accident Potential Zones (APZs) as a planning tool for local planning agencies. APZs are areas where an aircraft mishap is most likely to occur, if one occurs. They do not reflect the probability of an accident. APZs follow arrival, departure, and pattern flight tracks and are based upon analysis of historical data. The CZs at Davis-Monthan AFB are within Base boundaries; however, APZs I and II extend outside of the Base.

2.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, Davis-Monthan AFB would maintain their existing facilities and would not build the SPS, as proposed. Davis-Monthan AFB would continue to purchase all electric energy from TEP and would not receive the anticipated cost savings of the Proposed Action in addition to not contributing to DoD compliance with EO 13423 and the EPAct of 2005.

2.4 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

In addition to the Proposed Action and No Action Alternative discussed above, other alternatives were evaluated and found to be infeasible or unreasonable and therefore eliminated from detailed consideration. These alternatives include:

- The Explosive Ordnance Disposal (EOD) Range Parcel was a fourth parcel considered for inclusion in the development of the SPS. The parcel is approximately 42 acres located in the southwestern portion of the Base along Yuma Street and north of Valencia Road. This parcel can only be accessed from within the Base. The area is leased from the State of Arizona and currently has a paintball recreation area located on several acres. Davis-Monthan AFB requested permission to sublease this parcel for construction of the SPS; however, the Arizona State Land Department indicated that a sublease would not be approved for this parcel.
- Another parcel considered for inclusion in the development of the SPS was the Substation Parcel located near the center of the Base at the corner of Yuma Street and East Picacho Avenue. This parcel is 39 acres and is close to an existing substation and multiple distribution lines. The AMARG is separated from this parcel by a detention basin which abuts the parcel along its eastern boundary. Approximately 6 acres are fenced and are currently being used for recreational vehicle storage. Davis-Monthan AFB is now considering using the Substation Parcel to support other missions.
- Prior to developing the Proposed Action, Davis-Monthan AFB participated in an Alternative Energy Solutions Task Force that was assembled in September 2006. The task force included staff from the City of Tucson; representatives from the local electric and natural gas utilities; personnel from the Arizona and Pima County Departments of Environmental Quality; and other interested parties from the region. This effort included evaluations of various forms of renewable energy generated from solar, wind, biomass, landfill gas, ocean, geothermal, municipal solid waste, and new hydroelectric generation.

The task force noted that there were not viable resources available near Davis-Monthan AFB to generate renewable energy using wind, ocean, biomass, or hydroelectric resources; therefore, these alternatives were not carried forward for analysis by the task force and are not carried forward in this EA. Landfill gas options were considered, including the potential from the Harrison Landfill. Feasibility studies showed that from an economic and utility regulatory standpoint, the use of landfill gas from Harrison Landfill does not appear to be a viable option for Davis-Monthan AFB. Waste-to-energy is not under consideration at this time, but because of rising fossil fuel prices and growing concerns about carbon emissions, waste-to-energy could become an energy solution, as well as a waste solution, in the future. Other solar energy alternatives included the use of roof-top installations and the solar thermal technologies. While roof-top installations have been used in many other locations, their use at Davis-Monthan AFB would have a number of challenges. Given the secure nature of many of the air base's facilities,

the various types of buildings and construction types, and the potential for substantial maintenance issues, this type of installation at Davis-Monthan AFB was not considered feasible.

2.5 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

The Environmental Impact Analysis Process (EIAP) is used to evaluate a proposal's potential environmental consequences, and to notify and involve the public in the agency's decision-making process. The proponent of a given action is ultimately responsible for compliance with the EIAP. The Air Force EIAP requires that 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 SPS for Davis-Monthan AFB. The following resources are analyzed in this EA: earth resources, water resources, biological resources, air quality, noise, land use and visual resources, socioeconomics and environmental justice, cultural resources, safety, hazardous materials and waste management, and 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

EO 12372, *Intergovernmental Review of Federal Programs*, requires notifications to other agencies that may have relevant information regarding resources at the site prior to making any detailed statement of potential environmental consequences. Through the process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), Davis-Monthan AFB has notified concerned federal, state, and local agencies and is allowing them sufficient time to evaluate potential environmental impacts of the Proposed Action. All federal, state, and local agency input can be found in Appendix A. All relevant comments have been addressed and incorporated into the text, as appropriate.

The Air Force prepared and published newspaper advertisements announcing the availability of the Draft EA for a 30-day public and agency review to facilitate public involvement in this project. These advertisements were placed in the *Arizona Daily Star* and the *Tucson Citizen* on November 20, 2008 and in the *Desert Lightning News* on November 21, 2008. Copies of these advertisements are also available in Appendix A. The Draft EA was also available on the Davis-Monthan AFB website at www.dm.af.mil/units/communityinitiatives/index.asp. Comments on the Draft EA were received from agencies and are included in Appendix A. However, no public comments were received during the 30-day review period.

2.5.2 Regulatory Compliance

2.5.2.1 NATIONAL ENVIRONMENTAL POLICY ACT

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 NEPA to implement and oversee federal policy in this process. The CEQ subsequently issued the Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR Sections 1500–1508) (CEQ 1978). These requirements specify that 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.
- 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 NEPA. To comply with 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 NEPA are contained in 32 CFR Part 989 *et seq.*, *Environmental Impact Analysis Process*.

2.5.2.2 ENDANGERED SPECIES ACT

The Endangered Species Act (ESA) of 1973 (16 USC §§ 1531–1544, as amended) established measures for the protection of plant and animal species that are federally listed as threatened and endangered, and for the conservation of habitats that are 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 U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Act.

2.5.2.3 CLEAN AIR ACT

The Clean Air Act (CAA) (42 USC §§ 7401–7671, as amended) provided the authority for the U.S. 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 Act also requires that 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 that 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 CWA of 1977 (33 USC § 1251 *et seq*.) regulates pollutant discharges that could affect aquatic life forms or human health and safety. The USACE and EO 11990 regulates the discharge of dredged and/or fill material into "waters of the U.S." including wetlands under Section 404 of the CWA. "Waters of the U.S." 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. EO 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) of 1966 (16 USC § 470) established the NRHP and the Advisory Council on Historic Preservation (ACHP), outlining 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 that are 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 Offices (SHPOs) if their undertakings might affect such resources. *Protection of Historic and Cultural Properties* (36 CFR 800 [1986]) provided an explicit set of procedures for federal agencies to meet their obligations under the NHPA, which includes inventorying of resources and consultation with SHPO.

The American Indian Religious Freedom Act (AIRFA) (42 USC § 1996) established federal policy to protect and preserve the rights of Native Americans to believe, express, and exercise their traditional religions, including providing access to sacred sites. The Native American Graves Protection and Repatriation Act (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

Additional regulatory legislation that potentially applies to the implementation of this proposal includes guidelines promulgated by EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to ensure that citizens in either of these categories are not disproportionately affected. Additionally, potential health and safety impacts that could disproportionately affect children will be considered under the guidelines established by 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 that have the potential to affect protected tribal resources, tribal rights, or Indian lands. Tribal input must be solicited early enough in the planning process that it may influence the decision to be made.

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 Davis-Monthan AFB permits has been compiled and reviewed during the preparation of this EA. Table 2.6-1 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 Air Force compliance with applicable instructions, guidance, and directives.

Table 2.6-1. Permit Requirements for Davis-Monthan AFB SPS Implementation

Permit	*Resource*	*Proposed Action*
Synthetic Minor Permit	Air	No change to existing permit expected; equipment (i.e., generators) may require air permit modification or amendment.
Operating Permit #1701	Air	No change to existing permit expected; equipment (i.e., generators) may require air permit modification or amendment.
Activity Permit from Pima County Department of Environmental Quality (PDEQ)	Air	The contractor would have to obtain an Air Quality Activity Permit for any land stripping, earth moving, trenching, and/or road construction.
Davis-Monthan AFB Arizona Pollutant Discharge Elimination System (AZPDES) Stormwater	Stormwater	The Stormwater Pollution Prevention Plan (SWPPP) would need to be updated.
Construction General Permit AZG2008-001	Stormwater	The contractor would have to file a Notice of Intent with the ADEQ to obtain coverage under this permit.
Section 404, Clean Water Act	Water	If the Valencia Road Parcel is developed, it may be necessary for the contractor to obtain a Section 404 permit from the USACE.

2.7 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2.7-1 summarizes the potential environmental consequences of 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 of Implementation of the Davis-Monthan AFB SPS
(Page 1 of 2)

Resources	*Proposed Action*	*No Action*
Earth Resources	Temporary disturbance of soils; impacts avoided or minimized if proper construction techniques, erosion control measures, and structural engineering designs incorporated. No significant impacts expected.	No changes to earth resources from the present would occur; no significant impacts expected.
Water Resources	Contractor of the SPS to obtain coverage under Construction General Permit AZG2008-001 for stormwater. Grading and trenching associated with the Proposed Action could potentially affect stormwater runoff. The SWPPP must include Best Management Practices (BMPs) to minimize the potential for exposed soils or other contaminants from construction activities on the Base to reach surface waters. The Valencia Road Parcel includes small tributaries to the Atterbury Wash, which is considered a "water of the U.S." If planned construction would impact the tributaries, the contractor would consult with the USACE to determine presence and delineate extent of "waters of the U.S." on the site. Applicable federal, state, and local permits would be acquired by the contractor prior to any action being taken that would impact "waters of the U.S." No impacts to the 100-year floodplain would be expected to occur. Impacts to water resources would not be significant.	No changes to water resources from the present would occur; no significant impacts expected.
Biological Resources	Minor impacts to vegetation, wildlife, and migratory birds as a result of construction activities. A western burrowing owl was found in the Chevron parcel during surveys conducted by Arizona Game and Fish Department (AZGFD). If the Chevron parcel is selected by the contractor for the SPS, AZGFD recommends active translocation to relocate the western burrowing owl prior to construction. Comply with Arizona Native Plant Law regarding all sensitive plants covered under law.	No changes to biological resources from the present would occur; no significant impacts expected.
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. Impacts would not be significant.	No changes to air quality would occur; no significant impacts expected.
Noise	Construction noise would be intermittent and short-term; no long-term noise impacts would result.	No changes to the noise environment would occur; no significant impacts expected.

Table 2.7-1. Summary of Potential Environmental Consequences of Implementation of the Davis-Monthan AFB SPS
(Page 2 of 2)

Resources	*Proposed Action*	*No Action*
Land Use/ Visual	Construction of the SPS would not be incompatible with any surrounding land uses. The SPS would be a change in land use in the West Airfield Parcel. The proposed SPS is located within Base boundaries and would not be incompatible with off-base land use. The SPS may be visible from off-base locations, but it is not expected to be taller than a one-story building with a minor impact on Visual Resources; no significant impacts would result.	No changes to land use or visual resources would occur; no significant impacts expected.
Socioeconomics/ Environmental Justice	No long term change in Base employment or expenditures; no disproportionate impacts to minority or low-income populations expected; no significant impacts expected.	No change in Base employment or expenditures; no disproportionate impacts to minority or low-income populations would occur; no significant impacts expected
Cultural Resources	No cultural or historic resources affected by action; no significant impacts expected.	Cultural resources would remain as they presently are; no significant impacts expected.
Safety	Implementation of the Proposed Action does involve ground activities that may expose workers performing the required site preparation, grading, and building construction to some risk. Strict adherence to all applicable occupational safety requirements would minimize the relatively low risk associated with these construction activities.	Safety conditions would remain as they currently are; no significant impacts expected.
Solid and Hazardous Materials and Wastes	Construction waste that cannot be recycled would be landfilled. Hazardous materials/waste and construction debris would be handled, stored, and disposed of in accordance with Base procedures and applicable regulations. Any contaminated soil encountered would either be remediated or disposed of in compliance with appropriate regulations. A waiver for construction near any active ERP/MMRP site would be obtained prior to proposed activities. No waiver would be required for ERP/MMRP sites that are closed with unrestricted use or no institutional controls.	Hazardous materials and waste management would remain as they presently are; no significant impacts expected.
Infrastructure	Construction vehicles would generate short-term increases in on-Base traffic. No change in demand for potable water, wastewater, or liquid fuels is expected. The SPS would be compatible with existing electrical systems and would supplement the demand for electric energy; no significant impacts would be expected.	Infrastructure would remain the same as the present condition; no significant impacts expected.

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

3.1.1 Definition of the Resource

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

The ROI for earth resources in this EA includes Davis-Monthan AFB. The geologic description for the project site is general to the region surrounding Davis-Monthan AFB including the project area, while the soils discussion focuses on both the project area and site specific areas.

3.1.2 Existing Conditions

3.1.2.1 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 (U.S. Geological Survey [USGS] 2003). Some basaltic flows occurred as early as four million years ago and as late as 65 million years ago (Natural Resources Conservation Service [NRCS] 2006). 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 (USGS 2003). The Tucson Mountains are a small range composed of Tertiary intrusive and volcanic rocks bordered by faulted, folded Paleozoic and Cretaceous sedimentary rock (Chronic 1983). 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 (University of Colorado at Boulder 2005).

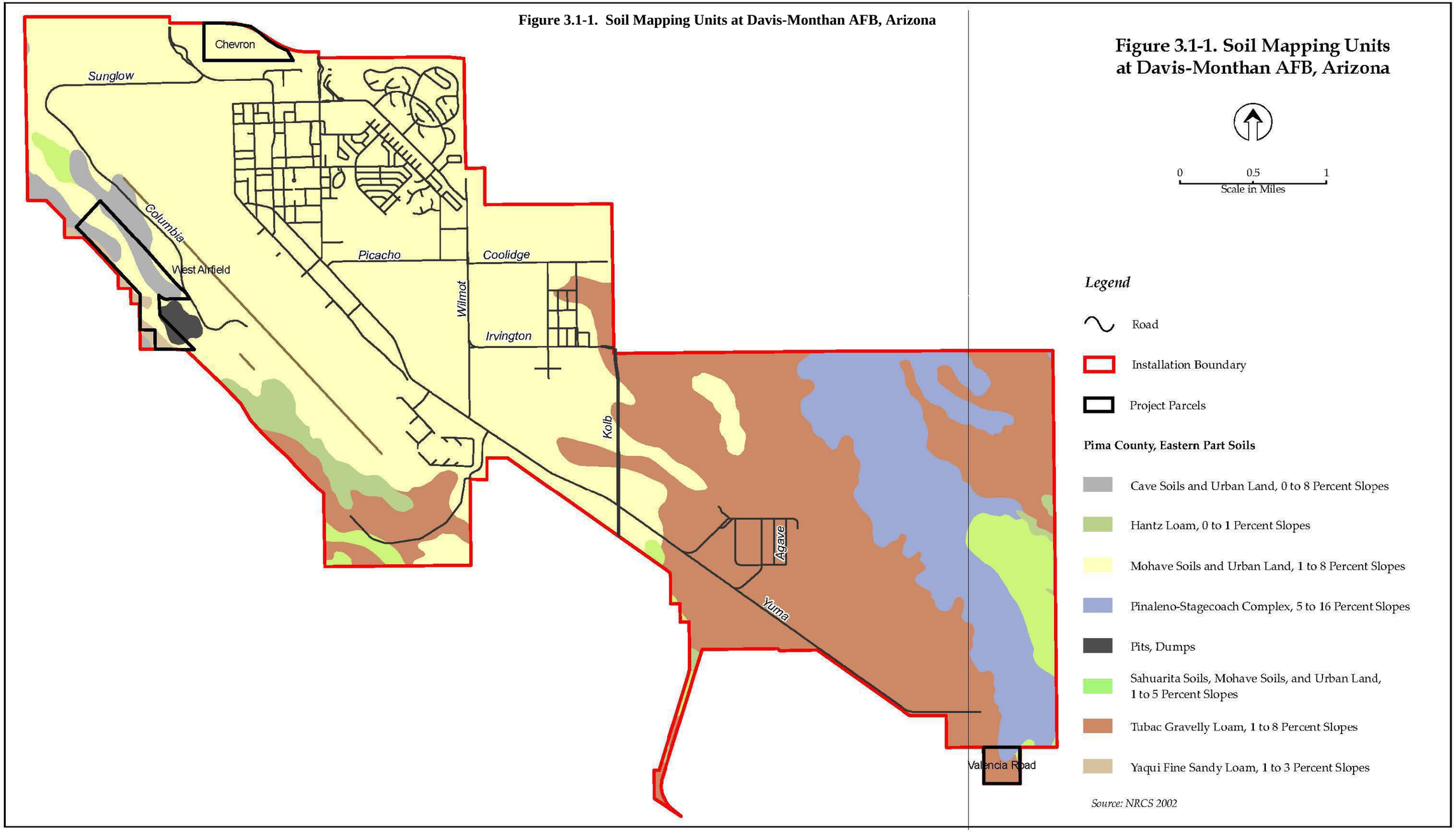
Most of the soils in the ROI, formed in transported parent material, are primarily alluvium of mixed origin and mineralogy. Much of the alluvium in the area is derived from the weathering products of the surrounding mountain ranges. On most of the valley terraces, the soils formed in mixed material high in quartz and feldspar, and in material deposited by wind. Bedrock and eolian (material accumulated through wind erosion) material are less common, but are direct sources for the alluvium and some of the secondary calcium carbonate enrichment of the soils. The alluvium in the ROI is primarily derived from granite, gneiss, rhyolite, and andesite (NRCS 1993).

3.1.2.2 SOILS

Soils information for this section is largely derived from the Natural Resources Conservation Service (NRCS) Soil Survey spatial and tabular database for Pima County, Arizona, Eastern Part (NRCS 1993, 2008). According to the NRCS, Greater Tucson and Davis-Monthan AFB fall within the Major Land Resource Area (MLRA) classification of the Sonoran Basin and Range, in which the dominant soil orders are Aridisols and Entisols (NRCS 2006). The soils of this MLRA tend to be very shallow to very deep, well-drained to excessively well-drained, of mixed mineralogy, and generally formed in alluvium. Dominant soils have a thermic (mean annual soil temperature is 15 degrees Celsius [°C] or higher, but lower than 22°C) or hyperthermic (mean annual soil temperature greater than 22°C) soil temperature regime. Soil moisture regimes in the Sonoran Basin and Range MLRA tend to be aridic, meaning they are dry in all parts for more than half of the year when soil temperature is above 5°C at a depth of 50 centimeters; and moist in some parts for less than 90 consecutive days when soil temperature is above 8°C at a depth of 50 centimeters (NRCS 2006).

A soil mapping unit represents an area that is dominated by one major kind of soil, or an area dominated by several kinds of soils (referred to as a complex). Each of the soil map units described has minor soils that are encompassed within the map unit. These minor soils may have different properties and limitations that can only be delineated on-site. The properties and limitations of the soil type that comprises the majority of each soil map unit are presented in this section to provide an indication of the conditions and limitations found in the ROI. Davis-Monthan AFB has eight distinct soil mapping units (Figure 3.1-1). Characteristics of each soil unit are summarized below and in Table 3.1-1.

Figure 3.1-1. Soil Mapping Units at Davis-Monthan AFB, Arizona



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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. Cave soils are formed in mixed alluvium and are often associated with Yaqui, Arizo, Delnorte, Mohave, Stagecoach, and Sahuarita soils. Cave soils are well-drained and shallow to a lime-cemented hardpan (caliche) and calcareous (chalky) throughout. They appear on the surface as a light brown, gravelly fine sandy loam to a depth of approximately 4 inches, with a pinkish white, gravelly fine sandy loam to 3 inches below that. A white caliche begins at a depth of 7 inches; depth to caliche can vary from 4 to 20 inches depth. Under the caliche, generally from 20 to 60 inches depth, is a 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. One potential limitation for construction/urban development in this soil type results from the relatively shallow depth to caliche (NRCS 1993).

Urban land for this and other described soil types consists of areas within the dominant type that are heavily altered by construction, or obscured by other structures or pavement to such an extent that identification of underlying soil is nearly impossible. In soil areas categorized as Urban land, however, the underlying and interspersed soils retain many of the characteristics of the soils associated with the unit (NRCS 1993).

Hantz loam, 0 to 1 percent slopes – Hantz loam is found on level swales on alluvial fans and floodplains at elevations from 2,400 to 3,600 feet. It is very deep, well-drained, formed in mixed alluvium, and is often associated with Arizo, Buckelbar, Tubac, Mohave, and Glendale soils. Generally, the surface layer is brown loam to a depth of 5 inches (in some areas, it can be silty clay loam, clay loam, or clay), with a subsurface layer of grayish brown clay loam 7-inches thick. Substratum is grayish brown clay 33-inches thick, with a lower layer of brown clay, 16-inches thick. 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; headcutting and deposition can occur after particularly heavy storms. Hantz loam is not well suited for urban development due to potential to flood and high shrink-swell potential (NRCS 1993).

Mohave soils and Urban land, 1 to 8 percent slopes – Mohave soils are found on broad, gently sloping fan terraces shallowly dissected by ephemeral drainageways at elevations from 2,200 to 3,300 feet. They are very deep and well drained, formed in mixed alluvium, and are often associated with Bucklebear, Sahuarita, Hantz, and Yaqui soils. The surface layer is a yellowish brown loam to a depth of 3 inches with a subsurface layer of brown sandy loam, also approximately 3-inches thick. The subsoil extends another 34 inches, with a brown sandy clay loam 5-inches thick, a brown and light brown clay loam 13-inches thick, and a reddish brown sandy clay loam and mixed light reddish brown/pink clay loam 16-inches thick. 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 soils have moderately slow permeability, high available water capacity, slow to medium runoff, slight to moderate water erosion hazard, and

moderate wind erosion hazard. The primary limitation to urban development on this soil is a moderate shrink-swell potential (NRCS 1993).

Pinaleno-Stagecoach complex, 5 to 16 percent slopes – This 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, 35 percent Stagecoach very gravelly sandy loam, and 25 percent talus, rubble, and small areas of mixed soils. The Pinalero-Stagecoach complex is often associated with Tubac, Mohave, Palo Verdes, and Jaynes soils. Pinaleno soils are most often located on crests and shoulders of slope gradients of 5 to 10 percent. They are 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. These soils have moderately slow permeability, low available water capacity, medium runoff, a slight hazard of erosion due to water, and a very slight hazard of erosion due to wind (NRCS 1993).

Stagecoach soils are most often found on shoulders and backslopes with gradients of 5 to 16 percent. They are very deep, well-drained, and formed in mixed alluvium. The surface is typically covered by 55 to 60 percent gravel and cobble, with a surface layer of light brown, very gravelly loam approximately 10-inches thick (in some areas, the surface layer is very cobbly sandy loam). Below this is a pink, pinkish gray, and pinkish white, very gravelly loam and extremely gravelly loam 30-inches thick. Substratum reaches a depth of 60 inches or more and is a light brown, very gravelly loamy sand. Many soft masses of lime can be found in the subsoil and substratum and in some areas, caliche is found at a depth of 40 inches or more. Stagecoach soils have moderate permeability, medium runoff, slight hazard due to wind erosion, and very slight hazard due to water erosion. The main limitations for urban development on this soil type are high lime content and potential for erosion on higher slope areas (NRCS 1993).

Pits and Dumps – This map unit is found on hills and mountains, at elevations from 2,300 to 4,600 feet, with slopes ranging from 0 to 100 percent. General profile of the Pits and Dumps units is 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. Primary limitations to urban development on this soil unit include: slope; wind erosion; seepage; and sheet, rill, and gully erosion (NRCS 1993).

Sahuarita soils, Mohave soils, and Urban land, 1 to 5 percent slopes – This soil unit is found on gently sloping fan terraces at elevations from 2,200 to 2,800 feet. Sahuarita soils are very deep, well-drained, formed in mixed alluvium, and often associated with Arizo, Anthony, Yaqui, and Hayhook soils. 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 3 inches. Subsoil is light yellowish brown, fine sandy loam 25-inches thick and the buried subsoil below is brown loam 17-inches thick and brown, very gravelly sandy clay loam 15-inches thick.

Sahuarita soils are calcareous throughout and common fine lime filaments are found in the buried subsoil. The soils have moderate permeability in the upper part and moderately slow in the lower part, moderate available water capacity, slow to medium runoff (runoff can be rapid in shallow rills and deep gullies), hazard from water erosion is slight, and wind erosion hazard is very slight. This soil is moderately well suited for urban development, with the only limitations due to the moderate shrink-swell potential of the Mohave component as well as general dustiness of the unit (NRCS 1993).

Characteristics of Mohave soils and Urban land are described above.

Tubac gravelly loam, 1 to 8 percent – Tubac gravelly loam is found on broad, gently sloping fan terraces, shallowly dissected by ephemeral drainageways at elevations from 2,400 to 3,200 feet. The soil is very deep, well-drained, formed in mixed alluvium, and often associated with Mohave, Pinaleno, Sahuarita, Yaqui, and Hantz soils. The surface is typically covered by 25 percent gravel and 5 percent cobble, with a brown to dark brown gravelly loam approximately 2-inches thick; in some areas, the surface is covered in coarse sandy loam. Subsurface 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. 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 soil has slow permeability, available water capacity is moderate, medium runoff, and erosion hazards from both wind and water are slight. The primary limitation for urban development on the Tubac gravelly loam comes in the form of moderate shrink-swell potential (NRCS 1993).

Yaqui fine sandy loam, 1 to 3 percent – This soil is found on gently sloping alluvial fans at elevations ranging from 2,200 to 3,600 feet. Yaqui fine sandy loam is very deep, well-drained, formed in mixed alluvium, and is often associated with Anthony, Bucklebear, Sahuarita, Hantz, and Arizo soils. The surface layer is typically strong, brown, fine sandy loam to a depth of approximately 4 inches (in some areas, the surface layer can be loam or very fine sandy loam), with a subsoil of brown to dark brown sandy clay loam 27-inches thick. Below this layer is a buried subsoil of yellowish red clay loam 12-inches thick over pink gravelly loam to a depth of 60 inches or more. Yaqui fine sandy loam is calcareous throughout, and fine lime filaments can be found in the buried subsoil. The soil has moderate permeability to a depth of 31 inches and permeability becomes moderately slow below this point. Available water capacity is high, runoff is generally slow except when concentrated, water erosion hazard is slight, but wind erosion hazard is moderately high. Yaqui fine sandy loam is subject to rare, very brief periods of flooding during prolonged, high-intensity storm events. Primary limitations to urban development include flooding and a potential hazard of wind erosion in disturbed areas (NRCS 1993).

Table 3.1-1. Type and Acreage of Soils within ROI

Project Area Name	*Acres*
West Airfield	
Mohave Soils and Urban Land, 1 to 8 percent slopes	69
Cave Soils and Urban Land, 0 to 8 percent slopes	61
Yaqui Fine Sandy Loam, 1 to 3 percent slopes	12
Pits and Dumps	8
Chevron	
Mohave Soils and Urban Land, 1 to 8 percent slopes	54
Valencia Road	
Tubac Gravelly Loam, 1 to 8 percent slopes	26
Pinaleno-Stagecoach Complex, 5 to 16 percent slopes	6
Sahuarita Soils, Mohave Soils, and Urban Land, 1 to 5 percent slopes	<1
Total	**276[1]**

Note: 1. Slight differences in totals and parcel acreages occur due to rounding averages.

3.1.2.3 TOPOGRAPHY

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

Terrain on Davis-Monthan AFB is predominantly flat and slopes downward from the southeast to the northwest. On-base elevations range from 2,550 feet above mean sea level (MSL) on the west side of the Base, to 2,950 feet above MSL on the east side of the Base. Only two areas located on the Base have any significant slope: the road cut for Kolb Road as it passes through the Base and the Atterbury Wash (one of the primary ephemeral drainages on the Base), which is located in the eastern part of the Base (Davis-Monthan AFB 2001).

3.2 WATER RESOURCES

3.2.1 Definition of the Resource

Water resources analyzed in this EA include surface water and groundwater, and floodplains. Further, this section provides descriptions of the qualitative and quantitative characteristics of water resources. Wetlands are discussed in Section 3.3, *Biological Resources*; drinking water wells, wastewater facilities, and stormwater infrastructure are discussed in Section 3.11, *Infrastructure*.

Surface water resources include lakes, rivers, and streams, and are important for a variety of reasons including irrigation, power generation, recreation, flood control, and human health. Under the CWA, it is illegal to discharge pollutants from a point source into any surface water without a National Pollutant Discharge Elimination System (NPDES) permit. As of December 2002, the USEPA authorized Arizona to operate the NPDES Permit Program. This program is referred to as the AZPDES Permit Program. The USEPA has the authority to set standards for the quality of wastewater discharges. The goal of the CWA Section 402 is the "restoration and

maintenance of the chemical, physical, and biological integrity of the Nation's waters." Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into "waters of the U.S." must obtain certification from the state in which the discharge would originate, or if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval [such as issuance of a Section 404 permit]) must also comply with CWA Section 401. The State of Arizona has the legal authority to implement and enforce the provisions of the CWA while the USEPA retains oversight responsibilities.

Groundwater includes the subsurface hydrologic resources of the physical environment and is by and large a safe and reliable source of fresh water for the general population, especially for those in areas of limited precipitation, and is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater plays an important role in the overall hydrologic cycle. Its properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

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" (that area inundated by a 100-year flood). Floodplains and riparian habitat are biologically unique and highly diverse ecosystems providing a rich diversity of aquatic and terrestrial species, as well as promoting stream bank stability and regulating water temperatures. EO 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

The ROI for water resources considered in this EA includes Davis-Monthan AFB, as well as nearby surface waters that receive runoff generated within the project area.

3.2.2 Existing Conditions

3.2.2.1 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 2004a).

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 (Figure 3.2-1). Small tributaries to the Atterbury Wash are located within the Valencia Road Parcel. These tributaries are about 5 feet in width at their widest point and about 12 inches deep at their deepest point.

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 considered an Impaired Reach by the ADEQ and USEPA; possible contaminants include ammonia, chlorophyll a, dissolved oxygen, nitrogen, phosphorus, and unsuitable pH levels (USEPA 2008). The Atterbury Wash ultimately discharges to Lakeside Lake, which discharges to the Pantano Wash.

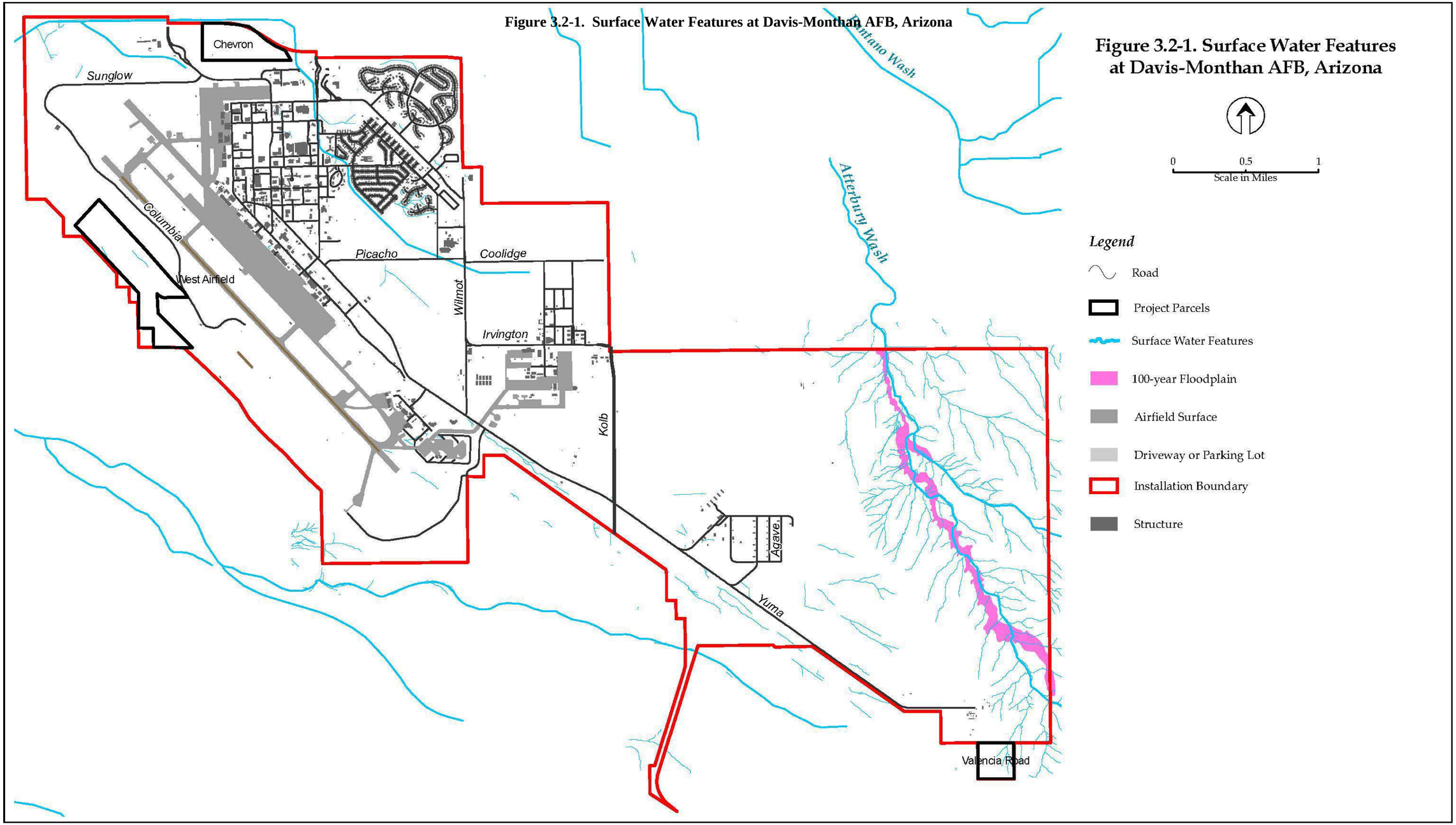
Surface drainage at Davis-Monthan AFB has been modified to comprise a series of ditches, channels, and culverts that ultimately discharge downstream into the Santa Cruz River. The stormwater drainage system at the Base consists of 11 drainage areas, each featuring one or more outfalls (an outfall is defined as a point source that discharges stormwater to "waters of the U.S."). There are currently 16 outfalls on Davis-Monthan AFB. 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 1 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 Davis-Monthan AFB eventually reach the Santa Cruz River (Davis-Monthan AFB 2004a, 2008).

Stormwater at Davis-Monthan AFB is managed in accordance with the NPDES Multi-sector General Permit (MSGP) AZR05A12F issued by the USEPA (Davis-Monthan AFB 2004a), which has been administered by ADEQ since December 2002. ADEQ is currently conducting workshops in order to review and revise the current MSGP in 2009. In order to comply with the current requirements of the MSGP, Davis-Monthan AFB has prepared and implemented an SWPPP that includes water quality monitoring requirements and Best Management Practices (BMPs) to minimize the potential for contaminants to reach nearby surface waters.

3.2.2.2 GROUND WATER

The Base's primary water source is ground water drawn from the Tinaja Beds and the Fort Lowell Formation of the Tucson Basin aquifer. Depletion of local aquifers is a concern in the ROI as water levels have declined an estimated 50 to 100 feet due to the high level of extraction combined with low recharge rates. Ground water depletion is expected to continue for the foreseeable future due to continued urbanization of the Tucson area. Another concern with regard to local ground water is contamination; a large plume of trichloroethylene lies within the vicinity of the Tucson International Airport, about 5 miles southwest of the Base. It is not believed that this contamination currently threatens the Base water supplies (Davis-Monthan AFB 2004a, 2008).

Figure 3.2-1. Surface Water Features at Davis-Monthan AFB, Arizona



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3.2.2.3 FLOODPLAINS

According to Federal Emergency Management Agency Flood Insurance Rate Maps covering the ROI, Davis-Monthan AFB is located in an area categorized as Zone D: "Areas in which flood hazards are undetermined" (Federal Emergency Management Agency 2007). However, a floodplain analysis of Davis-Monthan AFB completed in 1998 (Davis-Monthan AFB 1998) provides detailed flood data for the Base and specifically the Atterbury Wash (Figure 3.2-1). The floodplain analysis estimated that the peak discharge associated with a 100-year flood of the Atterbury Wash would be 2,906 cubic feet per second, and that the lateral width of the 100-year flood would range from 69 to 1,154 feet due to the extreme variations in stream geometry (Davis-Monthan AFB 2006a). It is important to note that an area is not necessarily considered to be a "water of the U.S." as defined by the CWA simply because it is a floodplain.

3.3 BIOLOGICAL RESOURCES

3.3.1 Definition of the Resource

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 that typify 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, sensitive biological resources are defined as those plant and animal species listed as threatened or endangered by the USFWS and species that are listed for conservation-related reasons by the State of Arizona or other entities. Three categories of protection status are included in this section: 1) federally listed threatened and endangered species, 2) state listed species, and 3) 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 that are at risk of extinction in all or a significant portion of their range. Threatened species are those that could be 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 (WSCA) 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 have known or perceived threats or population declines, as described by the AZGFD's listing of WSCA. Additionally, under the Arizona Native Plant Law (1993), 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 those that are federal species of concern or species listed that are identified as rare or on a watch list under the Arizona Natural Heritage Program state ranking system. These 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 this and other countries. It requires 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 are those identified in 1) the report "Migratory Nongame Birds of Management Concern in the United States" (USFWS 1995), 2) priority species identified by established plans such as those prepared by Arizona Partners in Flight (Latta *et al.* 1999), or 3) listed species in 50 CFR 17.11, *Endangered and Threatened Wildlife*.

3.3.2 Existing Conditions

3.3.2.1 VEGETATION

Tucson, Arizona lies within the American Semi-desert and Desert Province, which is characterized by extensive plains, from which isolated mountains and buttes abruptly rise (Bailey 1995). Vegetation is typically sparse and the flora of this province is characteristic of the Sonoran Desert and well adapted to extremely high temperatures, high exposure to solar radiation, and low precipitation.

Davis-Monthan AFB is specifically classified into the following four vegetation subclasses (Davis-Monthan AFB 2001, 2008): landscaped and mowed (located primarily in the cantonment area of the Base), Sonoran Desertscrub, Sonoran Desert Riparian, and Semi-desert Grassland (the latter three primarily occur in undeveloped areas of the Base). The cantonment area of Davis-Monthan AFB is actively landscaped with a variety of native and nonnative grasses, shrubs, and trees. The developed area comprises approximately 60 percent of the Base. These areas consist primarily of buildings, roads, and the airfield. The remaining 40 percent of the Base is undeveloped and contains native vegetation reflecting its Sonoran Desert influence.

The Sonoran Desertscrub vegetation community is the most common community in the Sonoran Desert. There are two subdivisions of this vegetation community that are most common in the Tucson area: the Arizona Upland and the Lower Colorado Valley subdivisions. Davis-Monthan AFB supports primarily the Arizona Upland vegetation subdivision; however, due to the proximity, and similarity of habitat and topography, many aspects of the Lower Colorado Valley subdivision are evident as well. The Arizona Upland subdivision includes some of the most famous and picturesque portions of the Sonoran Desert (Davis-Monthan AFB 2001). Representative plant species in the Arizona Uplands include the saguaro cactus (*Carnegiea gigantean*) and cholla cactus (*Cylindropuntia* spp.). Table 3.3-1 summarizes floristic species that typically occur in each of the vegetation classes at Davis-Monthan AFB.

Table 3.3-1. Common Vegetation Communities Likely to Occur on Davis-Monthan AFB

Community	*Scientific Name*	*Common Name*
Sonoran Desert Scrub	*Larrea tridentata*	Creosote bush
	Ambrosia dumosa	White bursage
	Hymenoclea monogyra	Burrobrush
	Carnegiea gigantea	Saguaro cactus
	Opuntia fulgida and *Opuntia versicolor*	Cholla species
	Chloris spp.	Windmill grass
	Aristida spp.	Three-awns
	Bouteloua spp.	Grama grass
	Parkinsonia microphylla and *Parkinsonia aculeata*	Paloverde
	Acacia greggii	Catclaw
	Baccharis glutinosa	Seep willow
	Prosopis velutina	Velvet mesquite
	Echinocactus wislizenii	Barrel cacti
	Opuntia spp.	Cacti
Sonoran Desert Riparian	*Lycium brevipes*	Tomatillo
	Acacia greggii	Catclaw
	Celtis pallida	Desert hackberry
	Prosopis spp.	Mesquite
	Baccharis salicifolia	Desert broom
	Baccharis glutinosa	Seep willow
	Baccharis viminea	Mule fat
Semi-Desert Grassland[1]	*Bouteloua rothrockii*	Grama grass
	Bouteloua californica	Grama grass
	Bouteloua radicosa	Grama grass
	Bouteloua parryi	Grama grass
	Bouteloua barbata	Grama grass
	Cathestecum erectum	False grama grass
	Aristida hamulosa	Three-awns grass
	Aristida wrighti	Three-awns grass
	Aristida ternipes	Three-awns grass
	Aristada aristidoides	Three-awns grass
	Heteropogon contortus	Gangle-head grass
	Chloris spp.	Windmill grass
Landscaped/Mowed[2]	*Eragrostis lehmanniana*	Lehmann's lovegrass

Notes: 1. These species may occur in patchy distribution, contiguous habitat is unlikely due to modern development at Davis-Monthan AFB.
2. Species occurring in the other three classes may also occur in this class as ornamental species or patchy distribution.

Sources: Davis-Monthan AFB 2008

The Sonoran Desert Riparian vegetation community is found at Davis-Monthan AFB, primarily along the Atterbury Wash, and comprises a relatively small proportion of the total acreage of the Base. With more water capture capacity, the Sonoran Desert Riparian community often has deeper soils and provides a greater diversity and density of vegetation than surrounding uplands. Refer to Table 3.3-1 for typical vegetation from this community type.

The Semi-desert Grassland community is a landscape dominated by perennial grass-scrub species. It is not likely that pure stands of Semi-desert Grasslands still exist at Davis-Monthan AFB due to past grazing pressures in which shrubs, cacti, and other forbs have replaced the original grassland species. Table 3.3-1 lists representative species of this community. Those areas on the installation where grasses constitute a substantial portion of cover may be remnants of this community (Davis-Monthan AFB 2001).

ARIZONA NATIVE PLANT LAW

Arizona contains more rare and unusual plants than anywhere else in the U.S. Under Arizona Native Plant Law (Arizona Revised Statutes Title 3, Chapter 7, *Arizona Native Plants*), native plants cannot be removed from any Arizona land without the permission of the landowner and a permit from the Arizona Department of Agriculture. Plants that fall under this jurisdiction include the saguaro, hedgehog cactus, pincushion cactus, and numerous others. Many of these species occur on Davis-Monthan AFB.

Proposed Project Sites

Chevron (54 acres) – The Chevron Parcel is located on the northern edge of the Base and currently supports no vegetation, with much of its surface paved. The parcel is surrounded by East Golf Links Road, a divided six-lane highway to the north, and other primarily unvegetated lands on its remaining sides.

West Airfield (155 acres) – The West Airfield Parcel occurs on the western edge of the Base between the airfield runway protection zone on its east side and a landfill and TEP to the west. It supports scrubland vegetation as well as the non-native buffelgrass (*Pennisetum ciliare*), an invasive grass, and State of Arizona noxious weed in areas that have been previously disturbed.

Valencia Road (38 acres) – Being on the extreme southeast edge of the Base, the Valencia Parcel supports native scrub vegetation and is contiguous with similar habitat on most of its perimeter. A small tributary to the Atterbury Wash exits the parcel in its northeastern corner and catches/contains enough ephemeral water to support denser and larger vegetation. There are disturbed areas present within the western half of the Valencia Road Parcel, which is divided from the other half diagonally by a road. The Valencia Road Parcel contains buffelgrass, especially associated with areas of past disturbance. A two-lane road (E. Valencia Road) divides the southern boundary of the parcel from residential and commercial areas to the south.

3.3.2.2 WILDLIFE

Wildlife typical of the American Semi-desert and Desert province are typically well-adapted to extreme temperatures and low precipitation. Ungulates that occur in the area (e.g., javelinas) inhabit primarily the paloverde-cactus shrub community, which is largely absent from the Base. Carnivores, including the desert kit fox (*Vulpes velox macrotis*) and the coyote (*Canis latrans*) are

common in this province and are typically nocturnal. Other common species found in this province include the western spotted skunk (*Spilogale gracilis*), kangaroo rats (*Dipodomys* sp.), and pocket mice (*Perognathus* sp.). Common desert birds include the loggerhead shrike (*Lanius ludovicianus*), Gila woodpecker (*Melanerpes uropygialis*), Gambel's quail (*Callipepla gambelii*), and the cactus wren (*Campylorhynchus brunneicapillus*) (more discussion on birds is presented below under Migratory Birds). Reptiles include many species of snakes and lizards (Bailey 1995). A representative list of common wildlife that may occur at Davis-Monthan AFB is presented in Table 3.3-2.

Table 3.3-2. Common Wildlife Likely to Occur on Davis-Monthan AFB

Class	*Scientific Name*	*Common Name*
Mammals	*Canis latrans*	Coyote
	Lepus californicus	Black-tailed jackrabbit
	Sylvilagus audubonii	Desert cottontail
	Taxidea taxus	Badger
	Felis rufus	Bobcat
	Spilogale putorius	Spotted skunk
	Tayassu tajacu	Javelina
	Eptesicus fuscus pallidus	Big brown bat
	Tadarida brasiliensis mexicana	Mexican free-tailed bat
Birds	*Campylorhynchus brunneicapillus*	Cactus wren
	Toxostoma curvirostre	Curve-billed thrasher
	Callipepla gambelii	Gambel's quail
	Columbina inca	Inca dove
	Corvus corax	Raven
	Vermivora spp. and *Dendroica* spp.	Warbler species
	Bubo virginianus	Great-horned owl
	Accipiter cooperii	Cooper's hawk
	Parabuteo unicinctus	Harris' hawk
	Buteo jamaicensis	Redtail hawk
	Buteo swainsoni	Swainson's hawk
	Falco sparverius	American kestrel
	Geococcyx californianus	Greater roadrunner
	Zonotrichia leucophyrs	White-crowned sparrow
	Passerella iliaca	Fox sparrow
	Passer domesticus	House sparrow
Reptiles	*Phrynosoma solare*	Regal horned lizard
	Sceleporus undulatus	Eastern fence lizard
	Heloderina suspectrum	Gila monster
	Pituophis melanoleucus	Gopher snake
	Crotalus atrox	Diamondback rattlesnake

Sources: Davis-Monthan AFB 2008; personal communication, Lisa 2007

Wildlife species that occur on Davis-Monthan AFB are typical of the Sonoran Desert. The presence of the Base perimeter fence generally keeps larger animal species from entering the Base. Species occurring on the Base are also generally adapted to urban environments as over half the Base is characteristic of this land classification. This developed portion of the Base (the cantonment area) contains habitats and species more typical of rural and agricultural areas where disturbance has previously occurred. Grassy and landscaped areas are often watered, attracting a wide variety of wildlife species, particularly birds. Base structures can be attractive to bats and birds as roosting and nesting areas. Davis-Monthan AFB is known to have a diverse wildlife community. There are over 120 avian species, several mammalian, reptilian, and amphibian species, as well as hundreds of invertebrate species that have been documented on Base (Davis-Monthan AFB 2001).

While currently having no formal protections, there is concern in the Tucson area that the Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) may be declining in numbers. This snake is also considered a priority vulnerable species in the Sonoran Desert Conservation Plan (Pima County 2008a). A petition to list the species as endangered under the ESA was filed in 2004. In 2008, the USFWS responded with a finding that the snake may warrant protection, and is currently reviewing its status. This snake inhabits sandy washes, dunes, and rocky hillsides of arid deserts. The shovel-nosed snake prefers areas with scattered mesquite-creosote bush vegetative cover.

With the greater diversity and density of vegetation that occurs in the riparian areas, the relatively small number of acres comprising this community provide richer habitat for many more species than the surrounding uplands (Davis-Monthan AFB 2001).

MIGRATORY BIRDS

Davis-Monthan AFB falls between the Central and Pacific Flyways and within the Sonoran Desertscrub Habitat Region. The region is rich in bird diversity, especially during migratory periods. Typical birds that occupy the Arizona Uplands vegetation subdivision include Harris hawk, white-winged dove, roadrunner, mourning dove, verdin, cactus wren, black-tailed gnatcatcher, phainopepla, Gambel's quail, Costa's hummingbird, gilded flicker, and Gila woodpecker (Latta *et al*. 1999). The Arizona Partners in Flight Conservation Plan identified bird species that appear to be sensitive to loss of undisturbed native habitat associated with urbanization that should be monitored in the Arizona Uplands vegetation subdivision. Of those listed, only Gambel's quail and greater roadrunner are likely to occur on the Base. This Conservation Plan also lists bird species that are indicators of Sonoran Desertscrub habitat health that include Costa's hummingbird, gilded flicker, rufous-winged sparrow, Le Conte's thrasher, purple martin (Latta *et al.* 1999). Of these species, only the rufous-wing sparrow and Costa's hummingbird have been documented on the Base (Tucson Bird Count 2004; personal communication, Lisa 2007), but other species may be transients in the area.

SPECIAL-STATUS SPECIES

There are currently 76 special status wildlife and plant species listed by the AZGFD for Pima County, Arizona. Of the 76 species, the two species known to occur on Davis-Monthan AFB are

the western burrowing owl and American peregrine falcon. Also, three species have the potential to occur because their suitable habitat requirements are present; however, they have not been documented on Base. These species are the lesser long-nosed bat, cave myotis bat, and the Pima pineapple cactus.

No federally threatened, endangered, or proposed threatened species are known to occur on Base (Davis-Monthan AFB 2006a, 2008; personal communication, Lisa 2007). In the spring of 2009, a biological survey was conducted on the proposed SPS parcels. This biological survey focused on detecting the presence of the Pima pineapple cactus, Tucson shovel-nosed snake, and the western burrowing owl (AZGFD 2009). Table 3.3-3 contains a list of special status species known to occur on, or in the nearby vicinity of (within 6 miles) Davis-Monthan AFB and the general habitat requirements for each species.

Proposed Project Sites

Chevron (54 acres) – The Chevron Parcel has intermittent sparse vegetation and has currently unused burrowing owl burrows within the parcel. The most recent biological survey conducted by the AZGFD detected the presence of a western burrowing owl. No Pima pineapple cactus were detected and it was determined that the Chevron parcel does not have suitable habitat for the Tucson shovel-nosed snake. The presence of East Golf Links Road, a divided six-lane highway along the northern boundary, would preclude most species from accessing the parcel, as well as the Base perimeter fence. Common, urban species such as birds that inhabit the developed and landscaped areas of the Base may occasionally visit the parcel.

West Airfield (155 acres) – The West Airfield Parcel supports scrubland vegetation and is a portion of a contiguous corridor between developed lands that likely supports some larger, human-tolerant wildlife species such as coyote and javelina. Small mammals, reptiles, and birds are also likely residents. The recent biological survey by AZGFD in 2009 determined that the West Airfield parcel has suitable habitat for the Tucson shovel-nosed snake. However, no Tucson shovel-nosed snakes were detected during the surveys. No Pima pineapple cactus or western burrowing owls were detected during this survey.

Valencia Road (38 acres) – Occurring in the less-developed area of the Base, the Valencia Road Parcel supports native scrubland, but also contains several disturbed areas. Small tributaries to the Atterbury Wash occur on the parcel, which could be expected to provide habitat and an access corridor for wildlife. Approximately a third of the parcel has been disturbed and contains bare soil. The Base perimeter fence surrounds the parcel on three sides, which decreases its habitat value for wildlife due to fragmentation from adjacent habitat for most animals. No Pima pineapple cactus, western burrowing owls, or Tucson shovel-nosed snakes were detected during the 2009 biological surveys.

Table 3.3-3. Special-Status Species Occurring On or Near Davis-Monthan AFB

Class	*Genus species*	*Common Name*	*USFWS*	*AZGFD*	*General Species Habitat Requirements*	*Occurrence at Davis-Monthan AFB Based on Habitat Requirements*
Bird	*Athene cunicularia hypugaea*	Western burrowing owl	SC	WSCA	Variable in open (may occur in human developed areas), well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals.	Occurs
Bird	*Falco peregrinus anatum*	American peregrine falcon	SC	WSCA	Steep, sheer cliffs overlooking woodlands, riparian areas, or other habitats supporting avian prey species in abundance.	Occurs
Bird	*Glaucidium brasilianum cactorum*	Cactus ferruginous pygmy-owl	SC	WSCA	Nests in saguaro cactus cavities excavated by other species.	Not known to occur
Mammal	*Leptonycteris curasoae yerbabuenae*	Lesser long-nosed bat	LE	WSCA	Desert scrub habitat with agave and columnar cacti present as food plants.	May Occur
Mammal	*Myotis velifer*	Cave myotis bat	SC	-	Desertscrub of creosote, brittlebush, paloverde, and cacti. Roost in caves, tunnels, mineshafts, under bridges, and sometimes in buildings within a few miles of water.	May Occur
Plant	*Coryphantha scheeri* var. *robustispina*	Pima pineapple cactus	LE	-	Sonoran desertscrub or semi-desert grassland communities.	Potential to Occur

SC = Species of Concern; LE = List Endangered; WSCA = Wildlife of Special Concern in Arizona.
Sources: personal communication, Lisa 2007; personal communication, Snow 2004; AZGFD 2004, 2008

3.3.2.3 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.

There are no jurisdictional wetlands found on the Base; however, a ponding area located on the northern end of the runway was determined to be a jurisdictional water of the U.S. (Davis-Monthan AFB 2006a).

3.4 AIR QUALITY

3.4.1 Definition of the Resource

This section discusses air quality considerations and conditions in the area around Davis-Monthan AFB in Pima County, Arizona. It addresses air quality standards and describes current air quality conditions in the region.

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

These federal standards, known as the NAAQS, represent the maximum allowable atmospheric concentrations and were developed for seven "criteria" pollutants: O_3, NO_2, CO, SO_2, particulate matter less than or equal to 10 microns in diameter (PM_{10}), particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and Pb. Because volatile organic compounds (VOCs) and nitrogen oxides (NO_x) are precursors to the formation of O_3 in the atmosphere, control of these pollutants is the primary method of reducing O_3 concentrations in the atmosphere. The NAAQS are defined in terms of concentration (e.g., parts per million [ppm] or micrograms per cubic meter [$\mu g/m^3$]) determined over various periods of time (averaging periods). Short-term standards (1-hour, 8-hour, or 24-hour periods) were established for pollutants with acute health effects and may not be exceeded more than once a year. Long-term standards (annual periods) were established for pollutants with chronic health effects and may never be exceeded.

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

State Air Quality Standards. Under the CAA, state and local agencies may establish ambient air quality standards (AAQS) and regulations of their own, provided that these are at least as stringent as the federal requirements. For all criteria pollutants, Arizona has adopted the NAAQS. A summary of the federal and Arizona AAQS that apply to the proposed project area is presented in Table 3.4-1.

Table 3.4-1. Arizona and Federal Ambient Air Quality Standards

Air Pollutant	*Averaging Time*	*Arizona AAQS*	FEDERAL (NAAQS)	
			Primary	*Secondary*
Carbon Monoxide (CO)	8-hour 1-hour	9 ppm 35 ppm	9 ppm 35 ppm	--- ---
Nitrogen Dioxide (NO_2)	AAM	0.053 ppm	0.053 ppm	0.053 ppm
Sulfur Dioxide (SO_2)	AAM 24-hour 3-hour	0.030 ppm 0.140 ppm 0.500 ppm	0.030 ppm 0.140 ppm ---	--- --- 0.500 ppm
Particulate Matter (PM_{10}) [1]	AAM 24-hr	50 µg/m^3 150 µg/m^3	--- 150 µg/m^3	--- 150 µg/m^3
Particulate Matter ($PM_{2.5}$) [2]	AAM 24-hour	15 µg/m^3 35 µg/m^3	15 µg/m^3 35 µg/m^3	15 µg/m^3 35 µg/m^3
Ozone (O_3) [3]	1-hour 8-hour	--- 0.080ppm	0.120 ppm 0.080 ppm	0.120 ppm 0.080 ppm
Lead (Pb) and Lead Compounds	Calendar Quarter	1.5 µg/m^3	1.5 µg/m^3	1.5 µg/m^3

Notes: AAM = Annual Arithmetic Mean; ppm = parts per million; µg/m^3 = micrograms per cubic meter

1. In 2006, the federal annual PM_{10} standard of 50 µg/m^3 was revoked; Arizona Administrative Code 17.08 has kept the 50 µg/m^3 for PM_{10} standard.
2. In 2006, the $PM_{2.5}$ standard for the 24-hour averaging time was changed from 65 µg/m^3 to 35 µg/m^3.
3. The USEPA replaced the 1-hour O_3 standard with the 8-hour O_3 standard in June 2005. The 1-hour standard still applies in a few areas; however, Tucson, Arizona is not one of them.

Sources: 40 Code of Federal Regulations 50; Arizona Administrative Code Chapter 17.08.

State Implementation Plan. For nonattainment regions, states are required to develop an SIP designed to eliminate or reduce the severity and number of NAAQS violations, with an underlying goal to bring state air quality conditions into (and maintain) compliance with the NAAQS by specific deadlines. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS in each state.

Prevention of Significant Deterioration (PSD). Section 162 of the CAA further established the goal of PSD of air quality in all international parks, national parks which exceeded 6,000 acres, and national wilderness areas and memorial parks which exceeded 5,000 acres if these areas were in existence on August 7, 1977. These areas were defined as mandatory Class I areas, while all other attainment or unclassifiable areas were defined as Class II areas. Under CAA Section 164, states or tribal nations, in addition to the federal government, have the authority to redesignate certain areas as (nonmandatory) PSD Class I areas (e.g., a national park or national wilderness area established after August 7, 1977) which exceeds 10,000 acres. PSD Class I areas

are areas where any appreciable deterioration of air quality is considered significant. Class II areas are those where moderate, well-controlled growth could be permitted. Class III areas are those designated by the governor of a state as requiring less protection than Class II areas. No Class III areas have yet been so designated. The PSD requirements affect construction of new major stationary sources in the PSD Class I, II, and III areas and are a pre-construction permitting system.

Visibility. CAA Section 169(a) established the additional goal of prevention of further visibility impairment in PSD Class I areas. Visibility impairment is defined as a reduction in the visual range and atmospheric discoloration. Determination of the significance of an activity on visibility in a PSD Class I area is typically associated with evaluation of stationary source contributions. The USEPA is implementing a Regional Haze rule for PSD Class I areas that will address contributions from mobile sources and pollution transported from other states or regions. Emission levels are used to qualitatively assess potential impairment to visibility in PSD Class I areas. Decreased visibility may potentially result from elevated concentrations of PM_{10} and SO_2 in the lower atmosphere.

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

(a) cause or contribute to any new violation;

(b) increase the frequency or severity of any existing violation; or

(c) delay timely attainment of any standard, interim emission reductions, or milestones in conformity to an SIP's purpose of eliminating or reducing the severity and number of NAAQS violations or achieving attainment of NAAQS.

General conformity applies only to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual thresholds identified in the rule, a conformity determination is required of that action. The thresholds become more restrictive as the severity of the nonattainment status of the region increases.

Stationary Source Operating Permits. In Pima County, the PDEQ regulates air quality and processes permit applications for stationary air pollution sources. Activity permits must be obtained for various construction, earthmoving, and land clearing activities. Title V of the CAA Amendments of 1990 requires states to issue Federal Operating Permits for major stationary sources. A major stationary source in Pima County is a facility (i.e., plant, base, or activity) that emits more than 100 tons per year (TPY) of any criteria air pollutant, 10 TPY of a hazardous air pollutant (HAP), or 25 TPY of any combination of HAPs (40 CFR 93; USEPA 2007).

3.4.2 Existing Conditions

Regional Air Quality. Federal regulations at 40 CFR 81 delineate certain air quality control regions (AQCRs), which were originally designated based on population and topographic criteria closely approximating each air basin. The potential influence of emissions on regional

air quality would typically be confined to the air basin in which the emissions occur. Therefore, the ROI for air quality for the Proposed Action is the Pima Intrastate AQCR (AQCR 15), which includes Pima County, Arizona (40 CFR 81.269).

Attainment Status. A review of federally published attainment status for Tucson, Arizona in 40 CFR 81.303 indicated that Davis-Monthan AFB is located within a region designated as in attainment (i.e., meeting national standards) for all criteria pollutants including CO, NO_2, SO_2, PM_{10}, O_3, and Pb. The Tucson metropolitan area was designated as in attainment for CO as of July 10, 2000, and is currently covered by a 10-year maintenance plan for CO (65 FR 36353, June 8, 2000); therefore, although the county is designated as in attainment for CO, conformity requirements apply for CO due to its maintenance status.

In 1999, Tucson violated the 24-hour PM_{10} NAAQS due to high wind natural events and an extended period of low rainfall. As a result, the Pima County Department of Environmental Quality adopted a Natural Events Action Plan in 2002 to protect the public from airborne fine dust particles on days with high ambient levels of PM_{10} with increased enforcement and educational measures. Implementing the Natural Events Action Plan avoided possible redesignation of the Tucson area from attainment to nonattainment with respect to PM_{10}. No PM_{10} exceedances were recorded in 2006 (Pima County Department of Environmental Quality 2007).

PSD Class I Areas. Mandatory PSD Class I areas for the State of Arizona are listed under 40 CFR 81.403. The nearest PSD Class I area is the Saguaro National Park East which is 14 miles from Davis-Monthan AFB. The West Unit of Saguaro National Park is 21 miles west-northwest of the Base. Other nearby PSD Class I areas include the Galiuro Wilderness, 41 miles northeast of the Base; Chiricahua National Monument, 88 miles east of the Base; the Chiricahua Wilderness, 93 miles east-southeast of the Base; the Superstition Wilderness, 95 miles north of the Base; the Sierra Ancha Wilderness, 116 miles north of the Base; the Mazatzal Wilderness, 142 miles north of the Base; the Mount Baldy Wilderness, 145 miles north-northeast of the Base; the Gila Wilderness in New Mexico, 157 miles east of the Base; and the Pine Mountain Wilderness, 159 miles north (National Park Service 2004, n.d.a, n.d.b, n.d.c) of the Base (Figure 3.4-1).

Climate. The climate of Pima County and southeastern Arizona varies with elevation; the mountain ranges experience higher amounts of precipitation and lower temperatures than the low desert regions. Average maximum and minimum temperatures at the Tucson International Airport (elevation 2,560 feet) are 82 degrees Fahrenheit (°F) and 55°F, compared with 59°F and 34°F at the Palisades Ranger Station (elevation 8,000 feet), 40 miles away in the Coronado National Forest. Average annual precipitation is 12 inches in Tucson and 31 inches at the higher elevations. Average snowfall is slightly more than one inch per year in Tucson and 78 inches per year at the ranger station (Arizona Board of Regents 2004).

In general, the hottest period in Tucson is from May to September, with daytime temperatures often exceeding 100°F. Nighttime temperatures are typically 30 degrees cooler. Winters are mild with warm days and cool nights, occasionally falling below freezing. The majority of the rain falls during two rainy seasons: July through mid-September and December through mid-March. The summer storms are often torrential, with lightning strikes and occasional flash flooding.

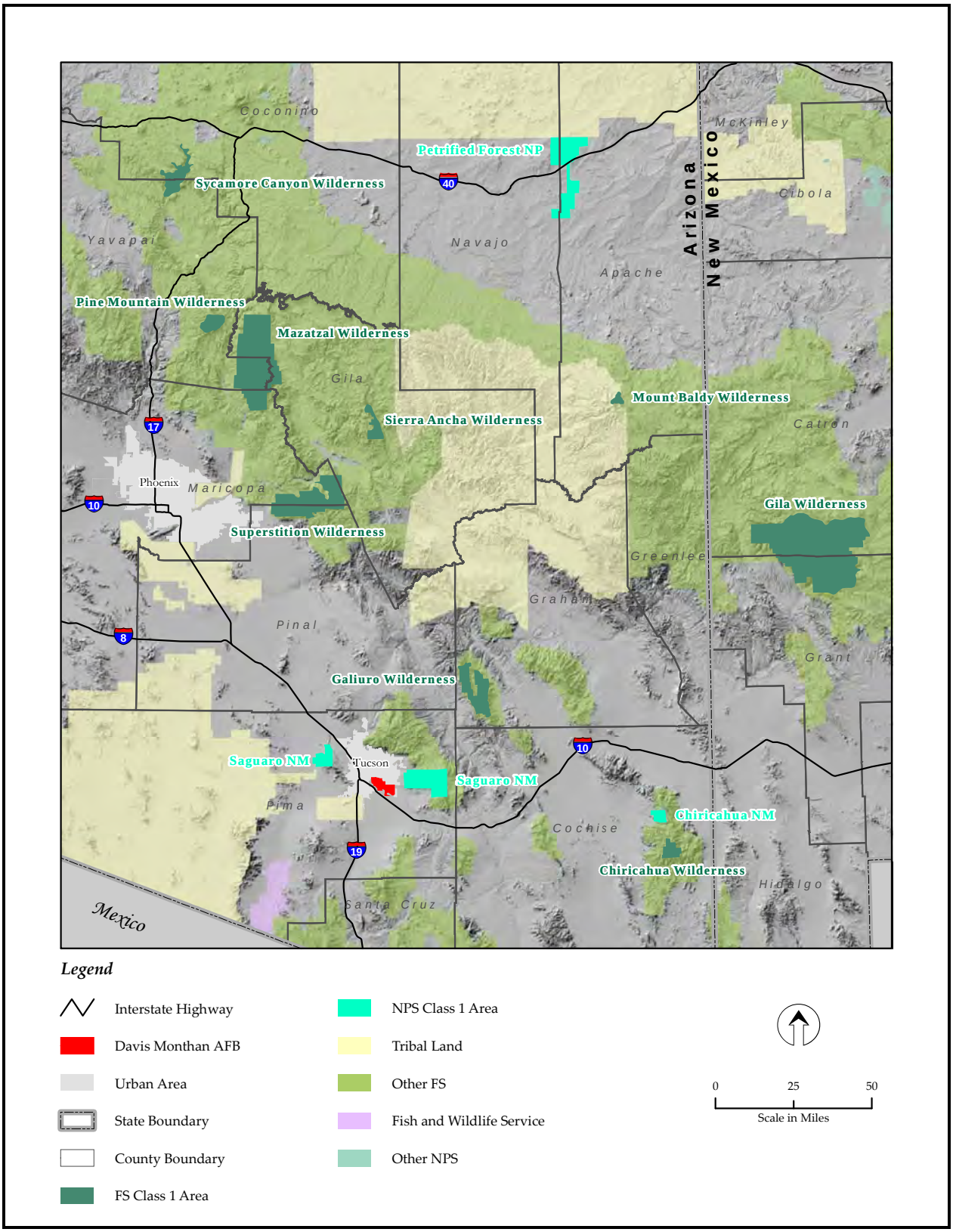


Figure 3.4-1. Prevention of Significant Deterioration (PSD) Class I Areas Near Davis-Monthan AFB, Arizona

Tucson experiences an average of 193 clear days, 91 partly cloudy days, and 81 cloudy days (53 of the 81 cloudy days are also considered rainy days) per year. Temperatures above 90°F occur during an average of 143 days per year; sub-freezing temperatures are experienced an average of 18 days per year. Wind is typically from the southeast year-round, at an average speed of 8.3 miles per hour (Friends of Saguaro National Park 2007; Western Regional Climate Center 2004).

Current Emissions. Sources of air emissions at Davis-Monthan AFB include mobile sources, non-road engines, and stationary sources. Mobile sources include aircraft, highway vehicles, and off-road vehicles. Nonroad engines include aerospace ground equipment, portable generators, welders, and grounds maintenance equipment. Because these mobile and nonroad sources are not regulated by the State of Arizona, they are not included in the base-wide emissions inventory. Stationary sources at Davis-Monthan AFB include jet engine test cells, fuel storage and distribution equipment, corrosion control facilities, fuel cell maintenance, solvent cleaning, abrasive blasting, boilers and heaters, emergency generators, and gasoline service stations. In the following table, particulate matter includes PM_{10} as a component of the total; NO_x includes NO_2 and other nitrogen compounds; and sulfur oxides (SO_x) include SO_2 and other sulfur compounds. Because VOCs and NO_x are precursors to the formation of O_3 in the atmosphere, control of these pollutants is the primary method of reducing O_3 concentrations in the atmosphere. Table 3.4-2 summarizes the results of an emissions inventory for stationary sources at Davis-Monthan AFB for calendar year 2008 (Flannery 2009).

Table 3.4-2. Baseline Emissions at Davis-Monthan AFB, Calendar Year 2008

	ANNUAL EMISSIONS (TONS PER YEAR)				
	CO	***VOC***	***NO_x***	***SO_x***	***PM_{10}***
Stationary Sources	33.1	32.3	38.3	2.83	11.3

Note: $PM_{2.5}$ emissions were not estimated in the 2005 Davis-Monthan AFB air emissions inventory.
Source: Flannery 2009

Davis-Monthan AFB operates under Operating Permit #1701, which contains voluntary limits on activity emissions for all major types of HAPs on the Base. The permit allows Davis-Monthan AFB 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 in 1998, the Base 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 that may emit air pollutants (Davis-Monthan AFB 2006b).

Regional Air Emissions. The previous section lists on-base emissions for Davis-Monthan AFB. The NEPA process, however, must also consider impacts from mobile sources and indirect emissions related to the project, some of which (for example, commuting of new employees to and from the facility) occur outside of the installation. For comparison purposes, Table 3.4-3 lists county-wide emissions for Pima County, as compiled by the USEPA in its National Emissions Inventory (NEI), which was last updated in 2002 (USEPA 2002). The 2002 NEI contains estimates of annual emissions for stationary and mobile sources of air pollutants in each country on an annual basis.

Table 3.4-3. Air Emissions Inventory for Pima County, Arizona Calendar Year 2002

Source Type	PIMA COUNTY EMISSIONS (TPY)				
	CO	*NO_x*	*PM*	*SO_x*	*VOC*
Area Sources	4,896	1,574	44,323	1,375	10,525
Nonroad Mobile	66,572	4,679	22,083	371	5,353
On-Road Mobile	9,432	1,886	22,178	68	1,101
Point Sources	4,652	5,799	1,576	3,160	919
Total	**85,552**	**13,938**	**90,160**	**4,974**	**17,898**

Source: USEPA 2002

3.5 NOISE

3.5.1 Definition of the Resource

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive, or stationary or transient. Stationary sources are normally related to specific land uses, e.g., housing tracts or industrial plants. Transient noise sources move through the environment, either along established paths (i.e., highways, railroads, and airports), or randomly. There is wide diversity in responses to noise that not only vary according to the type of noise and the characteristics of the sound source, but also according to 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 (i.e., a person or 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 that travel through a medium, like air, and are sensed by the eardrum. This may be likened to the ripples in water that would be produced 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 is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is nothing more than a mathematical tool that simplifies dealing with very large and very small numbers. For example, the logarithm of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is -6 (minus 6). Obviously, as more

zeros are added before or after the decimal point, converting these numbers to their logarithms greatly simplifies calculations that use these numbers. Sound levels are easily measured, but the variability is subjective and physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation by subjective terms such as "loudness" or "noisiness."

The term most often used when measuring the magnitude of sound is *sound pressure level*. Sound pressure level can vary over an extremely large range of amplitudes. It is a relative quantity, in that it is a ratio between the actual sound pressure and a fixed reference pressure, which is normally the threshold of human hearing. Table 3.5-1 presents the subjective effect of changes in sound pressure level.

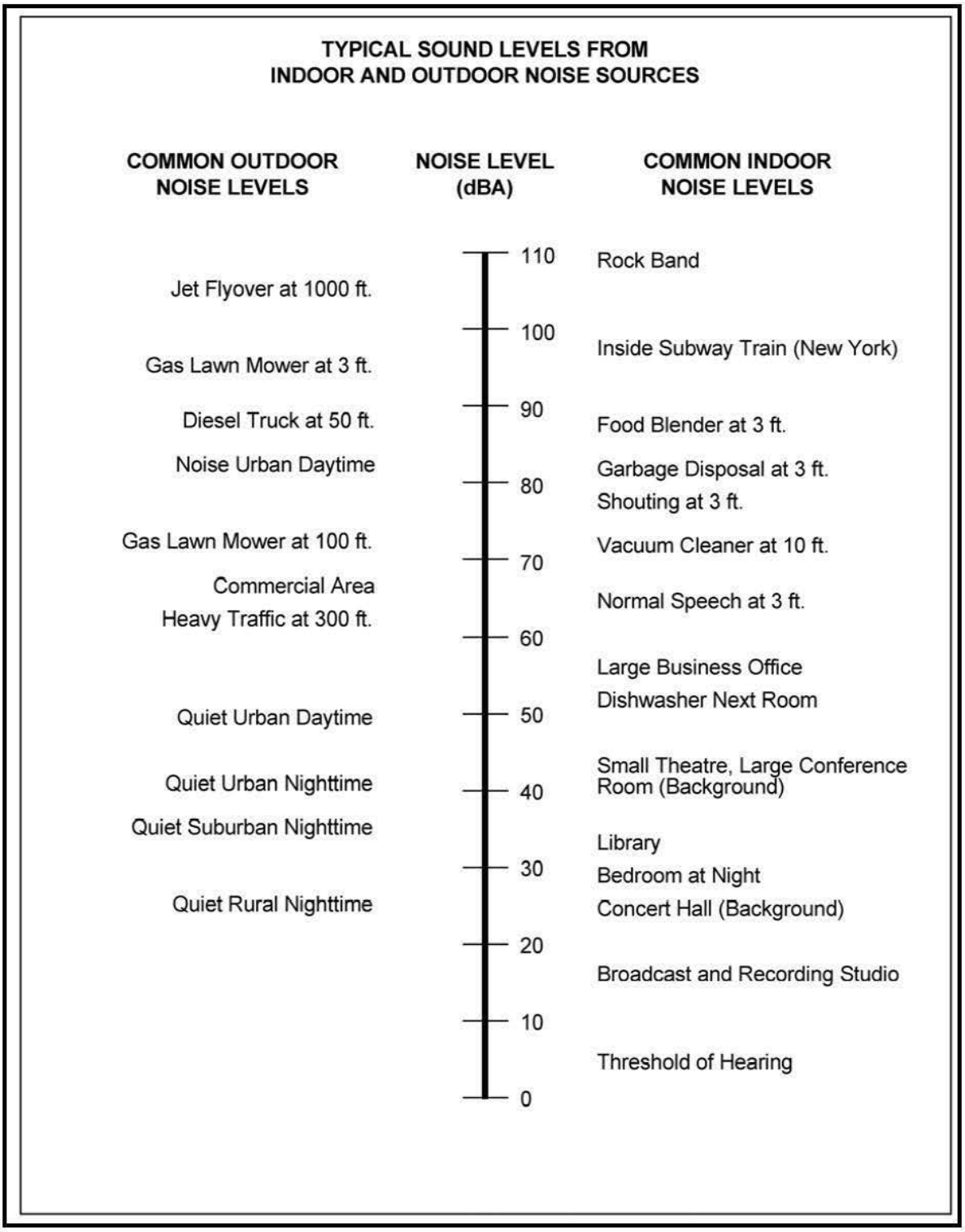
Table 3.5-1. Perceived Changes in Noise as Sound Pressure Changes

Change in Sound Level (dB)	CHANGE IN POWER		*Change in Apparent Loudness*
	Decrease	*Increase*	
3	1/2	2	Just perceptible
5	1/3	3	Clearly noticeable
10	1/10	10	Half or twice as loud
20	1/100	100	Much quieter or louder

Different sounds contain different frequencies. When describing sound and its effect on a human population, A-weighted decibel (dBA) sound levels are typically used to account for the response of the human ear. The term "A-weighted" refers to a filtering of the noise signal, which emphasizes frequencies in the middle of the audible spectrum and de-emphasizes low and high frequencies in a manner corresponding to the way the human ear perceives sound. This filtering network has been established by the American National Standards Institute (American National Standards Institute 1983). The dBA noise level has been found to correlate well with people's judgments of the noisiness of different sounds and has been used for many years as a measure of community noise. Source: Harris 1991

Figure 3.5-1 shows the typical dBA sound levels for various sources.

The word "metric" is used to describe a standard of measurement. As used in environmental noise analysis, there are many different types of noise metrics. Each metric has a different physical meaning or interpretation and each metric was developed by researchers attempting to represent the effects of environmental noise.



Source: Harris 1991

Figure 3.5-1. Typical Sound Levels from Indoor and Outdoor Noise Sources

The day-night average sound level (DNL) was developed to evaluate the total daily community noise environment. DNL is the average A-weighted acoustical energy for a 24-hour period with a 10 dB upward adjustment added to the nighttime levels (10 p.m. to 7 a.m.). This adjustment is an effort to account for the increased sensitivity of most people to noise in the quiet nighttime hours. DNL 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.

3.5.2 Existing Conditions

Noise associated with activities at Davis-Monthan AFB is characteristic of that associated with most Air Force installations with a flying mission. During periods of no aircraft activity, noise associated with the Base operations results primarily from the firing range, maintenance and shop activities, ground traffic movement, occasional construction, and similar sources. The resultant noise is almost entirely restricted to the Base itself and is comparable to that which might occur in adjacent community areas. 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 (Federal Interagency Committee on Urban Noise 1980); 65 to greater than 85 dB (DNL) noise contours are frequently used to help determine compatibility of aircraft operations with local land use. Figure 3.5-2 depicts the baseline DNL 65 to 85 dB noise contours in 5 dB increments surrounding the Davis-Monthan AFB airfield. Table 3.5-2 presents the baseline land acreage exposed to noise levels greater than 65 dB (DNL).

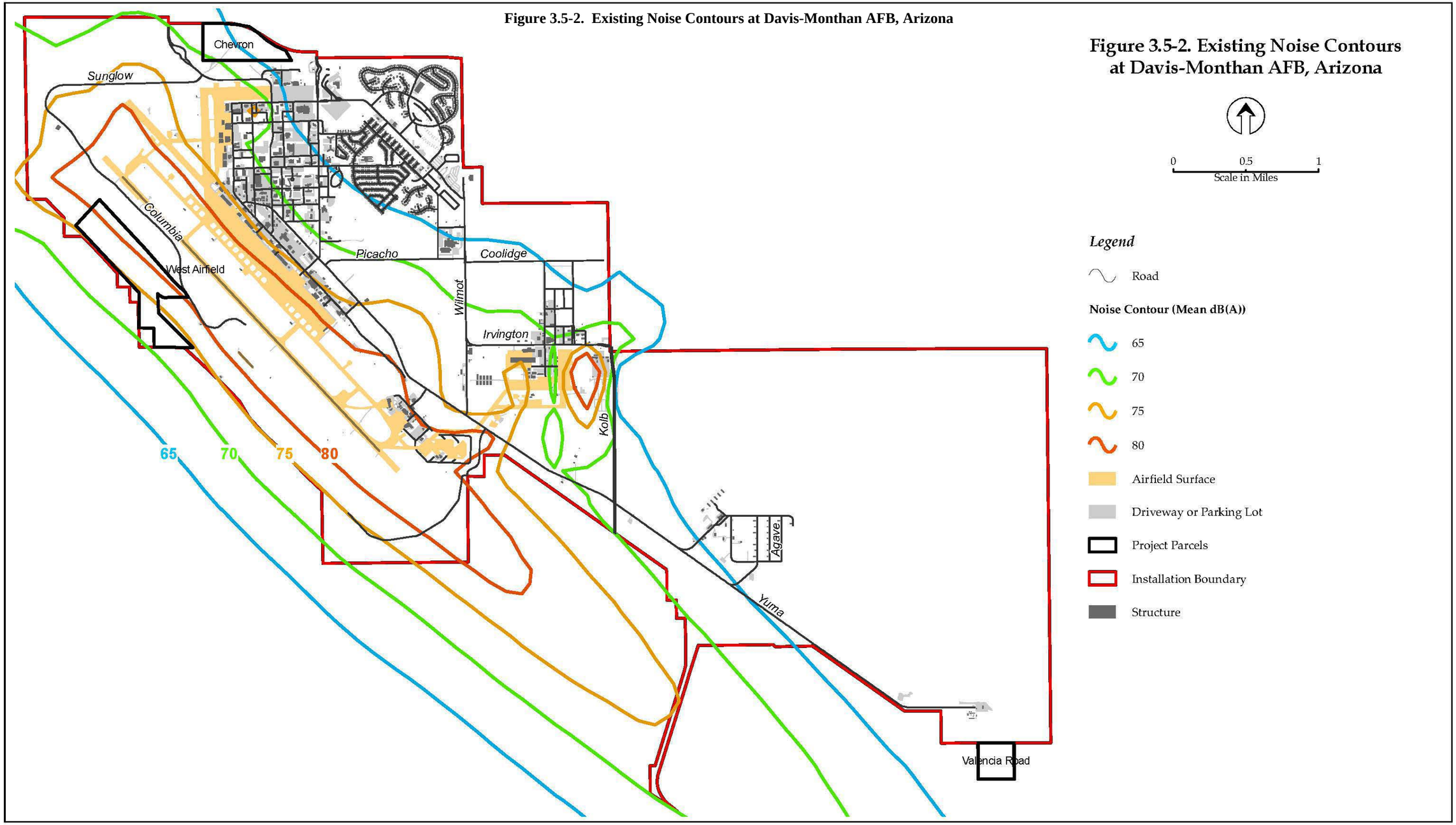
Table 3.5-2. Noise Contour Acreage, Baseline Conditions

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: ACC 2002

Much of the Base administrative, industrial, and unaccompanied housing areas are within the DNL 65 dB noise level contour. Although not prohibited, residential and community areas are discouraged from being sited inside the DNL 65 dB noise contour. Sound attenuation is required for administrative facilities exposed to the DNL 70 dB noise contour, which includes areas mostly along the flight line (Davis-Monthan AFB 2006a).

Figure 3.5-2. Existing Noise Contours at Davis-Monthan AFB, Arizona



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3.6 LAND USE AND VISUAL RESOURCES

3.6.1 Definition of the Resource

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, waterbodies, 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.

The ROI for land use and visual resources consists of all the lands of Davis-Monthan AFB, as well as adjacent portions of Tucson and Pima County.

3.6.2 Existing Conditions

3.6.2.1 LAND USE

Davis-Monthan AFB occupies 10,613 acres located mostly within the city limits of Tucson. A small portion of the southern end of the Base is located within unincorporated Pima County. 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 Davis-Monthan AFB in 1948 with a clause that states that 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 Davis-Monthan AFB by the City of Tucson with the lease terms lasting until 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 Davis-Monthan AFB. The remaining 958 acres are considered public domain (Davis-Monthan AFB 2006a).

There are 12 land use categories at Davis-Monthan AFB. These are listed in Table 3.6-1 and are depicted in Figure 3.6-1. As shown in Table 3.6-1, Open Space is the most prevalent land use type on base, followed by Industrial and Airfield uses, respectively. Although land uses within the Base are considered to be generally compatible, most of the Base's existing land use pattern was developed during and shortly after World War II, prior to the establishment of current Air Force guidelines for airfield land use patterns. As such, some anomalies and conflicts with land use patterns exist at Davis-Monthan AFB. Primary on-base conflicts are associated with airfield related uses such as structures that are located within airfield CZs (Davis-Monthan AFB 2006a).

Table 3.6-1. 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, Civil Engineering facilities, vehicle maintenance facilities, etc.
Administrative	85	Headquarters facilities, base support, security, etc.
Community Commercial	68	AAFES, commissary, credit union, dining hall, 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 Space	4,209	Conservation areas, safety clearance zones, etc.
Water	13	Storm drainage collection ponds

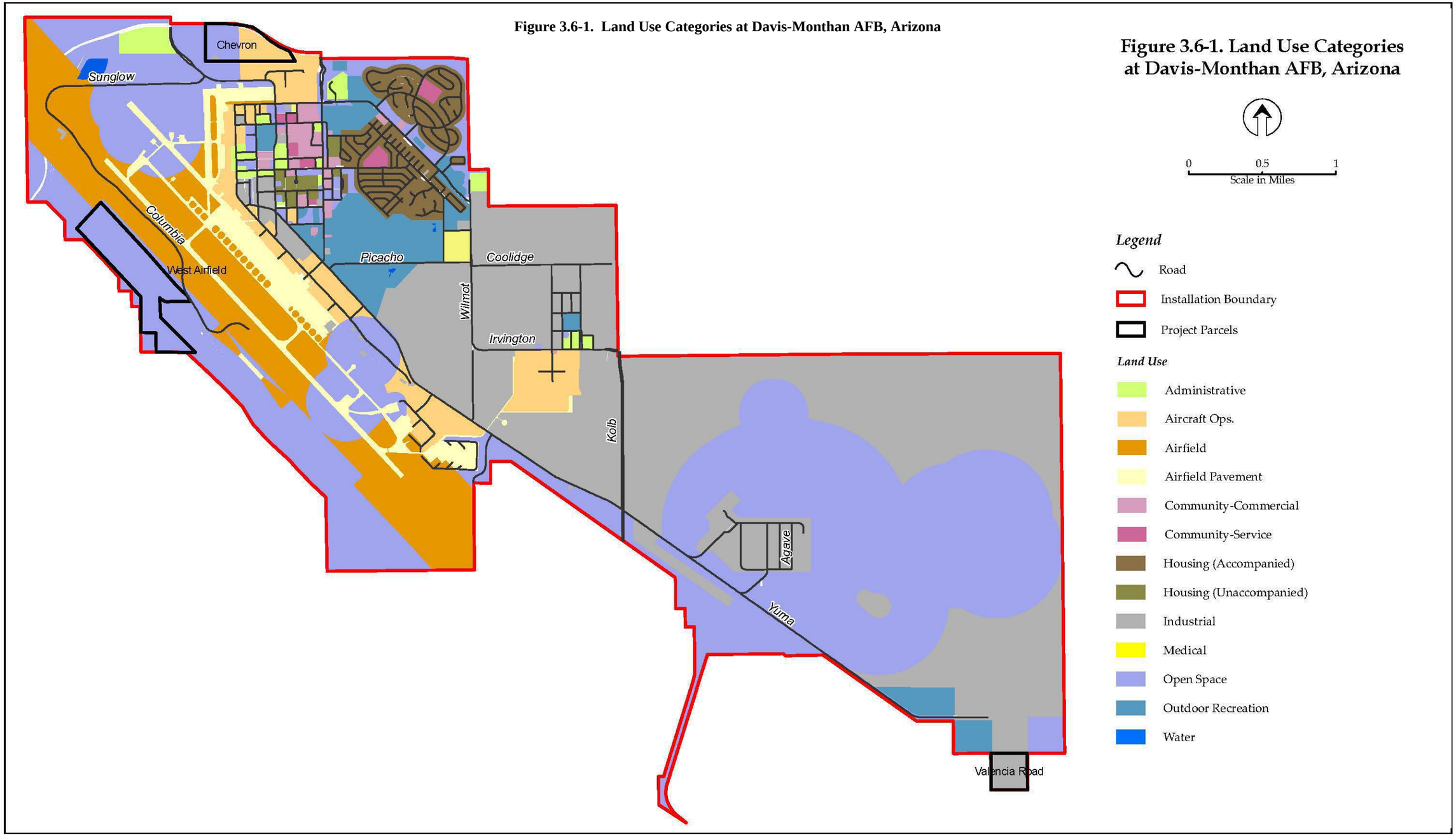
Source: Davis-Monthan AFB 2006a

Land use policies associated with the airfield at Davis-Monthan AFB include the following (Davis-Monthan AFB 2006a):

- New structures at Davis-Monthan AFB cannot be sited within the CZ,
- Structures within 1,000 feet of the centerline of the runway (lateral CZ) cannot be above ground level,
- Structures cannot be located within 200 feet of the centerline on taxiways, and
- Structures that are not related to flight operations cannot be located within 125 feet of the edge of the aircraft parking apron.

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 Davis-Monthan AFB on most sides, with the most highly developed areas located immediately north and west of the Base boundary. Land use adjacent to the north side of the Base is primarily suburban residential, with a mix of office, retail, and business services. Land use to the east and south of the Base comprises primarily undeveloped rangeland, along with pockets of planned mixed uses including light industrial, scientific and research, and single-family residential subdivisions. Land use to the west comprises residential, office retail, business services, and light industrial. Encroachment is a primary land use concern at the Base as 3,139 acres outside of the Base are considered to be affected by the Base operations, with 471 acres considered to be incompatible with the Base's aircraft operations. The primary conflicts between the Base operations and off-base land uses are safety risks related to military overflights and noise exposure (Davis-Monthan AFB 2006a; ACC 2002; Arizona Department of Commerce 2004).

Figure 3.6-1. Land Use Categories at Davis-Monthan AFB, Arizona



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In order to address land use conflicts related to the encroachment of urban development adjacent to Davis-Monthan AFB, 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 Base 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 this study is to protect the Base's ability 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 the Base in a manner that is consistent with the Base's mission. Among the primary goals of this study are:

- 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 that impacts the Base's mission (Arizona Department of Commerce 2004).

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 the Base. The Tucson Working Group and Policy Advisory Committee and the Davis-Monthan AFB – Tucson Joint Land Use Study Advisory Committee identify resolutions to possible land use compatibility issues associated with Davis-Monthan AFB. 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, Davis-Monthan AFB, 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 Davis-Monthan AFB.

3.6.2.2 VISUAL RESOURCES

The visual character of Davis-Monthan AFB features a mixture of architectural styles and varying degrees of landscaping, with little uniformity. The varying architectural styles of buildings on the Base 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. Base landscaping ranges from areas that are highly landscaped to areas that generally lack any landscaping.

3.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.7.1 Definition of the Resource

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.

To comply with NEPA, the planning and decision making process for actions proposed by federal agencies involves a study of other relevant environmental statutes and regulations, including EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. The essential purpose of EO 12898 is to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, tribal, and local programs and policies.

Because children may suffer disproportionately from environmental health risks and safety risks, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was introduced in 1997 to prioritize the identification and assessment of environmental health risks and safety risks that may affect children and to ensure that federal agency policy, programs, activities, and standards address environmental risks and safety risks to children. This section identifies the distribution of children and locations where the number of children in the affected area may be proportionately high (e.g., schools, child care centers, etc.).

The ROI for socioeconomics for this analysis includes the Tucson Metropolitan Statistical Area, which is essentially Pima County. Baseline trends for this region are analyzed in comparison to those at the state and national scale. Consequently, various data in this section are presented for the ROI, county, state, and national levels. Existing conditions for environmental justice were analyzed through demographic characterization, particularly ethnicity and poverty status for the ROI.

3.7.2 Existing Conditions

3.7.2.1 POPULATION AND EMPLOYMENT

Table 3.7-1 compares the differences in population in the ROI between the 2000 Census and estimates from the most recent Census data. This comparison reveals that the State of Arizona experienced extraordinary growth, increasing nearly 24 percent during the last seven years. Pima County also experienced population growth that exceeded the national average.

Table 3.7-1. Population in the ROI

Area	*2000 Census Population*	*2007 Population*	*Percent Change*
United States	281,421,906	301,621,159	7.2
Arizona	5,130,632	6,338,755	23.5
Pima County	843,746	967,089	14.6

Source: U.S. Census Bureau (USCB) 2007a, 2007b, 2007c

The educational, health, and social services industry employed the largest percent of the civilian population over 16 years of age during 2007 in Pima County (22.8), Arizona (18.8), and the U.S. (21.2). In each of these areas, commercial employees were the most common, while government employees constituted 18.4, 14.3, and 14.5 percent of the workforce, respectively (U.S. Census Bureau [USCB] 2007a, 2007b, 2007c).

The military population at Davis-Monthan AFB is approximately 6,500 personnel. Davis-Monthan AFB employs nearly 1,700 civilian workers. As the fifth largest employer in the Tucson area (Tucson Regional Economic Opportunities 2008), Davis-Monthan AFB has an annual regional economic impact of over $1.1 billion (Tucson Regional Economic Opportunities 2008), which includes not only direct impacts such as payroll and pensions, but also indirect impacts such as materials and construction expenditures.

Table 3.7-2 compares the per capita income in the ROI with the state and the U.S. Pima County and the State of Arizona are comparable to the national mean.

Table 3.7-2. Per Capita Income

Geographic area	*Per Capita Income, In Dollars, 2007*
United States	26,688
Arizona	24,811
Pima County	24,319

Source: USCB 2007a, 2007b, 2007c

3.7.2.2 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 in the ROI.

DEMOGRAPHICS

The comparative statistics for race and Hispanic identification for the ROI are presented in Table 3.7-3. Pima County and Arizona have over twice the proportion of the population identified as Hispanic or Latino than the nation. Persons identifying themselves as white constitute the same percentage of the population at the national, state, and metropolitan levels; however, in minority groups, both Arizona and Pima County have higher proportions of "some other race" and "American Indian or Alaska Native" groups than the nation.

Table 3.7-3. Profile of Demographic Characteristics, Year 2000

Geographic Area	RACE								Hispanic or Latino (of any race)
	ONE RACE							Two or more races	
	One race	*White*	*Black or African American*	*American Indian and Alaska Native*	*Asian*	*Native Hawaiian and Other Pacific Islander*	*Some other race*		
U.S.	274,595,678	211,460,626	34,658,190	2,475,956	10,242,998	398,835	15,359,073	6,826,228	35,305,818
(%)	97.6	75.1	12.3	0.9	3.6	0.1	5.5	2.4	12.5
Arizona	4,984,106	3,873,611	158,873	255,879	92,236	6,733	596,774	146,526	1,295,617
(%)	97.1	75.5	3.1	5.0	1.8	0.1	11.6	2.9	25.3
Pima County	816,677	633,387	25,594	27,178	17,213	1,088	112,217	27,069	247,578
(%)	96.8	75.1	3.0	3.2	2.0	0.1	13.3	3.2	29.3

Note: Only the percentages under the 'Race' heading will total 100 percent. Hispanic or Latino can be part of any race, and therefore the percent of Hispanic or Latino is percent of total population.
Source: USCB 2007a, 2007b, 2007c

POVERTY AND LEGAL STATUS

The geographic comparison areas have relatively the same percent of persons under age 18, as seen in Table 3.7-4. Poverty rates for both individuals and persons under age 18 are greater than the national level (Table 3.7-5). Poverty in 2000 was defined as an income of $8,794 in a household of one individual, or $17,603 for a family of four (USCB 2000). Consequently, the ROI has higher poverty rates than the national average, but is composed of comparable numbers of persons under age 18.

Table 3.7-4. Persons Under Age 18 in the ROI

Geographic Area	*Percent Under Age 18, Year 2000*
United States	25.7
Arizona	26.6
Pima County	24.6

Source: USCB 2007a, 2007b, 2007c

Table 3.7-5. Individuals in Poverty in the ROI, Year 2000

Geographic Area	*Percent Individuals Below Poverty Level*	*Percent Persons Under Age 18 Below Poverty Level*
United States	12.4	16.6
Arizona	13.9	19.3
Pima County	14.7	20.0

Source: USCB 2007a, 2007b, 2007c

3.8 CULTURAL RESOURCES

3.8.1 Definition of the Resource

Cultural resources are any prehistoric or historic district, site, or 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 that are rooted in its history, and are important in maintaining the continuing cultural identity of the community.

Historic properties (as defined in 36 CFR 60.4) are significant archaeological, architectural, or traditional resources that are either eligible for listing, or listed in, the NRHP. Historic properties are evaluated for potential adverse impacts from an action, as are significant traditional resources identified by American Indian tribes or other groups. In 1999, the DoD promulgated its *American Indian and Alaska Native Policy*, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. The policy requires an assessment, thorough consultation of the effect of proposed DoD actions that may have the potential to significantly affect protected tribal resources, tribal rights, and Indian lands before decisions are made by the services.

The proposal is to construct an SPS on one or more parcels located on the Base, and therefore the ROI for cultural resources is Davis-Monthan AFB.

3.8.2 Existing Conditions

3.8.2.1 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 were occupied by shallow lakes and wetlands, creating an ideal habitat for birds. The area was host to 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 (Fagan 1991). 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 a variety of smaller game, but also used a wide range of plant resources as indicated by a marked increase in ground stone processing tools (Davis-Monthan AFB 2004b). 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, long distance trade, 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 that had seen continuous occupation for 10,000 years were vacated (Davis-Monthan AFB 2004b).

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 (Davis-Monthan AFB 2004b). 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 contains 71,095 acres just south of the City of Tucson (Intertribal Council of Arizona 2003).

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 (Pascua Yaqui 2007).

The Tucson Presidio was established in 1775, and Tucson became part of Mexico in 1821 (City of Tucson 2008a). After the war between the U.S. and Mexico in 1846, most of New Mexico and Arizona was ceded to the U.S. 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 in importance into the 20th century.

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 (Davis-Monthan AFB 2007a). 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 (Davis-Monthan AFB 2007a). During World War II, Davis-Monthan AFB served as a training location for medium and heavy bomber operations. Because of its arid climate, after World War II Davis-Monthan AFB became the final resting place of decommissioned B-29 (Super Fortress) long-range heavy bombers and C-47 (Gooney Bird) transport aircraft, among others. Today the facility contains more than 5,000 aircraft, providing a stockpile of rare parts for airframes (Davis-Monthan AFB 2007a). Davis-Monthan Field was officially renamed Davis-Monthan AFB in 1948 shortly after it was placed under the jurisdiction of the Strategic Air Command (Davis-Monthan AFB 2007a).

The 162nd Fighter Wing of the Arizona ANG was established at Davis-Monthan AFB in 1975. The 162nd executes "Operation Snowbird" which affords ANG units from the northern U.S. and high elevation locations to continue training during the winter. Davis-Monthan AFB is also home to Detachment 1 of the 120th Fighter Wing of the Montana ANG (Davis-Monthan AFB 2007a).

Currently, Davis-Monthan AFB occupies approximately 10,613 acres on the southeast side of the City of Tucson. Realignment under ACC in 1992 brought the 12th Air Force Headquarters from Texas to Davis-Monthan (Davis-Monthan AFB 2007a). The Base supports operations of the 355 FW flying A-10, OA-10, EC-130H, and EC-130E aircraft, as well as the UH-60 Blackhawk and Pavehawk helicopters, among others.

3.8.2.2 IDENTIFIED CULTURAL RESOURCES

The only NRHP-listed property associated with Davis-Monthan AFB is the Titan II Missile Silo site in Green Valley, Arizona, outside of the present project area (National Register Information System 2007). Once part of a 54-missile network on constant alert throughout the Cold War Period, it 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 2004b).

Archaeological surveys at Davis-Monthan AFB began in the 1980s. A survey of 4,675 semi-improved and unimproved acres at the Base took place in 1993 (USACE 1993). The area surveyed represents approximately 45 percent of the total base acreage and nearly 66 percent of its undeveloped areas. These areas include the Valencia Road parcel and portions of the West Airfield parcel. The Chevron parcel and the southwest portion of the West Airfield parcel were not included in the surveys. The surveys recorded 8 archaeological sites and 139 isolated artifacts (USACE 1993). Only one of the recorded sites (AZ BB:13:392) was evaluated as eligible for the NRHP. This site has been excavated completely, and its scientific potential has been exhausted (Davis-Monthan AFB 2004b). None of the sites is within the area of proposed construction.

There are 474 on-base facilities that are 50 years old or older. Of the total, 52 are general use structures. All of these facilities are treated as eligible for inclusion in the NRHP until they are determined ineligible. The remaining 422 are family housing units (Davis-Monthan AFB 2004b) that fall under the Program comment on Air Force and Navy Capehart and Wherry Era Housing (ACHP 2004). Three noteworthy facilities on the Base are associated with the Cold War Era. These facilities were recommended for stewardship and potential NRHP listing in the Davis-Monthan AFB Cold War Material Culture Inventory (Davis-Monthan AFB 2004b). They include a bomber/tanker alert facility (Building 140, scheduled to be demolished within the next several years), 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 Davis-Monthan AFB. None of these facilities are within the proposed areas of construction.

No traditional cultural properties or other traditional resources have been identified at Davis-Monthan AFB (USACE 1993; Davis-Monthan AFB 2004b; personal communication, Lisa 2007). The nearby Tohono O'odham Nation and the Pascua Yaqui Tribe were contacted through the IICEP process to determine if consultation is necessary for this Proposed Action.

3.9 SAFETY

3.9.1 Definition of Resource

This section addresses ground safety involving activities conducted by personnel assigned to Davis-Monthan AFB. Ground safety considers issues involving day-to-day operations and maintenance activities that support unit operations. The ROI for safety in this EA includes Davis-Monthan AFB.

3.9.2 Existing Conditions

3.9.2.1 GROUND SAFETY

Day-to-day operations and maintenance activities conducted by the 355 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 so obstructions to flight are kept to a minimum. These restrictions, which are described in UFC 03-260-01, *Airfield and Heliport Planning and Design*, limit the type and size of structures allowed in the immediate vicinity of the airfield. The allowable height depends on the distance and position of the structure relative to the runway. There are 24 structures in violation of these criteria at Davis-Monthan AFB. Of these, three have the required waivers, nine are authorized deviations to airfield criteria, five structures are exempt from waivers, and seven requests for waivers are in progress (Davis-Monthan AFB 2008). The CZs at Davis-Monthan AFB are within the Base boundaries; however, APZs I and II extend outside of the Base. Both CZs have obstructions within them.

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.

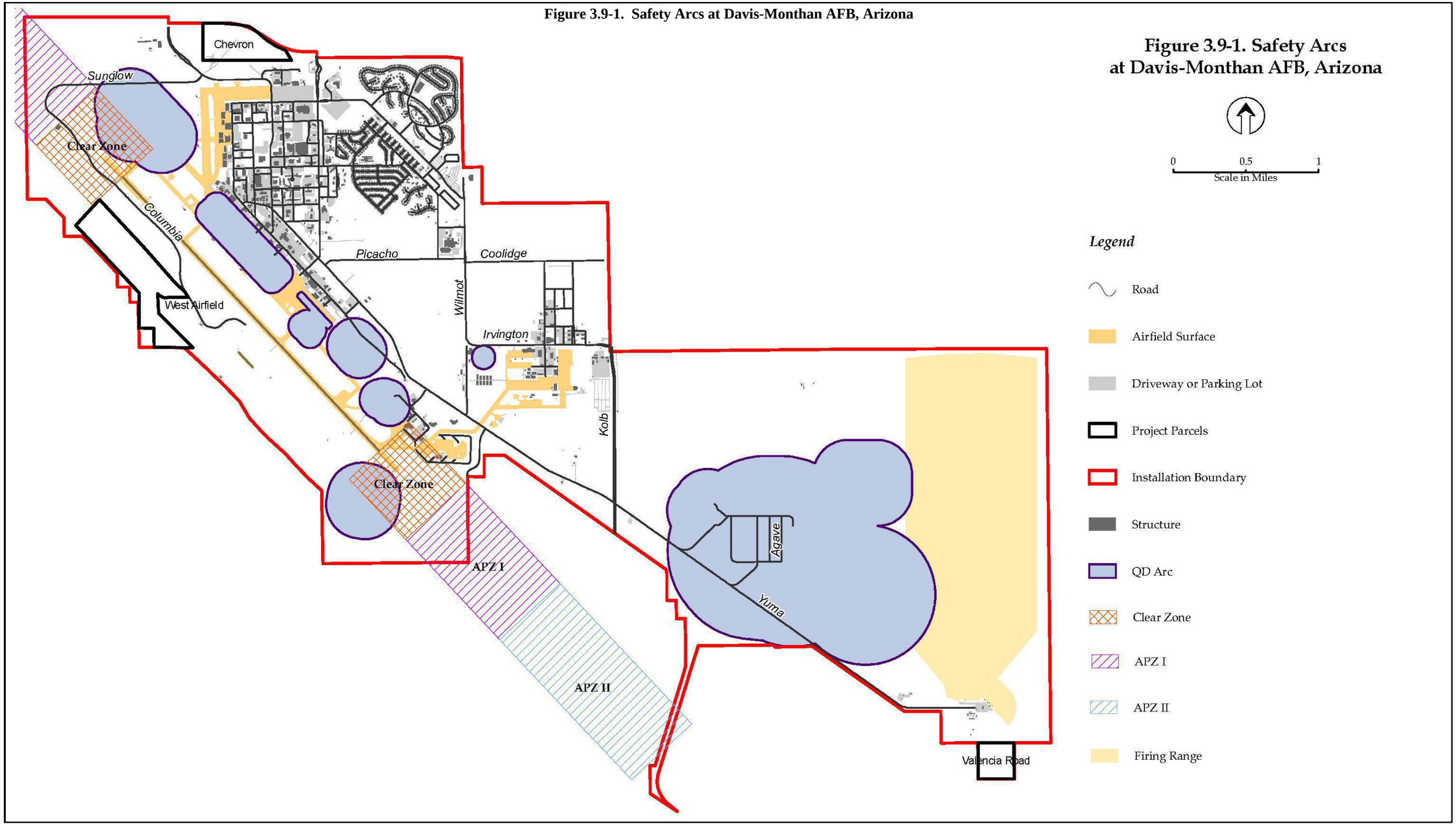
3.9.2.2 EXPLOSIVES SAFETY

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 that defined distances be maintained between munitions storage areas and a variety of other types of facilities. These distances, called 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 Davis-Monthan AFB include the munitions storage area, the EOD area, the alert hangar and apron, combat aircraft parking areas, hot cargo pad, aircraft explosives cargo area, the arm/dearm aprons on the airfield, the AMARG EOD area, and the AMARG ammunition shipping/inspection/storage facilities (Davis-Monthan 2006a).

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 Davis-Monthan AFB are depicted in Figure 3.9-1.

Figure 3.9-1. Safety Arcs at Davis-Monthan AFB, Arizona



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3.9.2.3 ANTI-TERRORISM/FORCE PROTECTION

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 that include access to the installation, access to facilities on the installation, facility siting, exterior design, interior infrastructure design, and landscaping (DoD 2002). 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 Davis-Monthan AFB, 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.

3.10 SOLID AND HAZARDOUS MATERIALS AND WASTES

3.10.1 Definition of the Resource

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

Municipal solid waste management and compliance at Air Force installations is established in 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 CERCLA and the Solid Waste Disposal Act (SWDA), as amended by the Resource Conservation and Recovery Act (RCRA). In general, hazardous materials include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment. Hazardous wastes that are regulated under RCRA are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that either exhibit 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 to identify, characterize, and remediate environmental contamination from past activities at Air Force installations.

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 or disposed in any way, they can threaten the health and well-being of wildlife species, habitats, and soil and water systems, as well as humans. This section also considers solid waste. The ROI for hazardous materials and wastes includes Davis-Monthan AFB.

3.10.2 Existing Conditions

3.10.2.1 SOLID WASTE MANAGEMENT

Solid waste generated from residential sources or by mission activities on Davis-Monthan AFB is removed by a licensed contractor or the City of Tucson and taken to the Los Reales Landfill operated by the City of Tucson (Davis-Monthan AFB 2005a). In calendar year 2006, Davis-Monthan AFB generated 4,381 tons of solid waste, 17 tons of construction debris, and diverted 2,694 tons for recycling. Recyclables are picked up by the Arizona Training Program at 139 buildings across the Base. The remaining useful life for the re-permitted 1,000 acre City of Tucson Landfill is 60 years (personal communication, Bowman 2007). The proper management and recycling or disposal of construction debris is the responsibility of construction site contractors.

3.10.2.2 HAZARDOUS MATERIALS AND WASTE

The majority of hazardous materials used by the Air Force and contractor personnel at Davis-Monthan AFB are controlled in accordance with AFI 32-7086, *Hazardous Material Management*. AFI 32-7086 established the requirements for the procurement, handling, storage, and issuing of hazardous materials and the redistribution/reuse of hazardous materials. The hazardous materials authorization process includes review and approval by Air Force personnel to ensure Air Force users are aware of exposure and safety risks. Base management plans further serve to ensure compliance with applicable federal, state, and local regulations.

Aircraft flight operations and maintenance, as well as installation maintenance, require the storage and use of many types of hazardous materials. These materials, such as flammable and combustible liquids, include acids, corrosives, caustics, glycols, compressed gases, aerosols, batteries, hydraulic fluids, solvents, paints, pesticides, herbicides, lubricants, fire retardants, alcohols, and sealants.

Davis-Monthan AFB is a large-quantity hazardous waste generator, since it generates more than 2,200 pounds of hazardous waste per month (personal communication, Shore 2004). Hazardous wastes are managed in accordance with the *Davis-Monthan AFB Hazardous Waste Management Plan* (Davis-Monthan AFB 2005a). Hazardous wastes are generated from a variety of functions on the Base, including aircraft and vehicle operations and maintenance (hydraulic and lubricating oils and JP-8 jet propulsion fuels); medical and dental facilities; and security operations. These wastes include batteries, fluorescent lamps, wastewater sludge, and various paint and other chemical process wastes. Davis-Monthan AFB recycles off-specification fuel, used oil, used antifreeze, and some types of solvents and aqueous cleaners. There are approximately 80 Hazardous Waste Satellite Accumulation Areas (SAAs) located on the Base, the number of which varies with changes in operational procedures and management practices.

Hazardous wastes ready to be shipped off-site are accumulated for less than 90 days at Hazardous Materials Pharmacy (Building 5227) in accordance with RCRA regulation for large quantity generators of hazardous waste. Davis-Monthan AFB typically generates approximately 50,000 pounds of RCRA-regulated waste annually (personal communication, Shore 2008).

3.10.2.3 STORAGE TANKS

There are currently 111 ASTs located at Davis-Monthan AFB, with a storage capacity of 50 to 15,000 gallons (Davis-Monthan AFB 2007b). These tanks are used for refueling, as well as storage of fuels and used oil. There are currently 75 USTs, of which 28 USTs are regulated by the ADEQ (Davis-Monthan AFB 2007c). All storage tanks at Davis-Monthan AFB are inspected and maintained by Civil Engineering Power Production and the Liquid Fuels Section, and integrity and condition of the associated piping is verified by the users.

3.10.2.4 ASBESTOS

Asbestos-containing materials (ACMs) are those materials that contain greater than 1 percent asbestos. Friable, finely divided, and powdered wastes containing greater than 1 percent asbestos are subject to regulation. A "friable" waste is one that can be reduced to a powder or dust under hand pressure when dry. Nonfriable ACMs, such as floor tiles, are considered to be nonhazardous, except during removal and/or renovation, and are not subject to regulation.

3.10.2.5 ENVIRONMENTAL RESTORATION PROGRAM

The DoD developed the ERP to identify, investigate, and remediate potentially hazardous material disposal sites that existed on DoD property prior to 1984. Fifty-three ERP sites have been identified at Davis-Monthan AFB and are regulated under CERCLA. Three of the ERP sites are in remedial action-operation while removal operations were completed at two sites in September 2008 (personal communication, Oden 2008). The remaining sites either require no further action or have site closed status and are waiting for concurrence by the regulators (Davis-Monthan AFB 2007d; personal communication, Oden 2007). The *Davis-Monthan AFB Environmental Restoration Program Site Status Summaries* (Davis-Monthan AFB 2007d) summarizes the current status of the Base ERP and presents 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 that support full restoration of the Base.

ACC policy requires that any proposed project on or near a Davis-Monthan AFB active ERP site be coordinated through the Davis-Monthan AFB ERP Manager. Construction would take place at or near several ERP sites (LF-01, OT-39, and OT-46 [ST-46]) (Figure 3.10-1). A construction waiver may be required for those projects that have the potential to disturb the ERP sites noted below.

ERP site LF-01 is a base landfill located approximately 2,000 feet west of the midpoint of the main runway. The landfill was created in the 1940s as a borrow source for gravel aggregate. Up until 1976, the landfill was used to dispose household garbage, metals, cars, aircraft, paint residue, thinners and solvents, oil, fuel tank sludge, pesticides, and photo lab chemicals. Following 1976, wastes were hauled off-site by an independent contractor. LF-01 is currently an open, 17-acre pit approximately 20-feet deep. Several drainage ditches are located around the site. Remedial action was conducted in Fiscal Year (FY) 1998 to manage landfill gases and modify the drainage patterns to prevent rainfall from migrating through the fill material. These actions were completed in FY 2000. An additional monitoring well was also installed in FY 1999, and three wells were replaced in FY 2003. Landfill gas collection and treatment occurs only twice a week due to the low volume of gas generated.

ERP site OT-39 is located near the southwestern boundary of the Base with the property line on the west and a dirt road on the east within the proposed West Airfield Parcel. The site contained four

piles of dross, as well as miscellaneous debris such as drums, auto parts, and metal waste, as a result of unauthorized dumping. A dry wash transects the site from southeast to northwest. Forty-seven drums containing solvents identified as acute hazardous waste were removed in 1987. An investigation was conducted in 1988 including a soil gas survey, construction of six soil borings, and construction of three monitoring wells. The soil gas survey revealed no significant volatile hydrocarbons in the soil gas at the site and soil borings indicated no significant Total Recoverable Petroleum Hydrocarbons or VOC contaminants. Samples taken from the dross revealed most metals above the background level and low concentrations of dioxins and furans. Concentrations of metals in native soil samples from the borings were near background levels. The results suggest a lack of significant downward migration of metals into the native soils beneath the dross piles. Remediation was completed by excavation and solidification. The stabilized dross was removed from Davis-Monthan AFB in 1993 and 1994, and placed in a landfill under the scrutiny of the ADEQ. Although ADEQ stated in 2000 that it considers the remedial action to have been successfully completed according to the negotiated requirements, and that no further action was required at this site (Davis-Monthan AFB 2007d)), a decision document for site OT-39 has not been signed by ADEQ because soil sample results appear to be above regulatory levels for arsenic.

ERP Site OT-46 (ST-46) is located in the north part of the Base within the proposed Chevron parcel and is the location of the former AMARC area. The site is an open, partially-vegetated, flat area with strips of broken asphalt pavement. A Preliminary Assessment/Site Investigation has been conducted on site OT-46. A passive soil gas survey of the site was used to focus a soil boring program. Twelve soil borings were drilled, sampled, and analyzed for total petroleum hydrocarbons, total metals, volatile organics, and semi-volatile organics. Low concentrations of toluene, polycyclic aromatic hydrocarbons, and phthalates were detected in soil boring samples throughout the site, particularly in near-surface samples. A marked attenuation with depth was apparent in all borings. The deepest sample in each boring produced no detectable concentrations, with the exception of low detections of toluene in 3 of the 12 borings. Further documentation on the site indicates that arsenic was detected; however, arsenic levels in the soil were not above soil remediation levels. The Air Force considers that no further action is necessary at this ERP site and has recommended closure. In a letter from ADEQ dated August 7, 2009, the ADEQ determined that the arsenic present at OT-46 does not pose a health risk and OT-46 can be included in a decision document (personal communication, Hillman 2009).

3.10.2.6 MILITARY MUNITIONS RESPONSE PROGRAM

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. Davis-Monthan AFB has four active ranges and four closed ranges (personal communication, Oden 2008). For the purpose of this analysis, areas in two of the closed ranges are those of interest because they could coincide with proposed construction activities. The closed ranges are described in Table 3.10-1 and illustrated in Figure 3.10-2.

Figure 3.10-1. Environmental Restoration Program (ERP) Sites at Davis-Monthan AFB, Arizona

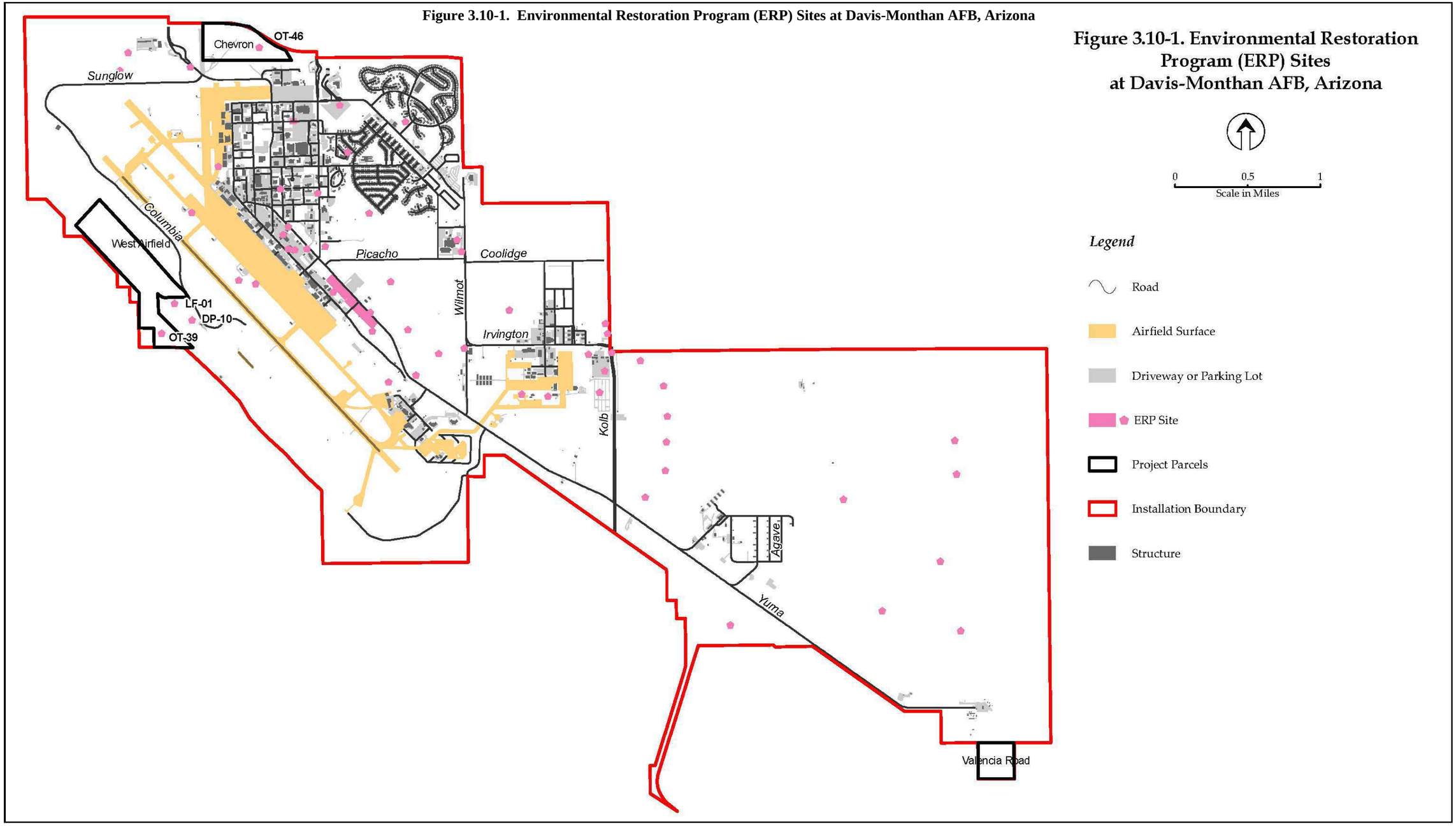

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Figure 3.10-2. Closed Ranges Under the Military Munitions Response Program (MMRP) at Davis-Monthan AFB, Arizona

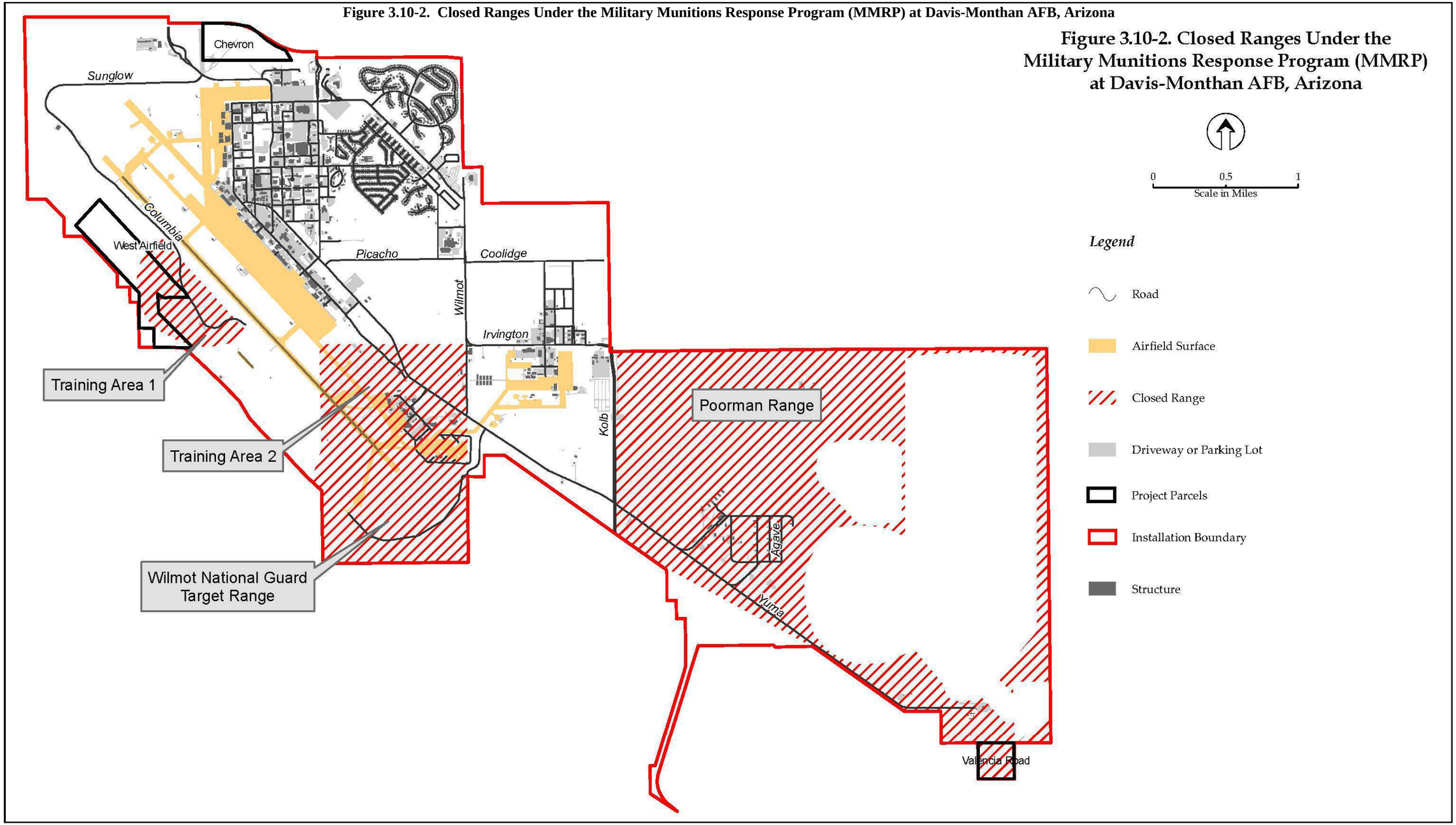

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Table 3.10-1. Closed Range Areas

Name	*Ordnance Types*	*Acreage*	*Approximate Dates of Operation*	*Current Activity Level*
Poorman Range Closed Areas	Small arms, expended; Flares, signals and simulators (other than white phosphorous)	2,536	1940s-2000	Closed
Training Area 1		159	1980s	Closed
Training Area 2		172	1980s	Closed
Wilmot National Guard Target Range	Small arms, expended; medium caliber (20 millimeter); Flares, signals and simulators (other than white phosphorous)	922	1940s	Closed
Firing-In Butt	Small arms, expended; medium caliber (20 millimeter)	8	1940s - 1950s	Closed
Former Munitions Storage Area	Unknown	58	1950s	Closed
Former Skeet Range	Small arms, expended; skeet	58	1950s	Closed

Source: personal communication, Oden 2008

There is a potential for ordnance and explosive contamination in all closed range areas. In 2008, a visual site survey of Training Area 1, which is located in the area known as the West Airfield parcel, discovered munitions debris from 19 M-126 illumination flares and 5 M-18 smoke grenades; additionally one M-18 smoke grenade in deteriorated condition was disposed of by EOD. These munitions posed a low risk and did not represent an explosive safety hazard. Analysis of soil samples in Training Area 1 did not yield munitions constituents above the Arizona Residential Soil Remediation Limits. Any proposed activities in these areas should be coordinated through the Civil Engineering Squadron (CES) Point of Contact, and a waiver for construction may be required. Davis-Monthan AFB has completed a Phase II Site Investigation in the closed Training Area 1 that indicates that no ordnance or explosive contamination is present in this area. Based on the Training Area 1 field work, Davis-Monthan AFB recommends No Department of Defense Action Indicated, and ADEQ "concurs that the munitions debris items found at the site do not represent an explosive safety hazard" (ADEQ 2009).

The 2008 Phase II Site investigation included a visual survey of closed areas of the Poorman Range, which includes the area known as the Valencia Road parcel. The visual survey of the area found no evidence of munitions debris. ADEQ acknowledges that no munitions posing an explosive safety hazard were found, but also notes that the possibility of future sampling exists and that construction workers should receive recognition training.

3.11 INFRASTRUCTURE

3.11.1 Definition of Resource

The infrastructure elements at Davis-Monthan AFB include transportation and utility systems, which service all areas of the Base. Transportation refers to roadway and street systems. Utilities include potable water, wastewater, storm drainage system, electrical system, heating and cooling systems, and liquid fuels. The ROI for these resources consists of Davis-Monthan AFB.

3.11.2 Existing Conditions

3.11.2.1 TRANSPORTATION AND PARKING

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. I-10 provides east-west access to Phoenix 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 (Figure 1.3-1).

There are four major primary roads on Davis-Monthan AFB:

- 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, 5th 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. The AMARG area of Davis-Monthan AFB is served by Irvington Road, the Wilmot Road extension, Coolidge Street, and Wickenberg Street.

Valencia Road borders the south side of Davis-Monthan AFB 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 that is located along the north and northwest boundary of Davis-Monthan AFB.

The City of Tucson does not provide mass transit on Davis-Monthan AFB, although there are nearby bus stops, including service to the main gate; there is no direct rail connection to the Base (Davis-Monthan AFB 2006a). There are officially designated bike paths on the Base, as

well as two major pedestrian routes on Kachina and Sixth streets that serve 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. Tucson International Airport provides direct international flight service to Mexico. The airport is located approximately 10 miles from the Main Gate at Davis-Monthan AFB, and can be reached in approximately 15 minutes by car or by airport shuttle bus. Military passengers and military cargo are served by the Military Air Passenger Terminal Building (Building 4819) and the Air Cargo Terminal (Building 4822). Additionally, east of the Air Cargo Terminal is a cargo marshalling area for cargo handling (Davis-Monthan AFB 2006a).

Generally, parking is adequate on Davis-Monthan AFB; however, as is the case with many installations, parking at high use customer-oriented locations can be problematic. The Base Commissary parking lot experiences parking problems during peak use, especially from 10:30 a.m. to 3 p.m. daily. On military paydays and holidays, the parking situation is more problematic. An additional 465 spaces are required to address this situation and the expansion of the Commissary retail space. The Base is exploring alternatives to address the parking situation. 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 2006a).

3.11.2.2 UTILITIES

Potable Water. Davis-Monthan AFB obtains potable water for a service population of approximately 7,400 from eight active on-base ground water wells. The Base has drilled 17 water supply wells, of which, eight are in production status with a capacity of 5.8 million gallons per day (MGD), three are nonoperational wells, and six do not have sufficient flow to support production. Average daily demands for the last 3 years have equaled approximately 1.1 MGD, although summertime demands can increase to as much as 2.37 MGD. The Base has two separate distribution 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 on-base. Water is chlorinated at the well heads and pumped into the storage tanks. The small arms range and horse stables are separately supplied by a well and a 2,000-gallon storage tank. The Base does not have any interconnection with the City of Tucson or other water supply source (Davis-Monthan AFB 2004c).

For potable water storage, the Base has four elevated storage tanks and two ground storage tanks with an approximate capacity of 1.5 million gallons. The Base also has two 500,000 gallon raw water cut-and-cover storage tanks (Davis-Monthan AFB 2004c, 2006a). Cut-and-cover tanks are generally steel tanks that are submerged into the ground and covered by soil resembling reservoirs.

Wastewater. Pima County treats approximately 1 MGD of wastewater discharged from the Base into the county sanitary sewer system. Pima County functions as the sole treatment facility for all the wastewater generated by the City of Tucson as well. Its total system capacity

is approximately 85 MGD, and it treats approximately 70 MGD. The sanitary sewer collection line exits the Base in the extreme northwest corner, where it crosses East Golf Links Road. The Base has five lift stations, two in the AMARG area, and three along the flightline. No capacity issues with the lift stations have been identified (Davis-Monthan AFB 2006a); however, there is no redundancy of the lift stations and therefore if any given lift station fails, the entire sewer line is down. ACC has a requirement for at least double redundancy as required per Air Force regulations (personal communication, Maisch 2005).

There are various areas on the Base that are not connected to the sewer system. These are served by septic systems.

Storm Drainage System. Stormwater runoff on Davis-Monthan AFB is managed through a stormwater system consisting of a combination of swales, culverts, and pipes currently having adequate capacity to handle most flows. The Base 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 detention basin on the edge of the AMARG area just due south of the golf course. Generally, the runoff travels towards the northwest (Davis-Monthan AFB 2006a).

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 flows of stormwater have degraded the security grates at the outfall locations where the flow exits the Base (Davis-Monthan AFB 2006a). The Base is divided into eight drainage areas with nine outfalls that are permitted under NPDES Multi-Sector Permit number AZR05A12F (Davis-Monthan AFB 2004a). Characteristics of these drainage areas are identified in Table 3.11-1.

Table 3.11-1. Characteristics of Outfalls and Their Drainage Areas

Drainage Area	*Estimated Drainage Area (acres)*	*Estimated Impervious Area (acres)*	*Percent Impervious*
001	1,280	384	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	2,414	0	0
007	1,164	116	10
008	74	4	5
009	529	11	2
010	572	257	45

Source: Davis-Monthan AFB 2004a

Electrical System. Davis-Monthan AFB consumes approximately 100,000 megawatt hours on an annual basis. TEP provides the electric power through two 46 kV lines that enter the base along Wilmot Road and travel along separate routes to the substation at Craycroft and Picacho

Roads. The substation transfer is rated at 25 mega volt-amps. The substation steps the voltage down to 13.8 kV and distributes it to eight circuits in a modified delta configuration. Transformers that feed facilities step down 13.8 kV to 480 volts before reducing to 120/208 volts.

Two other feeds power the west side of the airfield. The "West Gate" feed comes in at Alvernon Road and Technical Drive and crosses Alvernon and East Golf Links Road underground to power Building 8030 on Base. The "NAVAIDS" feed comes in at Canada Street on the west side of the Base and provides power to the control tower and the navigational aids west of the airfield. Annual electrical consumption is about 55,000 kilowatt hours for West Gate and about 600,000 kilowatt hours for NAVAIDS.

Heating and Cooling Systems. Natural gas is used primarily for these 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 Base by the Swan Gate and another entering the base by the Wilmot Road and Valencia Road intersection. Over the last 5 years, the maximum monthly consumption was about 36.5 million cubic feet (MCF), which occurred in the winter. Minimum monthly consumption occurs in summer and is about 5.5 MCF. The maximum delivery on any single day was 1.8 MCF.

Davis-Monthan AFB does not have a central heating and cooling system for the entire base. A central cooling system supplies chilled water to airmen's dormitories and to other administration facilities. The second provides both heat and chilled air to the clinic.

Building 5101, across the street from the Desert Inn, is capable of producing 1,200 tons of chilled water. The plant in Building 5101 has two natural gas-fired engines coupled to centrifugal compressors. The plant has two main loops that currently supply 11 facilities including 3 dorms. 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, it provides hot water year-round for the domestic hot water and pool water systems at the Fitness Center.

Liquid Fuels System. Davis-Monthan AFB functions as a distribution center in the DoD Fuels System for all military installations in the region. It receives fuel within the Defense Fuels Region - South and distributes it to other consumers as a Defense Fuels Support Point. These other consumers in southern Arizona include Ft. Huachuca (Army), Arizona National Guard, Yuma Proving Grounds, Sky Harbor Airport (Phoenix), and Tucson ANG at Tucson International Airport (Davis-Monthan AFB 2006a).

Since Davis-Monthan AFB supports a large number of flying operations, most of its fuel handling consists of JP-8. The Base receives JP-8 in two ways: via commercial pipeline and highway tanker truck. The Base receives, stores, and distributes a variety of fuels that include JP-8 aviation fuel, DL-2 diesel fuel, BDI bio-diesel, Mogas unleaded regular, and two kinds of cryogenics fuel: liquid oxygen and liquid nitrogen (Davis-Monthan AFB 2006a).

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, these 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 in the event of pump failure, 450 gallons per minute using gravity flow (Davis-Monthan AFB 2006a).

The flightline uses four locations as hot refueling pits. Two of these are serviced by Pump House J-4, and two are serviced by Pump House J-3. Pump Houses J-1 and J-2 are not currently active. These four pump houses are connected by an underground pipeline. 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 2006a).

Other features of the JP-8 fueling system include mobile units to increase the number of simultaneously-fueled aircraft during surge operations, berms and dedicated fire system for the tank farm, and a series of underground tanks at each pump house (Davis-Monthan AFB 2006a).

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

4.1.1 Methodology

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 that could potentially be affected, examination of the potential effects that an action may have on the resource, assessment of the significance of potential impacts, and provision of mitigation measures in the event that potentially 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 that would expose soil to wind or water erosion.

4.1.2 Impacts

4.1.2.1 PROPOSED ACTION

Under the Proposed Action, up to approximately 247 acres of surface area could be temporarily disturbed as a result of construction of the proposed facilities. The majority of the proposed construction activities would occur on the Mohave soils and Urban Land (161.5 acres), Cave soils and Urban land (60.2 acres), and Tubac gravelly loam (25.5 acres) soil mapping units, with the remainder of the proposed activities occurring on smaller areas of Yaqui fine sandy loam (11.5 acres), Pits, Dumps (7.5 acres), Pinaleno-Stagecoach complex (5.9 acres), and Sahuarita soils, Mohave soils, and Urban land (0.4 acres) mapping units (Figure 3.1-1, Table 4.1-1).

Table 4.1-1. Summary of Selected Properties of Soils at Davis-Monthan AFB[1]

Soil Map Unit	*Permeability*	*Available Water Capacity*	*Runoff*	EROSION HAZARD		*Limitation for Shallow Excavations*	*Total Project Area (Acres)*	*Project Area (Percent)[2]*
				Wind	*Water*			
Cave soils and Urban land, 0 to 8 percent slopes	Moderate	Low	Medium to Rapid	Slight	Slight	Severe (depth to caliche)	60.2	22%
Mohave soils and Urban land, 1 to 8 percent slopes	Moderately Slow	High	Slow to Medium	Moderate	Moderate	Slight	161.5	58%
Pinaleno-Stagecoach complex, 5 to 16 percent slopes	Moderately Slow to Moderate	Low	Medium	Very Slight	Very Slight to Slight	Severe (large stones, cutbanks)	11.5	4%
Sahuarita soils, Mohave soils, and Urban land, 1 to 5 percent slopes	Moderately Slow to Moderate	Moderate to High	Slow to Medium	Very Slight to Moderate	Slight to Moderate	Slight	25.5	9%
Tubac gravelly loam, 1 to 8 percent slopes	Slow	Moderate	Medium	Slight	Slight	Moderate (clay content)	5.9	2%
Yaqui fine sandy loam, 1 to 3 percent slopes	Slow to Moderate	High	Slow	Moderately High	Slight	Slight	0.4	<1%

Notes: 1. Risk of corrosion of uncoated steel is high for all soil types and low for risk of corrosion of concrete.
2. The remaining 3 to 4 percent of the available soils is on the soil classification type Pits and Dumps; this soil type is extremely variable and therefore hazard data and characteristics are site specific.

Source: NRCS 1993

These soil mapping units generally are acceptable for construction or urban development, but some considerations for the potential limitations for each soil type should be a component of any planned activities. Impacts to soil in these parcels would primarily result from ground disturbance associated with trenching conduit, and digging footing from the solar array panels or potentially deep holes associated with emplacement of additional power poles which would alter soil profiles. The potential for soil erosion and sediment transport could be a factor during the initial grading portion of construction given that over half of the soils (Mohave Soils and Urban Land) have moderate potential for wind and water erosion, especially in the Chevron, and West Airfield Parcels, and approximately 22 percent (associated with the West Airfield Parcel) has a medium to rapid runoff potential. In addition, approximately 25 percent of the soils have limitations associated with shallow excavations due to high caliche, stone, or clay composition.

Implementation of construction 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 revegetation 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.

4.1.2.2 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. Conditions would remain as described in Section 3.1.2.

4.2 WATER RESOURCES

4.2.1 Methodology

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.

Criteria for evaluating impacts related to water resources associated with the Proposed Action are water availability, water quality, and adherence to applicable regulations. Impacts are measured by the potential to reduce water availability to existing users, endanger public health or safety by creating or worsening health hazards or safety conditions, or violate laws or regulations adopted to protect or manage water resources. An impact to water resources would be significant if it would: 1) reduce water availability to, or interfere with the supply of, existing users; 2) create or contribute to overdraft of ground water basins or exceed safe annual yield of water supply sources; 3) adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions; 4) threaten or damage unique hydrologic

characteristics; or 5) violate established laws or regulations that have been adopted to protect or manage water resources of an area. Impacts of flood hazards on proposed actions can be significant if such actions are proposed in areas with high probabilities of flooding; however, these impacts can be mitigated through the use of specific design features to minimize the effects of flooding.

Increases in impervious surfaces act to increase peak discharge volume and speed delivery of water to nearby waterways, which ultimately increases the potential for flooding, as well as the transport of pollutants to surface waters. In undeveloped land, rainfall is collected and stored in vegetation, in the soil column, or in topographic depressions. Water is then utilized by plants and respired, or it moves slowly into groundwater and/or eventually to waterbodies where it slowly moves through the hydrologic cycle. Removal of vegetation and/or soil compaction decreases infiltration into the soil column, and thereby increases the quantity and timing of runoff. Replacement of vegetation with an impervious surface, such as concrete, eliminates any potential for infiltration and also speeds up delivery of the water to nearby drainage channels. With less storage capacity in the soil column and vegetation, urban streams rise more quickly during storm events and have higher peak discharge rates, both of which increase the potential for flooding downstream and damage to public infrastructure and private property.

The ADEQ Water Division and the USACE are the regulatory agencies that govern water resources in the State of Arizona and at Davis-Monthan AFB. The CWA of 1977 regulates pollutant discharges and development activities that could affect aquatic life forms or human health and safety.

4.2.2 Impacts

4.2.2.1 PROPOSED ACTION

With regard to water resources, the primary concerns associated with the Proposed Action include effects on water quality during construction and with operation of the proposed SPS, impacts on surface waters, changes to surface water drainage, and ground water recharge.

Grading and trenching associated with the Proposed Action could potentially affect stormwater runoff. Prior to construction, the contractor would be required to obtain coverage under an AZPDES Construction General Permit AZG2008-001 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 on the Base to reach surface waters. Such BMPs would include application of water sprays to keep soil from becoming airborne, the use of silt fences, covering of soil stockpiles, use of secondary containment for the temporary storage of hazardous liquids, use of soil sealants, establishment of buffer areas near intermittent streams, and revegetation of disturbed areas in a timely manner. Adherence to the requirements of the AZPDES construction permit would minimize impacts to water resources during construction. In addition, strict adherence to the SWPPP and BMPs would reduce any potential risk of further contamination of Lakeside Lake (considered an Impaired Reach by the ADEQ and USEPA) resulting from SPS development at the Valencia Road Parcel. The Valencia

Road parcel is about 0.75 mile from the Atterbury Wash and about 4 miles from Lakeside Lake. Increases in stormwater runoff resulting from construction of the SPS would be expected to be very minor because only the base of the SPS is impermeable to water. Ground area beneath the solar panels themselves would remain permeable, for the most part.

The USACE is delegated regulatory authority with respect to the CWA Section 404 which requires a permit before dredged or fill material may be discharged into "waters of the U.S." The USACE decides the designation of any stream or tributary in regard to its status as a "water of the U.S." The Valencia Road Parcel includes small tributaries of the Atterbury Wash (Figure 3.2-1) whose current status as a "water of the U.S." has yet to be determined. The Atterbury Wash itself has been designated as a "water of the U.S." If planned SPS construction activities would affect the tributaries, then the contractor would need to consult with the USACE to determine which portions, if any, of the tributaries are "waters of the U.S." Applicable federal, state, and local permits would need to be acquired by the contractor prior to any actions being taken that would impact "waters of the U.S."

None of the parcels proposed for development under the Proposed Action include 100-year floodplain. No impacts to the 100-year floodplain would be expected to occur as a result of implementation of the Proposed Action.

There would be no significant impact from the Proposed Action because the increase in stormwater runoff associated with the additional impermeable surface of the SPS would be minor. The implementation of BMPs and adherence to the AZPDES construction permit would minimize the potential for exposed soils or other contaminants from the construction activity to reach surface waters.

4.2.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, no construction would occur and no new impacts to water resources would result. Conditions would remain as described in Section 3.2.2.

4.3 BIOLOGICAL RESOURCES

4.3.1 Methodology

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.

4.3.2 Impacts

4.3.2.1 PROPOSED ACTION

VEGETATION

All proposed SPS sites were evaluated for impacts as a result of the Proposed Action because precise construction plans are not finalized at this time. If all sites were utilized for SPS

construction, it would result in disturbance to 247 acres of vegetation and soils; however, as discussed in Chapter 3.0, much of the ground surface in proposed sites is already disturbed. During construction, soil surfaces would have to be cleared, graded, trenched, and leveled before installation of the SPS equipment can occur. On the two sites that currently support vegetation, construction implementation would include vegetation removal of both native and non-native plants as a result of the Proposed Action. For all of the parcels used for the SPS, Davis-Monthan AFB would require the contractor to implement dust control measures which may include revegetation, gravel, or other dust suppressants. Therefore, implementation of the Proposed Action is not expected to result in significant impacts to vegetation.

Proposed Project Sites

Chevron (54 acres) – The Chevron Parcel currently supports no vegetation, therefore, effects to native vegetation would not occur with development of this parcel.

West Airfield (155 acres) – The West Airfield Parcel supports a scrubland community that has been previously disturbed. Clearing, grading, and leveling for project implementation would result in disturbance to 155 acres of both native and nonnative vegetation. Because of the presence of invasive plant species at the parcel, in particular buffelgrass, weed eradication would be a beneficial effect of site development. Removing vegetative cover at this parcel may protect adjacent sites from noxious plant invasions.

Valencia Road (38 acres) – Approximately two-thirds of the Valencia Parcel supports scrubland vegetation that is contiguous with other open land habitats, but that has been previously disturbed. Proposed Action implementation would result in the loss of approximately 25 acres of both native and nonnative vegetation. Because of the presence of invasive plant species at the parcel, in particular buffelgrass, weed eradication would be a beneficial effect of site development. Removing vegetative cover at this parcel may protect adjacent sites from noxious plant invasions.

Arizona Native Plant Law

To a large extent, one of the proposed SPS construction sites has been previously cleared of vegetation and the other two have past ground disturbance. There are no known sensitive plant species at any of the proposed construction sites; however, remnants of suitable, native habitat exist on the two sites that support native vegetation (West Airfield and Valencia Road).

As discussed in Chapter 3.0, Arizona contains more rare and unusual plants than anywhere else in the U.S. Under Arizona Native Plant Law (Arizona Revised Statutes Title 3, Chapter 7, *Arizona Native Plants*), native plants cannot be removed from any Arizona land without the permission of the landowner and a permit from the Arizona Department of Agriculture. Several cactus species fall under this jurisdiction, some of which occur on Davis-Monthan AFB.

If rare plants are identified in proposed construction areas, it has been arranged with local botanical experts that areas proposed to be cleared of vegetation be available for botanical salvage of valuable plants they wish to remove for transplant off-base. As a result, impacts to valuable vegetation communities and individual native plant populations would be expected to be minor under the Proposed Action. Post-construction mitigation activities would include

invasive plant control under the SPS collectors per the Base Pest Management Plan (Davis-Monthan 2001).

WILDLIFE

Construction activities associated with the Proposed Action could temporarily disturb wildlife that inhabit areas in and adjacent to the proposed project sites. Construction noise would differ qualitatively from existing noise sources (e.g., traffic, natural sounds, aircraft overflights). Existing noise levels would be exceeded in the immediate vicinity of construction activities (Section 4.7, *Noise*). For the three sites the nearby busy roads, other human activity, and the runways adjacent to the West Airfield Parcel create a level of ambient activity and noise that likely deters most species from presence. Smaller, less mobile, and fleeing resident 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 species found at the Base are fairly common, non-native, and well-adapted to rural or semi-urban settings. It is expected that these species would continue to utilize the project area following project construction; therefore, implementation of the Proposed Action is not expected to cause significant impacts to wildlife species or their associated habitat.

Proposed Project Sites

Chevron (54 acres) – Because the Chevron Parcel currently supports only sparse and intermittent vegetation, effects to native wildlife species resulting from development of the site would be expected to be minor. Therefore, the implementation of the Proposed Action at this parcel is not expected to have significant impacts.

West Airfield (155 acres) – With Proposed Action implementation at the West Airfield Parcel, some loss of wildlife habitat or travel routes may occur as this is a corridor area between developed sites. However, it is expected that species would continue to use this parcel as a habitat or travel route following construction of the SPS. Therefore, the implementation of the Proposed Action at this parcel is not expected to have significant impacts.

Valencia Road (38 acres) – This site supports scrubland habitat over approximately two-thirds of its acreage, with the other one-third being previously disturbed. Even though this habitat is contiguous with other open lands, the Base perimeter roads and fence would preclude easy access by most wildlife species. The presence of E. Valencia Road and development also deters animal movement to/from the south. Although the Proposed Action would remove up to 25 acres of scrubland habitat, limited revegetation of the affected area would occur through natural processes once construction was completed and certain wildlife species would be expected to utilize the site as habitat post-construction. Significant affects to wildlife populations or communities in the area would not be expected to occur as a result of the Proposed Action.

Migratory Birds

Migratory bird species identified by the Arizona Partners in Flight Bird Conservation Plan that are indicators of Sonoran Desertscrub habitat health, that have been documented on Davis-Monthan AFB, include the rufous-winged sparrow and Costa's hummingbird (Tucson

Bird Count 2004; personal communication, Lisa 2007). Other species may be transient or migratory through the area. In general, the habitats that occur on the Base do not provide unique or valuable bird foraging or nesting habitats. Therefore, impacts to migratory bird communities or populations as a result of implementation of the construction activities associated with the Proposed Action would not be expected to occur.

SPECIAL-STATUS SPECIES

No federally listed threatened or endangered species are known to occur on the Base. There are two USFWS species of concern that have been identified on the Base and other sensitive species have the potential to occur as suitable habitat is present. In the spring of 2009, the AZGFD conducted biological surveys of the proposed SPS parcels for the western burrowing owl, the Tucson shovel-nosed snake, and the Pima pineapple cactus (AZGFD 2009). The results of this survey have been coordinated with the 355 Civil Engineering Squadron/Environmental Analysis Element (CES/CEAN) office. Specific steps taken to minimize impacts to sensitive species would depend on site-specific factors (e.g., location of a nest relative to proposed development activity). 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 habitat; however, relocation is not typically conducted during breeding/nesting season. Alternatively, the contractors constructing the SPS may choose to avoid constructing in areas that contain sensitive species.

The following discussion analyzes the potential for impacts to the six special status species (Table 3.3-3) identified as occurring or having the potential to occur on the Base.

Western Burrowing Owl

Western burrowing owls are known to occur on the Base. This species nests in ground burrows abandoned by other wildlife species (round-tailed ground squirrels in this area). These colonial animal burrows are uncommon in the developed portions of the Base. The owl's diet is primarily arthropods, but it does consume small animals also (rodents, songbirds). While the Chevron parcel has been previously disturbed and may support limited arthropod, rodent, and songbird populations, the other two less-developed sites (West Airfield and Valencia Road) have the potential to support more abundant populations of these species. During the AZGFD survey in the spring of 2009, one owl was identified in the Chevron parcel (AZGFD 2009). The state typically requires that burrowing owl burrows be avoided until the owls have left the nest. However, if the Chevron parcel is chosen by the contractor, then the AZGFD recommends active translocation which would relocate the western burrowing owl to a burrow located in a different part of the Base or other location. The AZGFD would be able to relocate the western burrowing owl to an artificial burrow. The AZGFD currently has USFWS permits to relocate the owls and additional permits would not be required. No western burrowing owls or active burrows were found in the West Airfield or Valencia Road parcels. As a result of the Proposed Action, impacts to the western burrowing owl would be expected to be minimal and no significant impacts are anticipated.

American Peregrine Falcon

The American peregrine falcon is known to occur on the Base (personal communication, Lisa 2007), although the falcon's preferred nesting habitat (cliff habitat overlooking woodlands and riparian areas) does not occur on the Base. In the unlikely event that non-transient American peregrine falcon activity were found to be occurring on a proposed SPS development site, consultation with the USFWS and AZGFD would be initiated, and an appropriate course of action would be determined. Due to the lack of preferential habitat for this species, the known occurrences of the falcon are likely transient; therefore, the Proposed Action would not be likely to impact the American peregrine falcon.

Cactus Ferruginous Pygmy-owl

The cactus ferruginous pygmy-owl is considered a priority species in the Arizona Uplands vegetation subdivision, with habitat loss being the primary threat (Latta *et al*. 1999). These small owls use only the cavities in saguaro cactus excavated by other species for nesting. The cactus ferruginous pygmy-owl was removed from protection under the ESA in 2006, and subsequently, various groups have petitioned for relisting. On June 2, 2008, the USFWS announced a 90-day finding on the petition to list the species. The USFWS found that substantial scientific or commercial information was presented indicating that listing the pygmy-owl may be warranted and is currently conducting a status review of the species. This species has not been documented on the Base (Davis-Monthan AFB 2001); therefore, the Proposed Action would not be expected to impact the cactus ferruginous pygmy-owl.

Lesser Long-nosed Bat

The lesser long-nosed bat has not been documented on Davis-Monthan AFB; however, this species is known to occur in the Rincon Mountains, just east of the Base. The lesser long-nosed bat forages on nectar of columnar cacti and agave at night. The bat may occur as a transient forager in areas with columnar cacti and agave; however, these plant species occur primarily in landscaped areas of Davis-Monthan AFB and provide very little of the preferred foraging habitat for the bat. The proposed SPS parcels do not support saguaros or other suitable roosting or foraging habitats for the lesser long-nosed bat (personal communication, Ingraldi 2009). Additionally, the bat is a nocturnal forager, and construction activities would not occur during these foraging hours; therefore, the Proposed Action is unlikely to impact the lesser long-nosed bat or its activities if this species should forage on Base.

Cave Myotis Bat

The cave myotis is a bat species that could roost in abandoned buildings at Davis-Monthan AFB; however, this is less likely due to absence of preferred foraging habitat (creosote bush, brittlebush, paloverde, and cacti near water) on the Base. Bats are known to travel up to 40 miles from roosting sites at night to forage on insects (USFWS 1995). This species may occur on the Base as a transient forager. The proposed SPS parcels do not support saguaros or other suitable roosting or foraging habitats for the cave myotis bat (personal communication, Ingraldi 2009). Additionally, since the bat is a nocturnal forager, and construction activities would not

occur during these foraging hours, the Proposed Action would not be likely to impact the cave myotis.

Pima Pineapple Cactus

The Pima pineapple cactus occurs within the floristic community types (Sonoran Desertscrub and Semi-desert Grassland) that occur on the Base. During a survey for the Pima pineapple cactus in 2000, no individuals of this species were identified on the Base (personal communication, Lisa 2007). The Sonoran Desertscrub and Semi-desert Grassland habitat types primarily occur in the undeveloped portion of the Base, which includes two of the Proposed Action construction sites (West Airfield and Valencia Road). The AZGFD surveyed for Pima pineapple cactus in the spring 2009 surveys within all of the proposed SPS sites and no Pima pineapple cacti were found in any of the proposed SPS parcels. Therefore, implementation of the Proposed Action would not have a significant impact on the Pima pineapple cactus.

WETLANDS

There are no delineated wetlands on Davis-Monthan AFB. Based on the historical data, it is unlikely that any of the proposed construction projects would be sited on newly formed wetlands. Should any wetland indicators be observed during construction activities, work would stop and the Davis-Monthan AFB Environmental Manager would be contacted immediately. There would be no impacts to wetlands with implementation of the Proposed Action.

4.3.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed construction projects would not be implemented and therefore, there would be no impact to vegetation, wildlife, or special status species. There are no known wetlands on the Base, and therefore there would be no impacts to wetlands.

4.4 AIR QUALITY

4.4.1 Methodology

In order to evaluate air emissions and their impact on the overall ROI, the emissions associated with the project activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 NEI data. Potential impacts to air quality are identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10 percent criterion approach is used in the USEPA's General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas. According to the USEPA's General Conformity Rule in 40 CFR Part 51, Subpart W, any proposed federal action that has the potential to cause violations in an NAAQS nonattainment or maintenance area must undergo a conformity analysis. A conformity analysis is not required if the Proposed Action occurs within an attainment area. Since Pima County is in maintenance status (i.e., recently achieved attainment) for CO, a conformity determination must be performed if project emissions exceed the *de minimis* threshold for CO 100 TPY.

The Air Conformity Applicability Model (ACAM) version 4.3.0 was utilized to provide a level of consistency with respect to emissions factors and calculations. The ACAM provides estimated air emissions from proposed federal actions in areas designated as nonattainment and/or maintenance for each specific criteria and precursor pollutant as defined in the NAAQS. ACAM was utilized to provide emissions for construction, grading, and paving activities by providing user inputs for each; details are discussed in Appendix B, *Air Quality*. The ACAM calculations were augmented by emission calculations of large equipment emissions completed in Microsoft Excel. The Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis provided emission factors for the large equipment (O'Brien and Wade 2003).

4.4.2 Impacts

4.4.2.1 PROPOSED ACTION

This air quality analysis focuses on grading and installation of the solar panels. The parcels of land to be used equates to up to 247 acres which would need to be prepared for the installation of the solar panels. This requires grading and clearing. Some large equipment such as cranes, drill rigs, and trenchers would also be used to install the solar panels. Calculated air emissions were compared to the appropriate county (Pima County) as represented in the 2002 NEI to identify impacts (Table 4.4-1).

Table 4.4-1. Proposed Action Emissions Compared to Pima County, Arizona

Emission Activities	EMISSIONS (TONS/YEAR)				
	CO	*NO_x*	*PM_{10}*	*SO_2*	*VOC*
Construction Emissions	2.50	9.42	276.96	0.96	1.00
Point Source	0.00	0.00	0.00	0.00	0.00
Mobile Source	0.00	0.00	0.00	0.00	0.00
Installation Equipment[1]	10.35	14.59	1.98	1.28	1.94
Total	12.85	24.01	278.94	2.23	2.94
Pima County Emissions	85,552.00	13,938.00	90,160.00	4,974.00	17,898.00
Percentage of County Emissions	0.02%	0.17%	0.31%	0.04%	0.02%

Note: 1. Installation equipment includes the use of cranes, trenchers, and bore drill rigs.

Grading activities would cause an increase in particulate matter emissions (276 tpy) but would not exceed the 10 percent General Conformity threshold. This can be minimized with the implementation of control measures in accordance with standard construction practices. For instance, frequent spraying of water on exposed soil during construction, proper soil stockpiling methods, and prompt replacement of ground cover or pavement are standard landscaping procedures that could be

Representative Installation Equipment

used to minimize the amount of dust generated during construction. Using efficient practices and avoiding long periods where engines are running at idle may reduce combustion emissions from construction equipment. CO emissions are expected to remain below the 100 tpy *de minimis* threshold; therefore, a conformity determination is not required.

In general, combustive 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 in the Davis-Monthan AFB area. The temporary grading and implementation emissions of PM_{10} and CO are not expected to adversely impact the air quality or visibility. Prior to any construction activities, an air activity permit would be obtained from the Control Officer of Pima County, since the project would require trenching and land clearing activities.

Once the solar arrays are constructed, the land surrounding the arrays would require fugitive dust suppression measures until the area becomes permanently stabilized by paving, landscaping, or otherwise. Dust emissions would be controlled by applying adequate amounts of water, chemical stabilizer, or other effective dust suppressant (Pima County 2008b). With the use of dust suppressants and long-term plans to stabilize the land surrounding the arrays, long-term adverse impacts to air quality are not expected. Therefore, no significant impacts are anticipated with the implementation of the Proposed Action.

4.4.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the SPS would not be installed, the parcels of land would not be disturbed, and therefore, air quality would not change from baseline levels. No adverse impacts to regional air quality are expected with the No Action Alternative.

4.5 NOISE

4.5.1 Methodology

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 (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased exposure of sensitive receptors to unacceptable noise levels).

4.5.2 Impacts

4.5.2.1 PROPOSED ACTION

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. Assuming that noise from the heavy equipment radiates equally in all directions, the sound intensity diminishes inversely as the square of the distance from the source; therefore, in a free field (no reflections of sound), the sound pressure level decreases 6 dB with each doubling of the distance from the source. Under

most conditions, reflected sound will reduce the attenuation due to distance; therefore, doubling the distance may only result in a decrease of 4 to 5 dB (American Industrial Hygiene Association 1986). Table 4.5-1 illustrates the anticipated sound pressure levels at a distance of 50 feet for miscellaneous heavy equipment.

Table 4.5-1. Heavy Equipment Noise Levels at 50 Feet

Equipment Type[1]	*Number Used*[1]	*Generated Noise Levels, L_p (dBA)*
Bulldozer	1	88
Backhoe (rubber tire)	1	80
Front Loader (rubber tire)	1	80
Dump Truck	1	75
Concrete Truck	1	75
Concrete Finisher	1	80
Crane	1	75
Flat-bed Truck (18 Wheel)	1	75
Scraper	1	89
Trenching Machine	1	85

Note: 1. Estimated based on typical construction scenario
Source: American Industrial Hygiene Association 1986

Of the three sites proposed for SPS sites, the Valencia Road Parcel is the closest to a noise-sensitive land use. All other project locations are farther from noise-sensitive land uses and, therefore, noise impacts would be less severe. At its closest point, the Valencia Road Parcel is approximately 400 feet from a group of residences. At this distance, the expected peak noise level resulting from the loudest piece of construction equipment expected to be used would be 70.9 dBA. This noise level was calculated using the standard formula for spherical spreading attenuation of noise.

Impacts of short-duration noise at 70.9 dBA would be limited to disrupted speech/listening and minor annoyance. Construction noise would not remain at this peak level for long periods of time. As other (quieter) pieces of equipment are used, and as the equipment moves to more distant locations within the Valencia Road Parcel to do work, noise levels would decrease. Construction would be expected to be limited to normal working hours (7 a.m. to 5 p.m.).

Noise events exceeding the noise expected to be generated by construction occur frequently near Air Force bases during aircraft overflights. The location of the proposed SPS sites, in relation to existing DNL noise levels at Davis-Monthan AFB, is presented in Figure 3.5-2. It should be noted that the DNL metric represents a modified average of noise levels over the course of a typical day and cannot be compared directly with the instantaneous noise levels presented for construction equipment. DNL noise levels are presented to show areas exposed to relatively high aircraft noise levels.

Construction noise would be intermittent while the project is underway and would cease entirely upon project completion. Noise impacts would not be significant.

4.5.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, proposed construction projects would not occur. Noise levels would remain as described in Section 3.5.

4.6 LAND USE AND VISUAL RESOURCES

4.6.1 Methodology

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 Actions would alter the overall visual character of the area.

4.6.2 Impacts

4.6.2.1 PROPOSED ACTION

It is not anticipated that implementation of the Proposed Action would result in any significant impacts to either on-base or off-base land uses. The proposal would not result in any changes to the Base operations or personnel levels. The proposed parcels are the result of a coordinated land use planning process, and take into account facility siting issues such as adjacent land uses (both on and off the Base), the noise environment, and airfield safety criteria.

The West Airfield Parcel is categorized as open space and the construction of the SPS would represent a change in land use. The Valencia Road Parcel is categorized as industrial, and the Chevron Parcel is categorized as aircraft operations. The construction of the SPS in any of these parcels would not be incompatible with the surrounding land uses. The Chevron Parcel, while designated as aircraft operations, does not currently have an active role in the aircraft operations at Davis-Monthan AFB. The SPS at this location would not be incompatible with current aircraft operations.

It is not anticipated that any of the proposed projects would result in incompatible land use issues with adjacent, off-base land uses. Most of the proposed facilities are located inside the Base boundary and would therefore have no effect on the off-base environment. The parcels located along the base boundary would serve as an additional buffer between the local community and the military activities on Davis-Monthan AFB. In general, the Proposed Action would result in minor positive impacts to land use on and off base.

With regard to visual resources, solar panels on the Chevron Parcel and the Valencia Road Parcel may be visible from off-base locations, including a residential area south of Valencia Road. The panels are designed to capture as much of the sun's energy as possible and, therefore, reflection or glare from the panels is minimized. The solar panels would be 10 to 12 feet tall at the highest point. Overall, the Proposed Action would have a minor, but not significant, impact on visual resources.

4.6.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the SPS would not be constructed on any of the parcels. Land use in these areas would remain the same as described in Section 3.6.2.2 or these parcels would be available for other land use options that would be determined by the Base.

4.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.7.1 Methodology

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 in the ROI were analyzed, as presented in Section 3.7.2. 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.

4.7.2 Impacts

4.7.2.1 PROPOSED ACTION

Under the Proposed Action, a private contractor would implement construction projects associated with the SPS as described in Section 2.1, and the Air Force would lease the land and contract for the electricity generated from the SPS. The potential socioeconomic impacts that may occur as a result of construction activities include minor and temporary benefits as workers from the surrounding area may be employed. Total construction costs are estimated to be $5 to $6 million per MW of electricity generated, but yearly cost savings are also anticipated as a result of implementation of the Proposed Action.

The Proposed Action is not expected to create significantly adverse environmental or health impacts. Consequently, no disproportionately high and adverse human health or environmental impacts to minority and/or low-income populations have been identified. In addition, there are no known environmental health or safety risks associated with the Proposed Action that may disproportionately affect children. The construction areas would be restricted, to effectively bar any person, including children, from unauthorized access.

4.7.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, Davis-Monthan AFB would maintain their existing facilities and would not build the SPS, as proposed. Davis-Monthan AFB would continue to purchase all electric energy from TEP and would not receive the anticipated cost savings of the proposed action, in addition to not contributing to DoD compliance with EO 13423 and the EPAct of 2005. Failure to implement the proposed improvements would also not generate any of the minor or temporary construction-related employment or earnings impacts associated with the Proposed Action.

4.8 CULTURAL RESOURCES

4.8.1 Methodology

A number of federal regulations and guidelines have been established for the management of cultural resources. Section 106 of the NHPA, as amended, requires federal agencies to take into account the effects of their undertakings on historic properties. Historic properties are cultural resources that are listed in, or eligible for listing in, the NRHP. Eligibility evaluation is the process by which resources are assessed relative to NRHP significance criteria for scientific or historic research, for the general public, and for traditional cultural groups.

Under federal law, impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in the NRHP or have been identified as important to Native Americans as outlined in AIRFA and EO 13007, *Indian Sacred Sites*. DoD *American Indian and Alaska Native Policy* (1999) provides guidance for interacting and working with federally-recognized American Indian governments. DoD policy requires that installations provide timely notice to, and consult with, tribal governments prior to taking any actions that may have the potential to significantly affect protected tribal resources, tribal rights, or American Indian lands.

Analysis of potential impacts to cultural resources considers direct impacts that may occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resources that could be affected. Indirect impacts generally result from increased use of an area.

4.8.2 Impacts

4.8.2.1 PROPOSED ACTION

Impacts to cultural resources are not expected under the Proposed Action as these parcels have either been surveyed or disturbed by previous Base activities. Archaeological surveys of the Base, including the Valencia Road parcel and portions of the West Airfield parcel, have identified eight archaeological resources considered ineligible for the NRHP. None of these resources is within, or near, the present project area. The Chevron parcel and the southwest portion of the West Airfield parcel have not been surveyed for cultural resources; however, these areas have been previously disturbed by construction and remediation activities.

Impacts to architectural resources are also not expected under the Proposed Action. Cold War-era structures and facilities at Davis-Monthan AFB were inventoried in 1994 and evaluated for NRHP eligibility (Davis-Monthan AFB 2004b). Four sites (two alert facilities, one training facility, and one missile complex) were evaluated as eligible to the NRHP. None of these sites are part of, or in proximity to, the Proposed Action.

The Proposed Action includes construction of the SPS at several different parcels. Each parcel is cleared of permanent buildings and has minimal structures in place. None of these structures are eligible for NRHP and the parcels are not located near structures or facilities that are NRHP eligible.

In the event of inadvertent discoveries of cultural resources during construction, all activities at that location would be halted until the find is evaluated by a qualified professional archaeologist in compliance with the Davis-Monthan AFB *Integrated Cultural Resources Management Plan* and federal regulation.

Impacts to traditional resources are not expected under the Proposed Action. Traditional resources have not been identified at the Base. Consultation with the Arizona SHPO, the nearby Tohono O'odham Nation, and the Pascua Yaqui Tribe was conducted through the IICEP process to identify any traditional resource-related concerns associated with the proposed project. The Draft EA was also provided to the Arizona SHPO, the Tohono O'odham Nation, and the Pascua Yaqui Tribe in December 2008 and no notification was received by the Air Force.

4.8.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the construction of the SPS would not take place. Impacts to cultural resources are not expected under this alternative. Resources would continue to be managed in compliance with federal law, Air Force regulation, and the Davis-Monthan AFB *Integrated Cultural Resources Management Plan*.

4.9 SAFETY

4.9.1 Methodology

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.

4.9.2 Impacts

4.9.2.1 PROPOSED ACTION

None of the proposed project areas fall within explosives QD arcs, SDZs, or within the runway CZ/APZs (Figure 3.9-1). The proposed SPS sites would be uninhabited and would not require any special measures to be in compliance with DoD AT/FP standards. The photovoltaic solar panels were selected in part because this type of solar panel does not result in glaring reflections of light; therefore, aircraft pilots are not expected to experience any difficulties resulting from glare from the panels.

The SPSs would be 10 to 12 feet tall and would not conflict with DoD runway imaginary surface standards, as defined by UFC 03-260-01, *Airfield and Heliport Planning and Design*. The closest of the three sites to the runway is West Airfield Parcel. At its closest point, the West Airfield Parcel is approximately 1,200 feet from the runway centerline and the entire site falls beneath

the "Inner Horizontal Surface," which has an elevation of 150 feet above ground level. None of the proposed SPS sites fall below the "Approach-Departure Clearance Surface," which has a very gradual slope (50:1) that starts at the runway ends and extends outwards for several thousand feet.

Coordination would be required between the construction contractors and the Base prior to the implementation of construction activities. Construction activities must comply with all Occupational Safety and Health Administration standards to protect workers and are the responsibility of the contractor. This would include, for example, safe practices on construction sites, a description of required occupational protective gear, emergency procedures, and construction traffic routes.

Implementation of the Proposed Action would involve ground activities that may expose workers performing the required construction to some risk. The U.S. Department of Labor (DOL), Bureau of Labor Statistics maintains data analyzing fatal and nonfatal occupational injuries based on occupation. Due to the varying range of events classified as nonfatal injuries, the considerations described below focus on fatal injuries, since they are the most catastrophic. Data are categorized as incidence rates per 10,000 workers employed (on an annual average) in a specific industry.

To assess relative risk associated with the Proposed Action, it was assumed that the industrial classifications of workers involved would fall under the category Construction and Extraction Occupations. Based on DOL data and considerations of worker exposure, the probability of a fatal injury would be statistically predicted to be 1.2 out of 10,000 (DOL 2007). Although DoD guidelines for assessing risk hazards would categorize the hazard category as "catastrophic" (because a fatality would be involved), the expected frequency of the occurrence would be considered "remote" (DoD 2000).

While the potential result must be considered undesirable, relative risk is low. Strict adherence to all applicable occupational safety requirements would further minimize the relatively low risk associated with these construction activities. Therefore, no significant impacts to safety are anticipated.

4.9.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, construction of the proposed projects would not occur. Management of safety programs would continue under existing Davis-Monthan AFB programs and there would be no environmental impacts.

4.10 SOLID AND HAZARDOUS MATERIALS AND WASTES

4.10.1 Methodology

This section addresses the potential impacts caused by hazardous materials and waste management practices and the impacts of existing contaminated sites (e.g., ERP or MMRP) on the Proposed Action.

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 that could not be mitigated to acceptable standards.

Regulatory standards and guidelines have been applied in evaluating the potential impacts that may be caused by hazardous materials and wastes. The following criteria were used to identify potential impacts:

- Generation of 100 kilograms (or more) of hazardous waste or 1 kilogram (or more) of an acutely hazardous waste in a calendar month, resulting in increased regulatory requirements.
- A spill or release of a reportable quantity of a hazardous substance as defined by the USEPA in 40 CFR Part 302.
- Manufacturing, use, or storage of a compound that requires notifying the pertinent regulatory agency according to Emergency Planning and Community Right-to-Know Act.
- Exposure of the environment or public to any hazardous material and/or waste through release or disposal practices.

4.10.2 Impacts

4.10.2.1 PROPOSED ACTION

SOLID WASTE MANAGEMENT

Construction of the proposed SPS would generate minimal solid wastes. The construction comprises ground disturbance and digging for concrete footings, possible transmission lines, and fencing. The concrete footings would be installed and the solar panels would be assembled. Solid wastes that would be generated may include concrete, scrap wire, and packing materials.

Contractors would be directed to recycle materials to the maximum extent possible, thereby reducing the amount of debris disposed of in landfills. Materials not suitable for recycling would be taken to a landfill permitted to handle construction debris wastes, such as the City of Tucson's Speedway Landfill. 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.

HAZARDOUS MATERIALS AND WASTE

Construction of the SPS may require the use of hazardous materials by contractor personnel. Project contractors would comply with federal, state, and local environmental laws and would employ affirmative procurement practices when economically and technically feasible.

All hazardous materials and construction debris 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 during construction, the contractor would be responsible for its containment, clean up, and related disposal costs. The contractor would have sufficient spill supplies readily available on the pumping vehicle and/or at the site to contain any spillage. In the event of a contractor-related release, the contractor would call 911 and then immediately notify the 355 CES/CEAN Programming Element office and take appropriate actions to correct its cause and prevent future occurrences. Therefore, no significant impacts are anticipated.

STORAGE TANKS

The proposed SPS would not be located near any ASTs or USTs. The construction of the SPS would potentially involve ground disturbance of approximately 3 feet as trenches are dug to install transmission lines and concrete footings. No adverse environmental impacts are expected.

ASBESTOS AND LEAD-BASED PAINT

Davis-Monthan AFB has no knowledge of the presence of ACMs or lead-based paints (LBPs) on any of the parcels being proposed for the SPS. Also, the SPS does not contain ACMs or LBPs. No significant impacts from asbestos or LBP are anticipated from implementation of the Proposed Action. However, if ACMs or LBPs are found in or near the construction areas, then the following federal and state regulations must be followed.

- *Asbestos Removal and Disposal.* Upon classification as friable or nonfriable, all waste ACM would be disposed of in accordance with the Arizona Solid Waste Management Regulations (CAA of 1970, Title 40 NESHAP Regulation) and transported in accordance with USEPA regulations that govern transportation of hazardous materials (EPA 530-F-96-032 *et seq.*).
- *LBP Removal and Disposal.* The proposed activities would comply with the DOL, Occupational Safety and Health Administration regulations, and with the USEPA regulations addressing Lead Management and Disposal of Lead-Based Paint Debris (40 CFR Part 257, 258, and 745).

ENVIRONMENTAL RESTORATION PROGRAM

Construction of the SPS would occur in the vicinity of three ERP sites. LF-01 and OT-39 are located near or within the West Airfield Parcel. The boundary of this parcel has been delineated by Davis-Monthan AFB in order to avoid any direct interaction with LF-01. OT-39 is located

within the project area and construction of the SPS would potentially interact with this ERP site. Although ADEQ stated in 2000 that it considers the remedial action to have been successfully completed according to the negotiated requirements, and that no further action was required for the site (Davis-Monthan AFB 2007d), a decision document for site OT-39 has not been signed by ADEQ because soil sample results appear to be above regulatory levels for arsenic. Construction activities conducted in the Sawtooth area of the West Airfield area may have the potential to expose construction workers to contaminated soils associated with OT-39. Any soil suspected of contamination discovered during the construction process would be tested and disposed of in accordance with ADEQ regulations. The third ERP site, OT-46, is located in the Chevron Parcel. Davis-Monthan AFB recommends closure for OT-46, and in a letter from ADEQ dated August 7, 2009, ADEQ determined that the arsenic present at OT-46 does not pose a health risk and OT-46 can been included in a decision document (personal communication, Hillman 2009). No significant environmental impacts are expected because the construction would not have an adverse effect on the ERP sites. For any construction activities that would interact or be in close proximity to these ERP sites, the Base ERP office would request an ACC waiver.

MILITARY MUNITIONS RESPONSE PROGRAM

The West Airfield and Valencia Road parcels are located in the area of closed ranges (Figure 3.10-2). Site investigations in the closed ranges have been extensive. Illumination flares and smoke grenades were found in Training Area 1 in the proposed West Airfield parcel in 2008. However, these munitions posed a low risk and did not represent an explosive hazard. Preliminary results from the MMRP Comprehensive Site Evaluation Phase II investigation support not having to do a Remedial Investigation of the closed ranges. The Air Force has provided a recommendation of No Department of Defense Action Indicated at these sites and ADEQ has acknowledged that the munitions debris items found in the Western Airfield parcel (Training Area 1) do not represent an explosive safety hazard and that no munitions debris was found in the Valencia Road parcel (closed portion of the Poorman Range). If a No Department of Defense Action Indicated finding is reached, then a waiver would not be required prior to construction on these sites. If, however, such a finding is not reached, then a construction waiver would be required. This waiver would be coordinated through the 355 CES/CEAN office and would outline procedures to be taken to safeguard workers in the event that munitions are unearthed (personal communication, Oden 2005). Prior to construction of the SPS, construction workers should be provided with recognition training. The Davis-Monthan AFB EOD team would be available if potentially intact items are unearthed. There are no significant impacts expected because there is low probability of explosive safety hazards in the proposed parcels.

4.10.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the SPS would not be constructed on any of the three parcels. Management of solid waste, hazardous wastes, or materials would continue under existing Davis-Monthan AFB programs and there would be no environmental consequences to these resources.

4.11 INFRASTRUCTURE

4.11.1 Methodology

Potential impacts to infrastructure elements at the 355 FW are assessed in terms of effects of the proposed projects on existing service levels, described in Section 3.11 (*Infrastructure Existing Conditions*). Impacts to transportation and utilities are assessed with respect to the potential for disruption or improvement of current circulation patterns and utility systems, deterioration or improvement of existing levels of service, and changes in existing levels of transportation and utility safety. Impacts may arise from physical changes to circulation or utility corridors, construction activity, and introduction of construction-related traffic and utility use. Adverse impacts on roadway capacities would be significant if roads with no history of capacity exceedance had to operate at or above their full design capacity as a result of an action. Transportation effects may arise from changes in traffic circulation, delays due to construction activity, or changes in traffic volumes. Utility system effects may include disruption, degradation, or improvement of existing levels of service or potential change in demand for energy or water resources.

For this analysis, potential infrastructure impacts associated with implementation of the Proposed Action were evaluated. No personnel changes are associated with the action alternatives; therefore, no effect on infrastructure demand related to an increase in installation personal would occur. Potential infrastructure impacts would be related construction activity and facility operations after completion.

4.11.2 Impacts

4.11.2.1 PROPOSED ACTION

TRANSPORTATION AND PARKING

The transportation infrastructure for Davis-Monthan AFB would not be affected by the construction of the SPS. Each of the parcels would be fenced. For parcels located along the Base boundary fenceline, the parcel's fenceline would have to be set back far enough to allow vehicular access between the SPS sites and the boundary fence for security patrols. Access to the parcels would be required for construction and general maintenance by the contractors. For the West Airfield and Chevron parcels, this would require the contractors gaining access to the Base and using the road networks on the Base. For the Valencia Road Parcel, an access point could be created to allow access from off-base; however, this would be left to the discretion and expense of the contractor. No additional parking would be required for the construction or maintenance of the SPS.

UTILITIES

Potable Water. The demand for potable water for dust control during the construction activities of the Proposed Action would increase minimally. Potable water would be used to wash dust off of the solar panels of the SPS to increase efficiency; however, this maintenance would be infrequent and the contractor would rely on precipitation as much as possible to wash

the solar panels. Construction activities of the SPS would require potable water for dust control.

The average daily summertime water consumption at Davis-Monthan AFB is 2,370,000 gallons, which is only 41 percent of the total production capability (Davis-Monthan AFB 2006a). Thus, the capacity of the existing well system is capable of meeting short-term requirements, as well as any minimal increase associated with the proposed construction projects. No significant impacts are anticipated.

Wastewater. No change is anticipated to the generation of wastewater because of the construction of the SPS under the Proposed Action. Current wastewater flows are approximately 50 percent of the capacity of the existing sewer system that delivers wastewater to the Pima County treatment facilities, and no additional demands would be placed on the existing sewer system. No significant impacts are anticipated to wastewater facilities.

Storm Drainage System. Construction of the SPS would result in a slight increase in impervious surfaces on Davis-Monthan AFB. As the SPS is constructed, the potential effects of additional impervious surface and stormwater discharge would be evaluated in order to reduce the overall effect on the existing stormwater system. With a slight increase in impervious surface, no substantial impacts are expected to the storm drainage system as a result of the Proposed Action. Only the footers of the SPS would be impervious to rainwater. Ground area that would be below the solar panels, but not under the footers, would remain in their baseline condition with regard to water runoff.

Additionally, the proposed construction activities could affect the quality of stormwater runoff through potential increase in soil erosion. These activities can expose soils and, during rain storms, storms can pick up soil particles, thereby increasing sediment loading of stormwater runoff. However, prior to construction, the contractor would be required to obtain coverage under an AZPDES Construction General Permit with ADEQ and prepare an updated SWPPP to manage stormwater associated with construction activity. Strict adherence to state regulations and the SWPPP would reduce any adverse impacts associated with the Proposed Action. No significant impacts are anticipated to the storm drainage system.

Electrical System. The SPS would be connected to the existing electrical distribution lines at Davis-Monthan AFB in order to supplement the energy requirements of the Base. The contractor would be required to install all of the necessary components to make the energy generated by the SPS compatible with the Base's system. The Chevron and Valencia Road parcels are located near the existing electrical infrastructure which would simplify the construction of the SPS. The West Airfield Parcel is located across the flightline from the nearest electrical junction. Davis-Monthan AFB currently has a project scheduled in FY 2009 to install a distribution line under the flightline to the West Airfield Parcel.

By generating at least 1 MW of energy through renewable resources, the Base is contributing to DoD and Air Force requirements set by the EPAct of 2005 and EO 13423 resulting in a positive, but insignificant, impact to the electrical system.

Heating and Cooling Systems. Under the Proposed Action there would be no change in the heating and cooling demands of the Base. The heating and cooling demands of the Base would not be affected by the construction of the SPS and all demand would be met by the capacity of the existing natural gas system. No significant impacts are anticipated.

Liquid Fuels System. The construction of the SPS would not affect the existing liquid fuels system on the Base. The parcels under consideration for the system are not in the vicinity of the liquid fuels system. The current liquid fuels system would continue in the existing condition and no significant impacts are anticipated.

4.11.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to any of the infrastructure requirements of Davis-Monthan AFB. The Base would purchase all of the electric energy requirements from TEP as a source of nonrenewable energy. Davis-Monthan AFB would be unable to meet the goals set by the Air Force for renewable energy.

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 in the ROI. 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 projects that are proposed (or anticipated over the foreseeable future) is required.

5.1.1 Definition of Cumulative Effects

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." CEQ guidance in *Considering Cumulative Effects* affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the proposed action and the no action alternative. The scope must consider geographic and temporal overlaps among the proposed action and the no action alternative and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between action alternatives and the no action alternative and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with, or in close proximity to, the action alternatives and the no-action alternative would be expected to have more potential for a relationship than actions that may be geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects, this EA addresses three questions.

1. Does a relationship exist such that elements of the action alternatives and the no action alternative might interact with elements of past, present, or reasonably foreseeable actions?
2. If one or more of the elements of the action alternatives and the no action alternative and another action could be expected to interact, would the action alternatives and the no action alternative affect or be affected by impacts of the other action?
3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the action alternatives and the no action alternative are considered alone?

In this EA, an effort has been made to identify all actions that are being considered and that are in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the action alternatives and the no action alternative in this EA, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available so that they can evaluate the environmental consequences of the action alternatives and the no action alternative.

5.1.2 Past, Present, and Reasonably Foreseeable Actions

Davis-Monthan AFB is an active military installation that undergoes continuous change in mission and training requirements. This process of change is consistent with the U.S. defense policy that requires the Air Force be ready to respond to threats to American interests throughout the world. This base, like any other major military installation, also requires occasional new construction, facility improvements, and infrastructure upgrades. As such, Davis-Monthan AFB updates facilities on a continual basis, as necessary. While it is not practical to catalog all minor projects that could occur over the short-term, a list of the major projects in the ROI has been analyzed for the potential to create cumulative environmental impacts. Planning efforts in the ROI include the actions described within this EA, as well as others that are either ongoing or planned over the short-term. Additional projects within the ROI are discussed below.

On-going and proposed actions (in addition to those that are a component of this EA) at Davis-Monthan AFB include the following:

On-Going Projects:

- Permanent Headquarters Facility for the 563 RQG and 563rd Operations Support Squadron (563 OSS)
- Construction of Permanent Headquarters Facility for the 563 RQG and 563 OSS
- Construct Roads and Parking Lot for Site 5 (FBNV850033)
- Modifications to Family Camping (FAMCamp) (FBNV073040)
- Construct School Age Program (FBNV064003)
- Add/Alter Youth Center (FBNV064004)
- Construct EC-139 Hangar (FBNV053002)
- Capital Improvements Program construction, improvement, and demolition projects

Planned Projects for the Foreseeable Future:

- Construct AMARG Aircraft Hangar (FBNV063501)
- Construct Consolidated Packing and Crating Center (FBNV073502)

- Construct Sim Tower Parking Lot, Lavatory, and Break Room (FBNV040105)
- Construct CATM Jogging Trails (Rails to Trails) (FBNV030122)
- Construct U.S. Border Patrol Warehouse

The projects listed above, as well as the project analyzed within this EA, have all been coordinated through the Base Community Planning Department, and have all been or are being incorporated into the Base Master Plan. The projects listed above have either already gone through the NEPA process, or are currently undergoing NEPA analysis.

One project potentially occurring at Davis-Monthan AFB which has not been fully defined is the recapitalization of HC-130J aircraft and required facility modifications and/or construction. This action would potentially include changes in the number of aircraft currently assigned to Davis-Monthan, construction of new facilities and modification to existing facilities and may result in potential changes to the number of personnel assigned to Davis-Monthan AFB. This action is currently being evaluated by the Air Force and would be subject to environmental analysis once the action is more clearly defined.

None of the future infrastructure actions or potential personnel changes (analyzed in separate environmental documents) would be expected to result in more than negligible impacts either individually or cumulatively. All actions affect very specific, circumscribed areas, and the magnitude of the actions is minimal. Therefore, the combined impacts of these actions would remain well below the threshold of significance for any resource category. Detailed discussion of each resource category is discussed in further detail below.

5.1.3 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 and implementing the requirements contained in Construction General Permit AZG2008-001 for stormwater, would minimize any impacts to soil. For instance, installation of vegetative and structural protective covers, sediment barriers, stream and shore bank protection, and temporary construction and road stabilization are some standard BMPs that could be implemented as protective measures. Thus, there would be no significant cumulative impacts associated with this resource area.

Water Resources. Construction activities associated with the 3-year construction period for the SPS, 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. To a large extent, the construction described above for the SPS is planned within areas which are largely pervious surface. As discussed in Section 4.11.2, only the footers of the SPS would be impervious to rainwater. Ground area that would be below the solar panels, but not under the footers, would remain in their existing condition with

regard to water infiltration and runoff. The construction of the on-going projects and the planned and reasonably foreseeable actions are within areas which are largely impervious surface already. The Base is updating their SWPPP to include these projects. The contractor will 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 that are 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 that would be found in specific project areas are well-adapted to the human environment. The Base will coordinate with AZGFD regarding burrowing owls and cave myotis bat, should there be a need. Cumulative impacts to biological resources are not expected to be significant.

Air Quality. Planned and foreseeable activities within Davis-Monthan AFB 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 AQCR 015. 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 Davis-Monthan AFB 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 proposed construction associated with the SPS, as well as those described in Section 5.1.1, are expected to enhance the Base planning and compatibility of functions 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 base's functional efficiency. Some existing incompatibilities would be corrected. Land use off-base is not expected to be impacted. The SPS would consist of solar panels supported by metal framing and would be at most about 12 feet tall; fencing surrounding the SPS would be around 6 feet in height. 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. There are no projects identified that would have cumulative effects on land use.

Socioeconomics/Environmental Justice. The construction of the SPS 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. The only project with potentially long-term socioeconomic effects is the recapitalization of the HC-130J aircraft and related changes to personnel. However, the potential impacts of these personnel changes are currently being analyzed in a separate environmental analysis. Additionally, these projects are not expected to create adverse environmental or health effects, and therefore no disproportionately high or adverse impacts to minority, low-income, or youth populations are expected. Cumulative impacts to socioeconomics and environmental justice are not expected to be significant.

Cultural Resources. No archaeological resources or TCPs are located on or adjacent to any of the proposed locations under the proposed action. Activities associated with the SPS 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 traditional cultural resources are not expected. Cumulative impacts to cultural resources are not expected to be significant.

Safety. Planned and foreseeable activities would involve ground activities that may expose workers performing the required demolition and construction to some risk. However, strict adherence to all applicable occupational safety requirements would minimize the relatively low risk associated with these construction activities. Thus, no significant cumulative impacts to safety are anticipated.

Hazardous Materials and Waste Management. . Planned and foreseeable construction, renovation, and demolition activities within Davis-Monthan AFB 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 Davis-Monthan AFB could cumulatively impact available landfill capacity. However, due to the existing landfill capacity, there would be no significant cumulative impacts to solid wastes. Therefore, no significant cumulative impacts are anticipated.

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 Davis-Monthan AFB. Any ACM, LBP, or 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. The proposed construction of the SPS, as well as those described in Section 5.1.1, would result in some temporary planned interruption of utility services, while the SPS is brought online, and minor hindrance of transportation and circulation during construction activities. These impacts would be temporary, occurring only for the duration of the construction period. Additionally, new construction described in Section 5.1.1 would likely implement energy efficient equipment and materials and implementation of the proposed action would provide additional power generation. In general, infrastructure at Davis-Monthan AFB would improve under these actions, as there would be some upgrades to existing utilities. Cumulative impacts to infrastructure are not expected to be significant.

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA CEQ regulations require environmental analyses to identify "...any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented" (40 CFR Section 1502.16). Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that 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 because future options for using these parcels for other activities would be possible. The vast majority of Davis-Monthan AFB is undeveloped, and the Proposed Action would only lead to a slight increase in the amount of newly developed land. The undeveloped parcels could be used for alternative uses in the future, ranging from natural open space to base development. No loss of future options would occur with the exception of the area(s) utilized for construction of the SPS.

The primary irretrievable impacts of the Proposed Action would involve the use of energy, labor, materials and funds, and the conversion of some lands from an undeveloped condition through the construction of the SPS. Irretrievable impacts would occur as a result of construction, facility operation, and maintenance activities. Direct losses of biological productivity and the use of natural resources from these impacts would be inconsequential.

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APPENDIX A
INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP)

The following letter dated September 29, 2008, was sent to all recipients listed on pages A-3 and A-4. The letters that follow that list are responses that have been received from the initial mailing.

DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

SEP 29 2008

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United States Environmental Protection Agency
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Dear Sir/Madam

The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) to assess the potential environmental impacts of a proposal to construct a Solar Power System (SPS) at Davis-Monthan Air Force Base (AFB), Arizona (AZ). The environmental analysis for the Proposed Action and No Action alternative is being conducted in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969.

The Proposed Action would consist of the construction of a renewable energy system to add electrical power production to meet the regulatory goals set under the Energy Policy Act (EPAct) of 2005; Executive Order (EO) 13423 Strengthening Federal Environmental, Energy, and Transportation Management; and energy security requirements for national defense. The planned technology would consist of a solar photovoltaic system at Davis-Monthan AFB. The EA will evaluate the construction of the SPS on 315 acres dispersed on five non-contiguous parcels located throughout Davis-Monthan AFB. In addition to the Proposed Action, the No Action alternative would be analyzed in the EA. Attachment 1 is a map that provides an overview of the project areas.

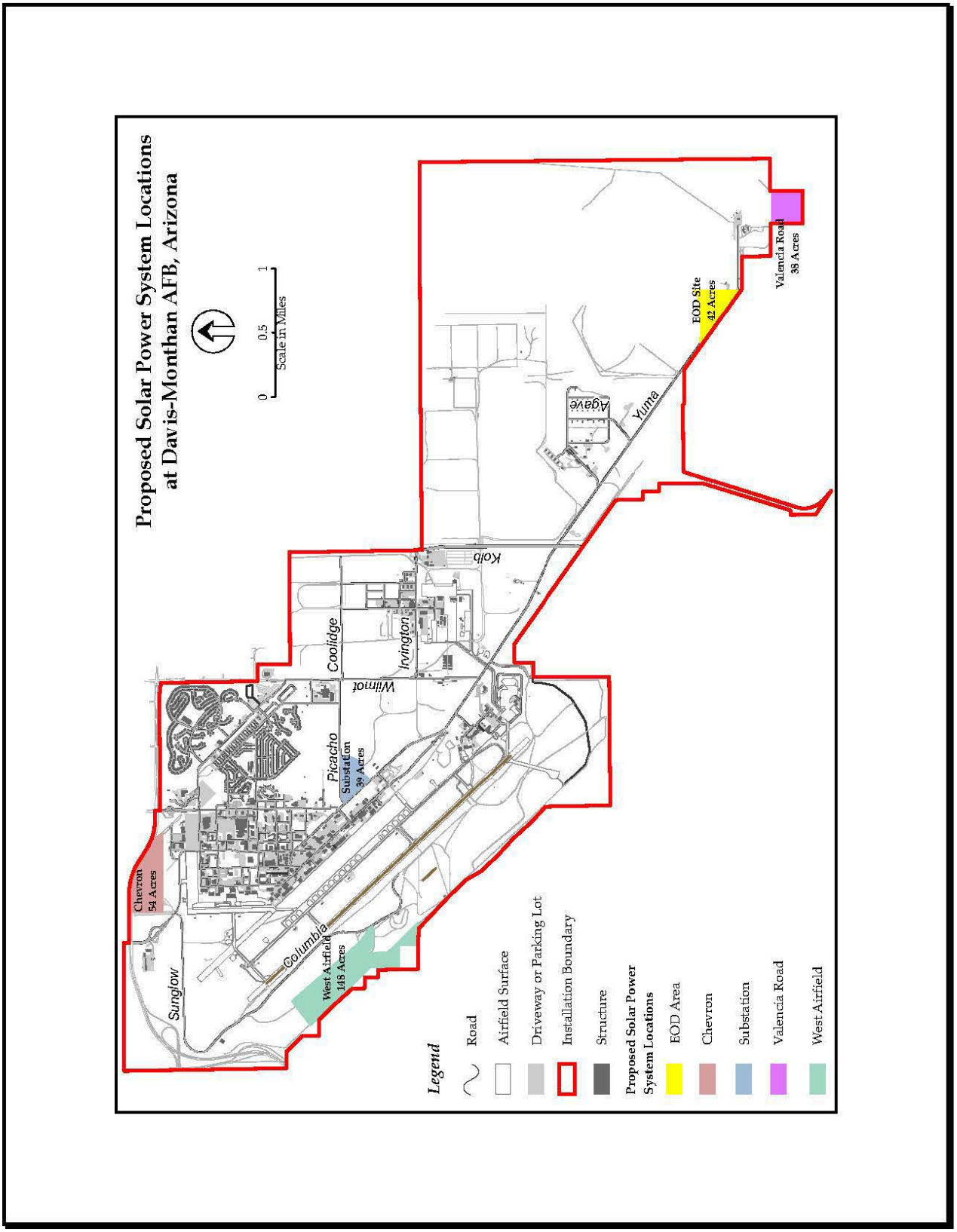
We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by October 25, 2008. Please contact our consultant, Science Applications International Corporation (SAIC) with any concerns that you or your staff may have. Please forward written comments to Ms. Vanessa Williford, SAIC, 333 N. Wilmot, Suite 400, Tucson, Arizona, 85711. Thank you for your assistance.

Sincerely

MICHAEL R. TORIELLO, YF-03
Deputy Base Civil Engineer

Attachment:
1. Map of Proposed Solar Power System Locations

Global Power for America


Proposed Solar Power System Locations
at Davis-Monthan AFB, Arizona
0
0.5
1
Scale in Miles
Chevron
54 Acres
Picacho
Substation
39 Acres
West Airfield
148 Acres
EOD Site
42 Acres
Valencia Road
38 Acres
Sunglow
Columbia
Coolidge
Irvington
Wilmot
Kolb
Agave
Yuma
Legend
Road
Airfield Surface
Driveway or Parking Lot
Installation Boundary
Structure
Proposed Solar Power
System Locations
EOD Area
Chevron
Substation
Valencia Road
West Airfield

Davis-Monthan AFB IICEP Distribution List

United States Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA, 94105
Phone: 415-947-8000
Toll free: 866-EPA-WEST

The Honorable Janet Napolitano
Governor of Arizona
1700 W Washington Street
Phoenix, Arizona 85007
Phone: 602-542-4331
Fax: 602-542-1381

Arizona Department of Agriculture
1688 W Adams
Phoenix, AZ 85007
Phone: 602-542-4373

Arizona Department of Environmental Quality Southern Regional Office
Attn: Assistant Director, David Esposito
400 W Congress, Suite 433
Tucson, AZ 85701
Phone: 520-628-6733
Toll free: 888-271-9302
Fax: 520-628-6745

Natural Resources Conservation Service
Tucson Service Center
4650 N Highway Drive
Tucson, AZ 85705-1914
Phone: 520-887-4505, ext 4
Fax: 520-888-1467

Arizona Water Protection Fund
C/O Department of Water Resources
Attn: Rodney Held
500 N Third Street
Phoenix, AZ 85004
Phone: 602-417-2200, ext 7012
Fax: 602-417-2423

Arizona Department of Water Resources
Tucson Active Management Area (AMA)
400 W Congress, Suite 518
Tucson, AZ 85701
Phone: 520-770-3800
Fax: 520-628-6759

Arizona Attorney General
Terry Goddard
Office of the Attorney General
Department of Law
1275 W Washington Street
Phoenix, AZ 85007
Phone: 602-542-5025
Fax: 602-542-4085

Water Protection Fund
US Bureau of Reclamation
Phoenix Area Office (PXAO)
2222 W Dunlap Avenue, Suite 100
Phoenix Arizona, 85021
Phone: 602-216-3999

US Army Corps of Engineers
Attn: Ms. Marjory Blaine
Regulatory Branch, Tucson Project Office
5205 E Comanche Street
Tucson, AZ 85707

Tohono O'odham Nation
P.O. Box 837
Sells, AZ 85634
Phone: 520-383-2028
Fax: 520-383-3379

Pascua Yaqui Tribe
7474 S Camino De Oeste
Tucson, AZ 85746
Phone: 520-883-5000
Fax: 520-883-5014

Scott Richardson
US Fish and Wildlife Service
201 N Bonita Avenue, Suite 141
Tucson AZ 85745
Phone: 520-670-6150, ext 242
scott_richardson@fws.gov

Tim Snow (Non-Game Species and Bats)
Arizona Game and Fish Department
555 N Greasewood Road
Tucson AZ 85745
Phone: 520-628-5376, ext 449
tsnow@gf.state.az.us

Michael Ingraldi
Non-Game Wildlife Biologist
Arizona Game and Fish Department
2221 Greenway Road
Phoenix, AZ 85023
Phone: 928-532-5625

Pima Association of Governments
Andy Gunning
Matt Matthewson
177 N Church Avenue, Suite 405
Tucson, AZ 85701

Pima County Planning
Dan Signor
201 N Stone
Tucson, AZ 85701

City of South Tucson Planning
Walker Smith
1601 S Sixth Avenue
Tucson, AZ 85713

City of Tucson Department of Urban Planning and Design
Roger Howlett
MacArthur Building
345 E Toole
Tucson, Arizona 85701

Town of Oro Valley Planning and Zoning
Bob Conant
Development Services Center
11000 N La Canada Drive
Oro Valley, Arizona 85737
Phone: 520-229-4800

Town of Marana Planning
Lisa Duncan
Town of Marana
Development Services Center
3696 W Orange Grove Road
Tucson, AZ 85741

Town of Sahuarita Planning
John Neunuebal
725-1 West Via Rancho Sahuarita
Sahuarita, AZ 85629

U of A Planning
David Duffy
University of Arizona
Department of Campus & Facilities Planning
P.O. Box 210300
Tucson, AZ 85721-0300

Pima Department of Environmental Quality
150 W Congress Street
Tucson, AZ 85701-1332
Phone: 520-740-3340
Fax: 520-882-770

Arizona Department of Environmental Quality
Office of Administrative Council
Attn: Henry Darwin
1110 West Washington Street
Phoenix, AZ 85007

James Garrison
SHPO
Arizona State Parks
1300 W. Washington
Phoenix, AZ 85007
Phone: 602-542-4009

Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Stephen A. Owens
Director

September 17, 2008

Ms. Vanessa Williford
Science Applications International Corp.
333 North Wilmot, Suite 400
Tucson, AZ 85711

RE: Pima County: Davis-Monthan AFB Environmental Assessment of Constructing A Solar Power System (SPS)

Dear Ms. Williford:

The Air Quality Division has reviewed the Department of the Air Force letter, dated September 29, 2008, in preparation of an Environmental Assessment (EA) to assess the potential environmental impacts during construction of a Solar Power System (SPS) on 5 parcels of land, totaling 315 acres, at Davis-Monthan Air Force Base, Arizona. The proposed project is not in a nonattainment or maintenance area for particulate matter. Nevertheless, considering prevailing winds and to comply with other applicable air pollution control requirements and minimize adverse impacts on public health and welfare, the following information is provided for your assessment:

REDUCE DISTURBANCE of PARTICULATE MATTER during CONSTRUCTION

This action, plan or activity may temporarily increase ambient particulate matter (dust) levels. Particulate matter 10 microns in size and smaller can penetrate the lungs of human beings and animals and is subject to a National Ambient Air Quality Standard (NAAQS) to protect public health and welfare. Particulate matter 2.5 microns in size and smaller is difficult for lungs to expel and has been linked to increases in death rates; heart attacks by disturbing heart rhythms and increasing plaque and clotting; respiratory infections; asthma attacks and cardiopulmonary obstructive disease (COPD) aggravation. It is also subject to a NAAQS.

The following measures are recommended to reduce disturbance of particulate matter, including emissions caused by strong winds as well as machinery and trucks tracking soil off the construction site:

I. Site Preparation and Construction
   A. Minimize land disturbance;
   B. Suppress dust on traveled paths which are not paved through wetting, use of watering trucks, chemical dust suppressants, or other reasonable precautions to prevent dust entering ambient air

Northern Regional Office
1801 W. Route 66 • Suite 117 • Flagstaff, AZ 86001
(928) 779-0313

Southern Regional Office
400 West Congress Street • Suite 433 • Tucson, AZ 85701
(520) 628-6733

c. If the burning would occur at a solid waste facility in violation of 40 CFR 258.24 and the Director has not issued a variance under A.R.S. § 49-763.01.

E. Open outdoor fires of dangerous material. A fire set for the disposal of a dangerous material is allowed by the provisions of this Section, when the material is too dangerous to store and transport, and the Director has issued a permit for the fire. A permit issued under this subsection shall contain all provisions in subsection (D)(3) except for subsections (D)(3)(e) and (D)(3)(f). The Director shall permit fires for the disposal of dangerous materials only when no safe alternative method of disposal exists, and burning the materials does not result in the emission of hazardous or toxic substances either directly or as a product of combustion in amounts that will endanger health or safety.

F. Open outdoor fires of household waste. An open outdoor fire for the disposal of household waste is allowed by provisions of this Section when permitted in writing by the Director or a delegated authority. A permit issued under this subsection shall contain all provisions in subsection (D)(3) except for subsections (D)(3)(e) and (D)(3)(f). The permittee shall conduct open outdoor fires of household waste in an approved waste burner and shall either:

1. Burn household waste generated on-site on farms or ranches of 40 acres or more where no household waste collection or disposal service is available; or
2. Burn household waste generated on-site where no household waste collection and disposal service is available and where the nearest other dwelling unit is at least 500 feet away.

G. Permits issued by a delegated authority. The Director may delegate authority for the issuance of open burning permits to a county, city, town, air pollution control district, or fire district. A delegated authority may not issue a permit for its own open burning activity. The Director shall not delegate authority to issue permits to burn dangerous material under subsection (E). A county, city, town, air pollution control district, or fire district with delegated authority from the Director may assign that authority to one or more private fire protection service providers that perform fire protection services within the county, city, town, air pollution control district, or fire district. A private fire protection provider shall not directly or indirectly condition the issuance of open burning permits on the applicant being a customer. Permits issued under this subsection shall comply with the requirements in subsection (D)(3) and be in a format prescribed by the Director. Each delegated authority shall:

1. Maintain a copy of each permit issued for the previous five years available for inspection by the Director;
2. For each permit currently issued, have a means of contacting the person authorized by the permit to set an open fire if an order to extinguish open burning is issued; and
3. Annually submit to the Director by May 15 a record of daily burn activity, excluding household waste burn permits, on a form provided by the Director for the previous calendar year containing the information required in subsections (D)(3)(e) and (D)(3)(f).

H. The Director shall hold an annual public meeting for interested parties to review operations of the open outdoor fire program and discuss emission reduction techniques.

I. Nothing in this Section is intended to permit any practice that is a violation of any statute, ordinance, rule, or regulation.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Amended effective October 2, 1979 (Supp. 79-5). Correction, subsection (C) repealed effective October 2, 1979, not shown (Supp. 80-1). Former Section R9-3-602 renumbered without change as Section R18-2-602 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-602 renumbered to R18-2-802, new Section R18-2-602 renumbered from R18-2-401 effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 10 A.A.R. 388, effective March 16, 2004 (Supp. 04-1).

R18-2-603. Repealed

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-603 renumbered without change as Section R18-2-603 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-603 renumbered to R18-2-803, new Section R18-2-603 renumbered from R18-2-403 effective November 15, 1993 (Supp. 93-4). Repealed effective October 8, 1996 (Supp. 96-4).

R18-2-604. Open Areas, Dry Washes, or Riverbeds

A. No person shall cause, suffer, allow, or permit a building or its appurtenances, or a building or subdivision site, or a driveway, or a parking area, or a vacant lot or sales lot, or an urban or suburban open area to be constructed, used, altered, repaired, demolished, cleared, or leveled, or the earth to be moved or excavated, without taking reasonable precautions to limit excessive amounts of particulate matter from becoming airborne. Dust and other types of air contaminants shall be kept to a minimum by good modern practices such as using an approved dust suppressant or adhesive soil stabilizer, paving, covering, landscaping, continuous wetting, detouring, barring access, or other acceptable means.

B. No person shall cause, suffer, allow, or permit a vacant lot, or an urban or suburban open area, to be driven over or used by motor vehicles, trucks, cars, cycles, bikes, or buggies, or by animals such as horses, without taking reasonable precautions to limit excessive amounts of particulates from becoming airborne. Dust shall be kept to a minimum by using an approved dust suppressant, or adhesive soil stabilizer, or by paving, or by barring access to the property, or by other acceptable means.

C. No person shall operate a motor vehicle for recreational purposes in a dry wash, riverbed or open area in such a way as to cause or contribute to visible dust emissions which then cross property lines into a residential, recreational, institutional, educational, retail sales, hotel or business premises. For purposes of this subsection "motor vehicles" shall include, but not be limited to trucks, cars, cycles, bikes, buggies and 3-wheelers. Any person who violates the provisions of this subsection shall be subject to prosecution under A.R.S. § 49-463.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-604 renumbered without change as Section R18-2-604 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-604 renumbered to R18-2-804, new Section R18-2-604 renumbered from R18-2-404 and amended effective November 15, 1993 (Supp. 93-4).

ARTICLE 8. EMISSIONS FROM MOBILE SOURCES (NEW AND EXISTING)

R18-2-801. Classification of Mobile Sources

A. This Article is applicable to mobile sources which either move while emitting air contaminants or are frequently moved during the course of their utilization but are not classified as motor vehicles, agricultural vehicles, or agricultural equipment used in normal farm operations.

B. Unless otherwise specified, no mobile source shall emit smoke or dust the opacity of which exceeds 40%.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Amended effective February 3, 1993 (Supp. 93-1). Former Section R18-2-801 renumbered to Section R18-2-901, new Section R18-2-801 renumbered from R18-2-601 effective November 15, 1993 (Supp. 93-4).

R18-2-802. Off-road Machinery

A. No person shall cause, allow or permit to be emitted into the atmosphere from any off-road machinery, smoke for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

B. Off-road machinery shall include trucks, graders, scrapers, rollers, locomotives and other construction and mining machinery not normally driven on a completed public roadway.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-802 renumbered to Section R18-2-902, new Section R18-2-802 renumbered from R18-2-602 effective November 15, 1993 (Supp. 93-4).

R18-2-803. Heater-planer Units

No person shall cause, allow or permit to be emitted into the atmosphere from any heater-planer operated for the purpose of reconstructing asphalt pavements smoke the opacity of which exceeds 20%. However three minutes' upset time in any one hour shall not constitute a violation of this Section.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-803 renumbered to Section R18-2-903, new Section R18-2-803 renumbered from R18-2-603 effective November 15, 1993 (Supp. 93-4).

R18-2-804. Roadway and Site Cleaning Machinery

A. No person shall cause, allow or permit to be emitted into the atmosphere from any roadway and site cleaning machinery smoke or dust for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

B. In addition to complying with subsection (A), no person shall cause, allow or permit the cleaning of any site, roadway, or alley without taking reasonable precautions to prevent particulate matter from becoming airborne. Reasonable precautions may include applying dust suppressants. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water or by other means.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Amended effective February 3, 1993 (Supp. 93-1). Former Section R18-2-804 renumbered to Section R18-2-904, new Section R18-2-804 renumbered from R18-2-604 effective November 15, 1993 (Supp. 93-4).

R18-2-805. Asphalt or Tar Kettles

A. No person shall cause, allow or permit to be emitted into the atmosphere from any asphalt or tar kettle smoke for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%.

B. In addition to complying with subsection (A), no person shall cause, allow or permit the operation of an asphalt or tar kettle without minimizing air contaminant emissions by utilizing all of the following control measures:

1. The control of temperature recommended by the asphalt or tar manufacturer;
2. The operation of the kettle with lid closed except when charging;
3. The pumping of asphalt from the kettle or the drawing of asphalt through cocks with no dipping;
4. The dipping of tar in an approved manner;
5. The maintaining of the kettle in clean, properly adjusted, and good operating condition;
6. The firing of the kettle with liquid petroleum gas or other fuels acceptable to the Director.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-805 renumbered to Section R18-2-905, new Section R18-2-805 renumbered from R18-2-605 effective November 15, 1993 (Supp. 93-4).

JANET NAPOLITANO
Governor

DONALD BUTLER
Director

Arizona Department of Agriculture

1688 W. Adams Street, Phoenix, Arizona 85007
(602) 542-3578 FAX (602) 542-0466

October 6, 2008

Ms. Vanessa Williford, SAIC
333 N. Wilmot, Suite 400
Tucson, AZ 85711

Re: Solar Power System at Davis-Monthan AFB

Dear Ms. Williford:

The Arizona Department of Agriculture has reviewed the referenced proposal regarding the process of preparing an Environmental Assessment to evaluate potential impacts of a solar power system construction project at the Davis-Monthan AFB in Tucson, AZ.

Based on the map provided by the Deputy Base Civil Engineer, Michael Toriello, no federally threatened or endangered plant species are known to occur in the proposed locations.

However, areas of concern where protected plants may exist are in the West Airfield, the EOD, and the Valencia Road sites. The Department recommends avoiding or transplanting any protected native plants that may be adversely impacted by the project.

The standard recommendations for clearing vegetation within the project sites should be minimal and limited to vegetation within the project. We strongly recommend that all protected native plants be preserved on or adjacent to the project areas that will not interfere with any work required. If any protected native plants are removed from the site for replanting off base, a permit from the Department of Agriculture may be required.

The Department has no other issues with the referenced project.

We appreciate the opportunity to review the proposed project. If you need additional information, please contact me at 602-364-0907, or e-mail at jmcginnis@azda.gov.

Sincerely,

James McGinnis
Environmental Services

c: Mike Reimer

www.azda.gov

Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Stephen A. Owens
Director

October 14, 2008
FPU 09-062

Ms. Vanessa Williford, SAIC
333 N. Wilmot, Suite 400
Tucson, AZ 85711

RE: Davis-Monthan Environmental Assessment for Proposed Solar Power System

Dear Ms. Williford;

The Arizona Department of Environmental Quality (ADEQ) received your letter dated September 29, 2008 regarding the Environmental Assessment (EA) to assess the potential environmental impacts of a proposal to construct a Solar Power System at Davis-Monthan Air Force Base.

ADEQ is aware of possible military munitions posing a safety hazard at the West Airfield. This issue was discussed with Davis-Monthan at an August 22, 2008 Military Munitions Response Program (MMRP) meeting for the Comprehensive Site Evaluation Phase II performed by ITSI and Shaw Environmental. The munitions response area (MRA) is referred to as TM 551 Training Area 1 and overlaps the southern portion of the West Airfield according to your map provided with your letter.

Several signal flares which may contain pyrotechnic filler material were identified on the surface in this area. Also encountered were fragments from a smoke grenade. Under the current Military Munitions Response Program these items would qualify the site for a Removal Action or a Remedial Investigation/ Feasibility Study to be performed under CERCLA. The Munitions Response Site Prioritization Protocol published in the Federal Register on August 22, 2003 as 32 CFR Part 179 is designed to prioritize and score munitions response sites. Evaluation of this site with the current munitions items identified would score the site high enough requiring further response action.

ADEQ is amenable to working together to perform a quick response action or clearance in order to rapidly develop this property for a beneficial use. This action should meet all ecological and cultural surveys required by the National Environmental Policy Act (NEPA). If you have any questions regarding this letter, please call Brian Stonebrink at (602) 771-4197.

Sincerely,

Brian Stonebrink

Brian Stonebrink, Project Manager
Federal Projects Unit
Waste Programs Division, ADEQ

Northern Regional Office
1801 W. Route 66- Suite 117- Flagstaff, AZ
86001
(928) 779-0313

Southern Regional Office
400 West Congress Street • Suite 433 • Tucson, AZ
85701
(520) 628-6733

FPU 09-062, Williford
October 14, 2008
Page 2 of 2

cc: Karen Oden, Restoration Program Manager, DMAFB
Harry Hendler, ADEQ Federal Projects Unit Manager
Susan Hess, ADEQ Project Manager, Southern Regional Office
Reading and MMRP projects file

2

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
TUCSON PROJECT OFFICE
5205 E. COMANCHE STREET
TUCSON, ARIZONA 85707

REPLY TO
ATTENTION OF:
Office of the Chief
Regulatory Division

October 15, 2008

Ms. Vanessa Williford
SAIC
333 N. Wilmot Road, Suite 400
Tucson, Arizona 85711

File Number: SPL-2008-01032-MB

Dear Ms. Williford:

I am responding to the letter dated September 29, 2008 from Mr. Toriello, Deputy Base Civil Engineer, Davis Monthan AFB (DMAFB) regarding construction of the proposed solar power system to support DMAFB, Tucson, Pima County, Arizona.

The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the U.S. including wetlands under Section 404 of the Clean Water Act. Types of activities which require a Section 404 permit if they discharge dredged or fill material into a water of the U.S. include but are not limited to roads, utilities, development (housing, industrial, commercial) pads, diversions, bank stabilization, grading, mechanized landclearing, or any other similar type of activity.

Mr. Toriello's letter did not contain enough information for us to determine if there are any waters of the U.S. on the site or if the project itself would result in the discharge of dredged and/or fill material into waters of the U.S. We would appreciate the submittal of more detailed information including an aerial photo so we may better advise you.

If you have questions, please contact me at (520)584-1684.

Sincerely,

Marjorie E. Blaine
Senior Project Manager/Biologist
Arizona Branch, Regulatory Division

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV

October 23, 2008

Mr. Michael R. Toriello
Deputy Base Civil Engineer
3791 S. 3rd St.
Davis-Monthan AFB, AZ 85707-3012

Re: **Proposed Solar Power System on Davis-Monthan AFB**

Dear Mr. Toriello:

The Arizona Game and Fish Department (Department) reviewed your letter addressed to Governor Napolitano. The Department understands the proposed action would consist of the construction of a renewable energy system. The Solar Power System would be constructed on 315 acres dispersed on five non-contiguous parcels located throughout Davis-Monthan AFB. The Department has the following comments.

The Department supports the development of alternative energies, such as solar, provided detrimental effects to wildlife and wildlife habitat are avoided to the extent possible. The Department recommends the use of previously disturbed lands, such as old mining sites and landfills, for solar energy development. When undisturbed lands are used, the Department recommends leaving as much natural vegetation possible to provide habitat for small animals such as snakes and lizards. The above referenced project should fully address and analyze the potential impacts to wildlife and their habitats. The Department's main concern is loss of habitat for burrowing owls which occur in the proposed areas. In addition, there is potential for Tucson shovel-nosed snake to occur at the site. Therefore, the Department recommends:

1. All five areas be surveyed for Western burrowing owls and that proper translocation of any owls be incorporated into any mitigation plans.

2. All areas be surveyed for Tucson shovel-nosed snake (soon to be federal candidate for listing) and if the species is deemed present within a solar field footprint that the proper exclusion mitigation techniques are incorporated.

Lastly, the Department is concerned about any future wildlife control programs that may be incorporated within the solar fields to minimize the presence of perched raptors, ground squirrels, and other wildlife. We request that any wildlife control programs be developed with the Department's input.

The Department would appreciate the opportunity to provide an evaluation of impacts to wildlife or wildlife habitats associated with project activities occurring in the subject areas when specific details become available. If you have any questions regarding this letter, please contact me at (623) 236-7606.

Sincerely,

Ginger Ritter
Project Evaluation Specialist

cc: Laura Canaca, Project Evaluation Program Supervisor
Joan Scott, Habitat Program Manager, Region V
Mike Ingraldi, Wildlife Specialist, Region I

AGFD #M08-10151745

Special Status Species within 5 Miles of Davis-Monthan Solar Areas

NAME	COMMON NAME	ESA	USFS	BLM	STATE
Aspidoscelis burti stictogrammus	Giant Spotted Whiptail	SC	S	S	
Athene cunicularia hypugaea	Western Burrowing Owl	SC		S	
Bat Colony					
Choeronycteris mexicana	Mexican Long-tongued Bat	SC			WSC
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC			
Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	LE			HS
Echinomastus erectocentrus var. erectocentrus	Needle-spined Pineapple Cactus	SC	S		SR
Gastrophryne olivacea	Great Plains Narrow-mouthed Toad				WSC
Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	SC			WSC
Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise	SC			WSC
Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE	S		WSC
Lysiloma watsonii	Littleleaf False Tamarind				SR
Myotis occultus	Arizona Myotis	SC		S	
Myotis velifer	Cave Myotis	SC		S	
Opuntia versicolor	Stag-horn Cholla				SR
Rana yavapaiensis	Lowland Leopard Frog	SC	S		WSC
San Xavier Indian Reservation	San Xavier Indian Reservation				

AGFD #M08-10151745. Proposed Solar Facility.

Arizona Game and Fish Department, Heritage Data Management System, October 22, 2008.
Project Evaluation Program.

The Burrowing Owl Project

The Burrowing Owl is a small raptor that lives in underground burrows and eats mice and insects.

Because Burrowing Owls are frequently active during the day, nearby residents can become very attached to them and protective of their welfare. Unfortunately, in the past, heavy equipment has often been used to prepare a site for development while owls were still living there, in many cases killing the adult owls and burying young in the nest.

The owls primarily breed in the spring and summer and occasionally in the other seasons. Moving federally protected Burrowing Owls out of the way is very inexpensive for a developer compared to a lengthy project delay. A licensed specialist, such as Wild At Heart, can remove the owls to an approved care facility and later relocate them to an appropriate area that won't be developed.

For more information

- To report the location of a Burrowing Owl burrow that lies in the path of development or to request help in removing an owl, contact:
  Bob Fox
  Wild At Heart
  31840 N. 45th St.
  Cave Creek, AZ 85331
  (480) 595-5047

- To request help in finding or evaluating a site for placement of artificial burrows and owls, contact:
  Greg Clark
  Burrowing Owl Habitat
  650 S. 79th St.
  Chandler, AZ 85226
  (480) 961-4047

- For more information about the Arizona Bird Conservation Initiative, contact:
  Edwin Juarez
  Arizona Game and Fish Department
  2221 W. Greenway Road
  Phoenix, AZ 85023
  (602) 789-3516
  ejuarez@azgfd.gov

Visit the Wild At Heart Burrowing Owl Project Web site at mirror-pole.com for details about owl removal, relocation and burrow installation locations.

DEVELOPMENT AND BURROWING OWLS IN ARIZONA

Don't let poor planning cause delays and cost you money!

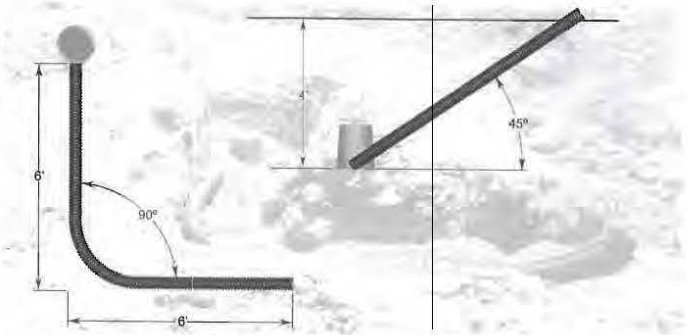
If you do not move this owl well before grading begins, it could delay your project, make enemies of the neighbors and possibly subject your company to fines for breaking a federal law: the Migratory Bird Treaty Act of 1918.

When is an owl in trouble?

Burrowing Owls can be found locally throughout Arizona where burrowing mammals, such as pocket gophers, prairie dogs and ground squirrels, dig their holes. The owls can then use those holes for homes. The most likely locations are flat and open areas with few tall trees. The owls prefer agricultural fields, canal banks, vacant lots, undisturbed natural desert grassland and open space near commercial buildings. Some land disturbance in these locations could displace or even kill an owl. Any site where mammal burrows are present that has planned canal maintenance, road maintenance or any upcoming earth-moving operation should be surveyed by an expert for Burrowing Owls before work begins.

What is relocation?

Burrowing Owls can be safely captured by an expert and held at an approved care facility for later release to a site prepared with artificial burrows. By using this process, also known as active translocation, Wild at Heart has already relocated hundreds of Arizona owls to sites that are never expected to be disturbed in the future. A U.S. Fish and Wildlife Service permit is required to trap and remove the owls. The cost of materials for a single burrow ranges between $25 and $35, and digging the hole for installation is quick and easy with a backhoe. Typically, a colony of 6 to 10 owls is relocated at one time to a cluster of 16 to 20 burrows.



An artificial burrow consists of one 5 gallon plastic bucket and 12 feet of perforated drain pipe.

Be part of the solution

Burrowing Owls are adorable animals that are entertaining to watch, and they catch insects and rodents that most people would rather not have around. In addition, the owls can be an important educational resource for schools and children. Help preserve this valuable natural resource by watching out for the owls to prevent their injury at job sites. At new project sites, artificial burrows can add value because they attract owls for all to enjoy.

The builder provided a backhoe and operator to excavate the hole for an artificial burrow.

Students digging a hole for an artificial burrow.

These can be installed in or near greenbelts, retention basins, open spaces, bike paths, storm water drainage channels and natural desert grassland.

Wild At Heart

Wild At Heart is an all-volunteer, nonprofit organization dedicated to the conservation and preservation of native wildlife in Arizona. Wild At Heart has met its conservation goals through the rescue and rehabilitation of injured and orphaned birds of prey, relocation of displaced raptors like Burrowing Owls, public education and wildlife habitat enhancement programs.

Arizona Bird Conservation Initiative (ABCI)

ABCI is an Arizona Game and Fish Department program that brings together representatives from wildlife organizations, government agencies and private landowners. Partnerships are created to implement conservation projects that will benefit priority habitats and species identified in the Arizona Partners in Flight Bird Conservation Plan. This brochure was created by Wild At Heart, and ABCI funded the printing.

Janet Napolitano
Governor

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Stephen A. Owens
Director

October 24, 2008

Ms. Vanessa Williford
Science Applications International Corp.
333 North Wilmot, Ste. 400
Tucson, AZ 85711

Re: Pima County: Davis-Monthan AFB Environmental Assessment of Constructing A Solar Power System (SPS).

Dear Ms. Williford:

The Arizona Department of Environmental Quality (ADEQ) appreciates the opportunity to comment in the preparation of an Environmental Assessment (EA) to assess the potential environmental impacts during construction of a Solar Power System. These comments supplement our previous letter sent to you by ADEQ Air Quality Division.

ADEQ Water Quality division has the following comments:

The Arizona Department of Environmental Quality Water Quality Division (WQD) is responsible for ensuring the delivery of safe drinking water to customers of regulated public water systems under the Safe Drinking Water Act, permits for proposed discharges to surface waters of the United States under the federal Clean Water Act (CWA), permits under the State aquifer protection program and water quality certifications of certain federal licenses and permits. With the information provided, the WQD would like to make you aware of some water quality issues that may need to be addressed in the Environmental Assessment (EA) to assess the potential environmental impacts of the proposal to construct a Solar Power System at Davis-Monthan Air Force Base.

Stormwater: Stormwater discharges associated with construction activities (clearing, grading, or excavating) which disturb one acre or more must obtain a general permit for coverage of stormwater discharges under the Arizona Pollutant Discharge Elimination System's Construction General Permit. Permit coverage also is required for construction activities that will disturb less than one acre of land but the project is part of a larger common plan of development or sale and the entire project will ultimately disturb one or more acres. The information indicates that this project has the potential to impact 315 acres. The EA should address the Stormwater Pollution Prevention Plan (SWPPP), which must be prepared and implemented during the course of construction. The SWPPP must comply with ADEQ's Construction General Permit's SWPPP requirements, and must identify such elements as the project scope, anticipated acreage of land disturbance, and the best management practices that would be implemented to reduce soil

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(520) 628-6733

erosion and contain and/or minimize the pollutants that might be released to waters of the U.S. In addition to preparing the SWPPP, the project proponent would need to file for permit coverage. The Construction General Permit, SWPPP checklist, and associated forms are available on ADEQ's website at:
http://www.azdeq.gov/environ/water/permits/stormwater.html#const.

CWA 401 water quality certification: If project activities will occur inside the Ordinary High Water Mark of any water of the U.S., then an U.S. Army Corps of Engineers-issued Clean Water Act (CWA) section 404 permit (a.k.a. dredge and fill permit) may be required. If a 404 permit (or any other federal permit) is required for the project, a state-issued CWA section 401 certification of the permit will be required. The U.S. Army Corps of Engineers will include the conditions of the CWA 401 certification as requirements of the Section 404 permit to ensure that the permitted activities will not result in a violation of the State's surface water quality standards. For questions relating to CWA 401/404 please contact Bob Scalamera at 602-771-4502 or by e-mail at RS3@azdeq.gov. The CWA 401 application form can be downloaded from ADEQ's website at: http://www.azdeq.gov/function/forms/appswater.html#dredge

Finally, the WQD would appreciate that the EA address any water discharge resulting from the power generation process, if applicable.

If you have any questions, please feel free to contact me at 602-771-2328.

Sincerely,

Henry R. Darwin
Administrative Counsel

United States Department of the Interior

Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
AESO/SE
22410-2009-TA-0024

October 27, 2008

2EA
Margaret

Mr. Michael R. Toriello
355th Civil Engineer Squadron (ACC)
3791 South 3rd Street
Davis-Monthan Air Force Base, Arizona 85707-3012

Dear Mr. Toriello:

Thank you for your September 29, 2008 request for our assistance in the development of an Environmental Assessment for the proposed development of a Solar Power System (SPS) at Davis-Monthan Air Force Base in Tucson, Pima County, Arizona. We have reviewed the information you provided and have the following comments regarding this action.

The project proposal falls within the range of the Pima pineapple cactus (*Coryphantha scheeri var. robustispina*)(PPC), a cactus listed as endangered under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544) (Act). The identified sites for the SPS also include appropriate habitat for the Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*), a species for which we have received a petition to list under the Act. Additionally, some of the proposed SPS sites support habitat for the western burrowing owl (*Athene cunicularia*), a sensitive species proposed for coverage under three local habitat conservation plans. We are providing comments on the proposed SPS for these three species.

The West Airfield, EOD Area, and Valencia Road SPS sites support potential habitat for the PPC. Pima pineapple cacti have been documented in this general area. Because the SPS sites would have all vegetation removed, there is the potential for impacts to this species. Casual site visits typically do not provide adequate survey coverage for this species because they are very difficult to see. Surveys require an intense, focused effort. We recommend that, if any of these three sites are selected for implementation of the SPS, they be formally surveyed for Pima pineapple cacti prior to any development activities. Please contact the PPC species lead in our office, Marit Alanen (520-670-6150 x 234), if you need direction regarding how these surveys should be conducted. Should any Pima pineapple cacti be located during surveys, we recommend you contact us for further guidance. Negative survey results would indicate that impacts to Pima pineapple cactus would not occur as a result of this project.

Mr. Michael R. Toriello 2

The West Airfield, EOD Area, and Valencia Road sites also fall within the range of the Tucson shovel-nosed snake. The petition to list this snake under the Act is currently being processed in our office. If possible, surveys should be conducted to determine if the Tucson shovel-nosed snake occupies any of these three sites, should they be selected for implementation of the SPS. Because occupancy of Tucson shovel-nosed snakes is difficult to determine, we also recommend that SPS sites that have already experienced disturbance be selected for implementation, in order to reduce impacts to soil conditions that are favorable to the shovel-nosed snake, and reduce the potential for direct mortality.

The burrowing owl is a species that is experiencing rangewide declines and is a covered species in three habitat conservation plans being developed in Pima County. This species is known to inhabit open areas with sparse vegetation on Davis-Monthan Air Force Base. We recommend that the areas to be disturbed as part of this project be surveyed for the presence of burrowing owls. For guidance on conducting burrowing owl surveys and conservation measures for this species, please contact the Arizona Game and Fish Department Research Branch (Dave Grandmaison, [520] 609-2164). We encourage you to coordinate review of this project with the Arizona Game and Fish Department.

This letter is not intended to express any requirement of, or conditions necessary for compliance with, the Endangered Species Act. Our comments are provided to you as technical assistance regarding how effects of the proposed SPS on biological resources can be minimized, but they do not constitute legal requirements. As the Federal action agency for this project, you will make a determination on the effects of the action on listed species and whether section 7 consultation, pursuant to the Act, is required.

If you have any questions regarding our comments, or need any additional information, please contact Scott Richardson at (520) 670-6150 (x242) or Sherry Barrett (x223). Thank you for your consideration of endangered species.

Sincerely,

Steven L. Spangle
Field Supervisor

cc: SAIC, Tucson, Tucson, AZ (Attn: Vanessa Williford)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Habitat Branch Chief, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ (Attn: Joan Scott)

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Notice of Availability

Arizona Daily Star, November 20, 2008

Notice of Availability
U.S. Air Force Draft Environmental Assessment Draft Environmental Assessment (EA) for a Solar Power System at Davis-Monthan Air Force Base (AFB), Arizona

The U.S. Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) analyzing the potential impacts of the construction of a Solar Power System (SPS) at Davis-Monthan Air Force Base (AFB), Arizona.

The proposed action calls for a contractor constructed, owned, and operated SPS to be installed on up to 279 acres in four non-contiguous parcels of land located on Davis-Monthan AFB. The SPS would generate a minimum of 1 megawatt (MW) of electricity for use by Davis-Monthan AFB. The SPS would reduce the cost of electricity at Davis-Monthan AFB and comply with the Energy Policy Act of 2005 and Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*. The U.S. Air Force will lease the land and contract for the electricity produced by the SPS.

The Air Force also evaluated the environmental impacts associated with the no-action alternative, under which no SPS would be constructed.

A copy of the Draft EA and FONSI will be available November 21, 2008 at the Joel D. Valdez Main Library at 101 N Stone Avenue, Tucson Arizona. An electronic copy of the document is also located on the Davis-Monthan AFB Community Initiatives webpage at http://www.dm.af.mil/units/communityinitiatives/index.asp. Alternatively, you may request a copy of the document from Davis-Monthan AFB Public Affairs at (520) 228-3406. Please provide any comments on the Draft EA by December 22, 2008 to the address below.

355 CES/CEAN
5285 E. Madera Street
Davis-Monthan AFB, AZ 85707-3012
Attn: Margaret Bowman

The Tucson Citizen, November 20, 2008

Notice of Availability
U.S. Air Force Draft Environmental Assessment Draft Environmental Assessment (EA) for a *Solar Power System* at Davis-Monthan Air Force Base (AFB), Arizona

The U.S. Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) analyzing the potential impacts of the construction of a *Solar Power System* (*SPS*) at Davis-Monthan Air Force Base (AFB), Arizona.

The proposed action calls for a contractor constructed, owned, and operated *SPS* to be installed on up to 279 acres in four non-contiguous parcels of land located on Davis-Monthan AFB. The *SPS* would generate a minimum of 1 megawatt (MW) of electricity for use by Davis-Monthan AFB. The *SPS* would reduce the cost of electricity at Davis-Monthan AFB and comply with the Energy Policy Act of 2005 and Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*. The U.S. Air Force will lease the land and contract for the electricity produced by the *SPS*.

The Air Force also evaluated the environmental impacts associated with the no-action alternative, under which no *SPS* would be constructed.

A copy of the Draft EA and FONSI will be available November 21, 2008 at the Joel D. Valdez Main Library at 101 N Stone Avenue, Tucson Arizona. An electronic copy of the document is also located on the Davis-Monthan AFB Community Initiatives webpage at http://www.dm.af.mil/units/communityinitiatives/index.asp. Alternatively, you may request a copy of the document from Davis-Monthan AFB Public Affairs at (520) 228-3406. Please provide any comments on the Draft EA by December 22, 2008 to the address below.

355 CES/CEAN
5285 E. Madera Street
Davis-Monthan AFB, AZ 85707-3013
Attn: Margaret Bowman

Desert Lightning News, Davis-Monthan AFB, November 21, 2008

Notice of Availability

U.S. Air Force Draft Environmental Assessment Draft Environmental Assessment (EA) for a Solar Power System at Davis-Monthan Air Force Base (AFB), Arizona

The U.S. Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) analyzing the proposed location of the construction of a Solar Power System (SPS) at Davis-Monthan Air Force Base (AFB), Arizona.

The proposed action calls for construction, operation, and eventual SPS at the existing 40 up to 270 acres in four non-contiguous parcels of land located on Davis-Monthan AFB. The SPS would generate a maximum of [illegible] of electricity per hour by Davis-Monthan AFB. The SPS would reduce the use of electricity on Davis-Monthan AFB and comply with the Energy Policy Act of 2005 and Executive Order (EO) 13423, Strengthening Federal Environmental, Energy, and Transportation Management. The U.S. Air Force will lease the land and contract for the energy produced by the SPS.

The Air Force also evaluated the environmental impacts associated with the no-action alternative, under which no SPS would be constructed.

A copy of the Draft EA and FONSI will be available November 21, 2008 and the Davis-Monthan AFB Library at 8011 S. Park Avenue, Tucson, Arizona. An electronic copy of the documents also located on the Davis-Monthan AFB Environmental Programs webpage at:

http://www.dm.af.mil/units/environmental/index.asp

Alternatively, you may request a copy of the documents from Davis-Monthan AFB Public Affairs at (520) 228-1426. Please provide any comments on the Draft EA by December 31, 2008 to the address below:

[illegible]

[illegible]

[illegible]

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Comments Received on Solar Power System Draft EA

Janet Napolitano
Governor

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
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Stephen A. Owens
Director

December 12, 2008

Ms. Margaret Bowman, 355 CES/CEAN
5285 East 22, 2008
Davis-Monthan AFB, AZ 85707

Subject: Pima County: Davis-Monthan AFB EA- Solar Power System

Dear Ms. Bowman:

The Air Quality Division has reviewed the proposed project draft described in your letter of November 19, 2008, which you submitted for our General Conformity Determination comments with the Arizona State Implementation Plan in accordance with Clean Air Act Section 176(c)(1); 58 Federal Register 63214-63259; Title 40 Code of Federal Regulations Part 51, Subpart W §§ 51.850-51.860; Title 40 Code of Federal Regulations Part 93, Subpart B §§ 93.150-160; and Arizona Administrative Code R18-2-348 (approved into the Arizona State Implementation Plan April 23, 1999; effective June 22, 1999). The Air Quality Division has concluded that a General Conformity Determination would not be required for the following reason:

- Project's total emissions of PM10 in a PM10 Maintenance Area would be less than *de minimis* levels in Title 40 CFR § 51.853(b) [and §93.153(b)] as described or calculated

Nevertheless, considering some of the project's nearness to a particulate matter nonattainment area and prevailing winds, to comply with other applicable air pollution control requirements and minimize adverse impacts on public health and welfare, the following information is provided for your consideration:

REDUCE DISTURBANCE of PARTICULATE MATTER during CONSTRUCTION

This action, plan or activity may temporarily increase ambient particulate matter (dust) levels. Particulate matter 10 microns in size and smaller can penetrate the lungs of human beings and animals and is subject to a National Ambient Air Quality Standard (NAAQS) to protect public health and welfare. Particulate matter 2.5 microns in size and smaller is difficult for lungs to expel and has been linked to increases in death rates; heart attacks by disturbing heart rhythms and increasing plaque and clotting; respiratory infections; asthma attacks and cardiopulmonary obstructive disease (COPD) aggravation. It is also subject to a NAAQS.

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Margaret Bowman
December 12, 2008
Page 2

The following measures are recommended to reduce disturbance of particulate matter, including emissions caused by strong winds as well as machinery and trucks tracking soil off the construction site:

I. Site Preparation and Construction
   A. Minimize land disturbance;
   B. Suppress dust on traveled paths which are not paved through wetting, use of watering trucks, chemical dust suppressants, or other reasonable precautions to prevent dust entering ambient air
   C. Cover trucks when hauling soil;
   D. Minimize soil track-out by washing or cleaning truck wheels before leaving construction site;
   E. Stabilize the surface of soil piles; and
   F. Create windbreaks

II. Site Restoration
   A. Re-vegetate any disturbed land not used;
   B. Remove unused material; and
   C. Remove soil piles via covered trucks.

The following rules applicable to reducing dust during construction, demolition and earth moving activities are enclosed:

- Arizona Administrative Code R18-2-604 through -607
- Arizona Administrative Code R18-2-804
- Pima County Code Chapter 17.16 Article III

If you have any questions, please contact David Biddle at (602) 771-2376 or by e-mail at dab@azdeq.gov.

Very truly yours,

Diane L. Arnst, Manager
Air Quality Planning Section

Enclosures

cc: Henry R. Darwin, EV Administrative Counsel
David Biddle, Environmental Program Specialist, Air Planning
File No. 197951

c. If the burning would occur at a solid waste facility in violation of 40 CFR 258.24 and the Director has not issued a variance under A.R.S. § 49-763.01.

E. Open outdoor fires of dangerous material. A fire set for the disposal of a dangerous material is allowed by the provisions of this Section, when the material is too dangerous to store and transport, and the Director has issued a permit for the fire. A permit issued under this subsection shall contain all provisions in subsection (D)(3) except for subsections (D)(3)(e) and (D)(3)(f). The Director shall permit fires for the disposal of dangerous materials only when no safe alternative method of disposal exists, and burning the materials does not result in the emission of hazardous or toxic substances either directly or as a product of combustion in amounts that will endanger health or safety.

F. Open outdoor fires of household waste. An open outdoor fire for the disposal of household waste is allowed by provisions of this Section when permitted in writing by the Director or a delegated authority. A permit issued under this subsection shall contain all provisions in subsection (D)(3) except for subsections (D)(3)(e) and (D)(3)(f). The permittee shall conduct open outdoor fires of household waste in an approved waste burner and shall either:

1. Burn household waste generated on-site on farms or ranches of 40 acres or more where no household waste collection or disposal service is available; or
2. Burn household waste generated on-site where no household waste collection and disposal service is available and where the nearest other dwelling unit is at least 500 feet away.

G. Permits issued by a delegated authority. The Director may delegate authority for the issuance of open burning permits to a county, city, town, air pollution control district, or fire district. A delegated authority may not issue a permit for its own open burning activity. The Director shall not delegate authority to issue permits to burn dangerous material under subsection (E). A county, city, town, air pollution control district, or fire district with delegated authority from the Director may assign that authority to one or more private fire protection service providers that perform fire protection services within the county, city, town, air pollution control district, or fire district. A private fire protection provider shall not directly or indirectly condition the issuance of open burning permits on the applicant being a customer. Permits issued under this subsection shall comply with the requirements in subsection (D)(3) and be in a format prescribed by the Director. Each delegated authority shall:

1. Maintain a copy of each permit issued for the previous five years available for inspection by the Director;
2. For each permit currently issued, have a means of contacting the person authorized by the permit to set an open fire if an order to extinguish open burning is issued; and
3. Annually submit to the Director by May 15 a record of daily burn activity, excluding household waste burn permits, on a form provided by the Director for the previous calendar year containing the information required in subsections (D)(3)(e) and (D)(3)(f).

H. The Director shall hold an annual public meeting for interested parties to review operations of the open outdoor fire program and discuss emission reduction techniques.

I. Nothing in this Section is intended to permit any practice that is a violation of any statute, ordinance, rule, or regulation.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Amended effective October 2, 1979 (Supp. 79-5). Correction, subsection (C) repealed effective October 2, 1979, not shown (Supp. 80-1). Former Section R9-3-602 renumbered without change as Section R18-2-602 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-602 renumbered to R18-2-802, new Section R18-2-602 renumbered from R18-2-401 effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 10 A.A.R. 388, effective March 16, 2004 (Supp. 04-1).

R18-2-603. Repealed

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-603 renumbered without change as Section R18-2-603 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-603 renumbered to R18-2-803, new Section R18-2-603 renumbered from R18-2-403 effective November 15, 1993 (Supp. 93-4). Repealed effective October 8, 1996 (Supp. 96-4).

R18-2-604. Open Areas, Dry Washes, or Riverbeds

A. No person shall cause, suffer, allow, or permit a building or its appurtenances, or a building or subdivision site, or a driveway, or a parking area, or a vacant lot or sales lot, or an urban or suburban open area to be constructed, used, altered, repaired, demolished, cleared, or leveled, or the earth to be moved or excavated, without taking reasonable precautions to limit excessive amounts of particulate matter from becoming airborne. Dust and other types of air contaminants shall be kept to a minimum by good modern practices such as using an approved dust suppressant or adhesive soil stabilizer, paving, covering, landscaping, continuous wetting, detouring, barring access, or other acceptable means.

B. No person shall cause, suffer, allow, or permit a vacant lot, or an urban or suburban open area, to be driven over or used by motor vehicles, trucks, cars, cycles, bikes, or buggies, or by animals such as horses, without taking reasonable precautions to limit excessive amounts of particulates from becoming airborne. Dust shall be kept to a minimum by using an approved dust suppressant, or adhesive soil stabilizer, or by paving, or by barring access to the property, or by other acceptable means.

C. No person shall operate a motor vehicle for recreational purposes in a dry wash, riverbed or open area in such a way as to cause or contribute to visible dust emissions which then cross property lines into a residential, recreational, institutional, educational, retail sales, hotel or business premises. For purposes of this subsection "motor vehicles" shall include, but not be limited to trucks, cars, cycles, bikes, buggies and 3-wheelers. Any person who violates the provisions of this subsection shall be subject to prosecution under A.R.S. § 49-463.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-604 renumbered without change as Section R18-2-604 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-604 renumbered to R18-2-804, new Section R18-2-604 renumbered from R18-2-404 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-605. Roadways and Streets

A. No person shall cause, suffer, allow or permit the use, repair, construction or reconstruction of a roadway or alley without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Dust and other particulates shall be kept to a minimum by employing temporary paving, dust suppressants, wetting down, detouring or by other reasonable means.

B. No person shall cause, suffer, allow or permit transportation of materials likely to give rise to airborne dust without taking reasonable precautions, such as wetting, applying dust suppressants, or covering the load, to prevent particulate matter from becoming airborne. Earth or other material that is deposited by trucking or earth moving equipment shall be removed from paved streets by the person responsible for such deposits.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-605 renumbered without change as Section R18-2-605 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-605 renumbered to R18-2-805, new Section R18-2-605 renumbered from R18-2-405 effective November 15, 1993 (Supp. 93-4).

R18-2-606. Material Handling

No person shall cause, suffer, allow or permit crushing, screening, handling, transporting or conveying of materials or other operations likely to result in significant amounts of airborne dust without taking reasonable precautions, such as the use of spray bars, wetting agents, dust suppressants, covering the load, and hoods to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-606 renumbered from R18-2-406 effective November 15, 1993 (Supp. 93-4).

R18-2-607. Storage Piles

A. No person shall cause, suffer, allow, or permit organic or inorganic dust producing material to be stacked, piled, or otherwise stored without taking reasonable precautions such as chemical stabilization, wetting, or covering to prevent excessive amounts of particulate matter from becoming airborne.

B. Stacking and reclaiming machinery utilized at storage piles shall be operated at all times with a minimum fall of material and in such manner, or with the use of spray bars and wetting agents, as to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-607 renumbered from R18-2-407 effective November 15, 1993 (Supp. 93-4).

R18-2-608. Mineral Tailings

No person shall cause, suffer, allow, or permit construction of mineral tailing piles without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Reasonable precautions shall mean wetting, chemical stabilization, revegetation or such other measures as are approved by the Director.

Historical Note

Section R18-2-608 renumbered from R18-2-408, new Section R18-2-408 adopted effective November 15, 1993 (Supp. 93-4).

R18-2-609. Agricultural Practices

A person shall not cause, suffer, allow, or permit the performance of agricultural practices outside the Phoenix and Yuma planning areas, as defined in 40 CFR 81.303, which is incorporated by reference in R18-2-210, including tilling of land and application of fertilizers without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-609 renumbered from R18-2-409 effective November 15, 1993 (Supp. 93-4). Amended by final rulemaking at 6 A.A.R. 2009, effective May 12, 2000 (Supp. 00-2). Amended by final rulemaking at 11 A.A.R. 2210, effective July 18, 2005 (Supp. 05-2).

R18-2-610. Definitions for R18-2-611

The definitions in Article 1 of this Chapter and the following definitions apply to R18-2-611:

1. "Access restriction" means restricting or eliminating public access to noncropland with signs or physical obstruction.
2. "Aggregate cover" means gravel, concrete, recycled road base, caliche, or other similar material applied to noncropland.
3. "Artificial wind barrier" means a physical barrier to the wind.
4. "Best management practice" means a technique verified by scientific research, that on a case-by-case basis is practical, economically feasible, and effective in reducing PM_{10} emissions from a regulated agricultural activity.
5. "Chemical irrigation" means applying a fertilizer, pesticide, or other agricultural chemical to cropland through an irrigation system.
6. "Combining tractor operations" means performing two or more tillage, cultivation, planting, or harvesting operations with a single tractor or harvester pass.
7. "Commercial farm" means 10 or more contiguous acres of land used for agricultural purposes within the boundary of the Maricopa PM_{10} nonattainment area.
8. "Commercial farmer" means an individual, entity, or joint operation in general control of a commercial farm.
9. "Committee" means the Governor's Agricultural Best Management Practices Committee.
10. "Cover crop" means plants or a green manure crop grown for seasonal soil protection or soil improvement.
11. "Critical area planting" means using trees, shrubs, vines, grasses, or other vegetative cover on noncropland.
12. "Cropland" means land on a commercial farm that:
    a. Is within the time-frame of final harvest to plant emergence;
    b. Has been tilled in a prior year and is suitable for crop production, but is currently fallow; or
    c. Is a turn-row.

ARTICLE 8. EMISSIONS FROM MOBILE SOURCES (NEW AND EXISTING)

R18-2-801. Classification of Mobile Sources

A. This Article is applicable to mobile sources which either move while emitting air contaminants or are frequently moved during the course of their utilization but are not classified as motor vehicles, agricultural vehicles, or agricultural equipment used in normal farm operations.

B. Unless otherwise specified, no mobile source shall emit smoke or dust the opacity of which exceeds 40%.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Amended effective February 3, 1993 (Supp. 93-1). Former Section R18-2-801 renumbered to Section R18-2-901, new Section R18-2-801 renumbered from R18-2-601 effective November 15, 1993 (Supp. 93-4).

R18-2-802. Off-road Machinery

A. No person shall cause, allow or permit to be emitted into the atmosphere from any off-road machinery, smoke for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

B. Off-road machinery shall include trucks, graders, scrapers, rollers, locomotives and other construction and mining machinery not normally driven on a completed public roadway.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-802 renumbered to Section R18-2-902, new Section R18-2-802 renumbered from R18-2-602 effective November 15, 1993 (Supp. 93-4).

R18-2-803. Heater-planer Units

No person shall cause, allow or permit to be emitted into the atmosphere from any heater-planer operated for the purpose of reconstructing asphalt pavements smoke the opacity of which exceeds 20%. However three minutes' upset time in any one hour shall not constitute a violation of this Section.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-803 renumbered to Section R18-2-903, new Section R18-2-803 renumbered from R18-2-603 effective November 15, 1993 (Supp. 93-4).

R18-2-804. Roadway and Site Cleaning Machinery

A. No person shall cause, allow or permit to be emitted into the atmosphere from any roadway and site cleaning machinery smoke or dust for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

B. In addition to complying with subsection (A), no person shall cause, allow or permit the cleaning of any site, roadway, or alley without taking reasonable precautions to prevent particulate matter from becoming airborne. Reasonable precautions may include applying dust suppressants. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water or by other means.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Amended effective February 3, 1993 (Supp. 93-1). Former Section R18-2-804 renumbered to Section R18-2-904, new Section R18-2-804 renumbered from R18-2-604 effective November 15, 1993 (Supp. 93-4).

R18-2-805. Asphalt or Tar Kettles

A. No person shall cause, allow or permit to be emitted into the atmosphere from any asphalt or tar kettle smoke for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%.

B. In addition to complying with subsection (A), no person shall cause, allow or permit the operation of an asphalt or tar kettle without minimizing air contaminant emissions by utilizing all of the following control measures:

1. The control of temperature recommended by the asphalt or tar manufacturer;
2. The operation of the kettle with lid closed except when charging;
3. The pumping of asphalt from the kettle or the drawing of asphalt through cocks with no dipping;
4. The dipping of tar in an approved manner;
5. The maintaining of the kettle in clean, properly adjusted, and good operating condition;
6. The firing of the kettle with liquid petroleum gas or other fuels acceptable to the Director.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-805 renumbered to Section R18-2-905, new Section R18-2-805 renumbered from R18-2-605 effective November 15, 1993 (Supp. 93-4).

Janet Napolitano
Governor

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Stephen A. Owens
Director

December 22, 2008
FPU 09-100

Ms. Margaret Bowman
355 CES/CEAN
5285 E. Madera Street
Davis-Monthan AFB, AZ 85707

RE: Davis-Monthan Draft Environmental Assessment for a Proposed Solar Power System

Dear Ms. Bowman;

The Arizona Department of Environmental Quality (ADEQ) Federal Projects Unit has reviewed the Draft Environmental Assessment for a Solar Power System at Davis-Monthan AFB dated November 2008 in regards to the Military Munitions Response Program (MMRP) and the Environmental Restoration Program (ERP) sites.

Portions of the West Airfield known as TM551 (Training Area 1) were recently investigated during the MMRP Comprehensive Site Evaluation Phase II. Helicopter training activities in the 1980's involved smoke grenades and illumination flares. ADEQ has reviewed the Summary and Recommendations Memorandum for TM551 (Training Area 1) dated November 14, 2008 and concurs that the munitions debris items found at the site do not represent an explosive safety hazard.

ADEQ supports the recommendation to provide recognition training for construction workers during construction of the solar power system which would involve grading and digging trenches. Also, having the DMAFB Explosive Ordnance and Disposal (EOD) team available if potentially intact items are identified would be recommended as outlined in the November 14, 2008 Memorandum.

ADEQ also recommends including the training area in the Base Master Plan. If the future use is not going to be a solar power system or if in the future the solar power system is dismantled and another land use is implemented on the training area the munitions constituents (MC) and munitions of explosive concern (MEC) may need to be reevaluated under the MMRP or equivalent program.

Specific Comments:

1. Page 3-51, Table 3-10-1 does not mention the five grenade remnants that have been discovered at TM-551 Training Area 1.

2. Page 4- 21, Impacts MMRP- The statement, "The Air Force is expected to support an ADEQ recommendation of No Further Action at these sites" is incorrect. ADEQ does not make these recommendations. The Air Force or their contractor makes recommendations and ADEQ either concurs or does not concur.

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FPU 09-100, Ms. Bowman
December 22, 2008
Page 2 of 2

Comments regarding the Environmental Restoration Program

3. Page 2-5; **Figure 2.2-1 Substation Parcel:** Please note that the proposed location named "Substation 39 Acres" partially overlaps ERP site AOC-50 (Recycling Yard Disposal Pit).

4. Page 2-6; **Figure 2.2-2 Chevron Parcel:** ERP site OT-46 is not shown on the Figure.

5. Page 2-10; Paragraph 3 **(Environmental Restoration Program (ERP) and Military Munitions Response Program (MMRP) Sites):** Please note that some of the 50 sites designated as No Further Action/ Site Closed are still undergoing review by the Arizona Department of Environmental Quality.

If you have any questions regarding this letter, please call Brian Stonebrink at (602) 771-4197 or email me at **Stonebrink.Brian@azdeq.gov**

Sincerely,

Brian Stonebrink

Brian Stonebrink, Project Manager
Federal Projects Unit
Waste Programs Division, ADEQ

cc: Henry Darwin, ADEQ Administrative Counsel
Joellen Meitl, ADEQ FPU Hydrologist
Susan Hess, ADEQ FPU Southern Regional Office
Reading and MMRP projects file

2

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Stephen A. Owens
Director

December 22, 2008
FPU 09-105

Attention: Jay Hillman
Natural Resources Management
355 CES/CEAN
5285 E. Madera Street
D-M AFB, AZ 85707

RE: DM MMRP- Summary & Recommendations Memorandum for TM551-Training Area 1

Dear Mr. Hillman:

The Arizona Department of Environmental Quality (ADEQ) has reviewed the Memorandum titled *Summary of Comprehensive Site Evaluation Phase II Effort for Munition Response Area TM 551 (Training Area 1) and Recommendations* dated November 14, 2008 and received by ADEQ on December 11, 2008 by email. The training area was used for helicopter training activities in the 1980's involving smoke grenades and illumination flares. During the visual site survey nineteen M-126 illumination flares and five M-18 smoke grenades were encountered.

ADEQ agrees that the M-18 smoke grenades and M-126 illumination flares identified on the site pose a low hazard risk and do not represent an explosive hazard. Analysis of soil samples did not yield munitions constituents above the Arizona Residential Soil Remediation Levels.

ADEQ recommends providing recognition training for construction workers during construction of the solar power system and having the DMAFB Explosive Ordnance and Disposal (EOD) team available if potentially intact items are identified as outlined in the Memorandum.

ADEQ also recommends including the training area in the Base Master Plan. If the future use is not going to be a solar power system or if in the future the solar power system is dismantled and another land use is implemented on the training area the munitions constituent (MC) and munitions of explosive concern (MEC) risk may need to be reevaluated under the Military Munitions Response Program (MMRP) or equivalent program.

ADEQ prefers the terminology No Department of Defense Action Indicated (NDAI) over the term No Further Action.

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If you have any questions or wish to discuss this letter, please feel free to call me at 602-771-4197 or send an e-mail to **Stonebrink.Brian@azdeq.gov**

Sincerely,

Brian Stonebrink

Brian Stonebrink,
FUDS Project Manager
Federal Projects Unit,
Waste Programs Division, ADEQ

cc: Harry Hendler, ADEQ Federal Projects Unit Manager
Joellen Meitl, ADEQ Project Hydrologist
Project and Reading File

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December 12, 2008

Ms. Margaret Bowman
355 CES/CEAN
5285 E. Madera St.
Davis-Monthan AFB, AZ 85707

Re: **Draft Environmental Assessment for a Solar Power System at Davis-Monthan Air Force Base, Tucson, Arizona**

Dear Ms. Bowman:

The Arizona Game and Fish Department (Department) reviewed the draft environmental assessment (EA) for the above referenced project. The Department understands the proposed action would consist of the construction of a renewable energy system in 4 locations on Davis-Monthan Air Force Base (Base). The Solar Power System may encompass up to 279 acres of the Base.

The Department has the following comments to consider. In Chapter 4, page 4-8, Western burrowing owl impacts are assessed as to where they might occur and surveys may be conducted. The paragraph states that burrowing owls "are uncommon in the developed portions of the Base" and the "two less-developed sites (West Airfield and Valencia Road) have the potential to support …these species." The more developed sites (Chevron and Substation) are discounted from likely supporting populations of burrowing owls. In actuality, the Department has data showing burrowing owls occur in the Chevron and Substation sites. The Department strongly encourages surveys be conducted in these two areas as well as the less-developed areas.

The Department appreciates the opportunity to provide comments on the EA. If you have any questions regarding this letter, please contact me at (623) 236-7606.

Sincerely,

Ginger Ritter
Project Evaluation Specialist

cc: Laura Canaca, Project Evaluation Program Supervisor
Joan Scott, Habitat Program Manager, Region V
Mike Ingraldi, Wildlife Specialist, Region I

AGFD #M08-11212357

Janet Napolitano
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Stephen A. Owens
Director

December 18, 2008

Ms. Margaret Bowman
355 CES/CEAN
5285 E. Madera Street
Davis-Monthan AFB, AZ 85707

Re: Draft Environmental Assessment for Solar Power System

Dear Ms. Bowman:

The Arizona Department of Environmental Quality Water Quality Division (WQD) appreciates that our October 24, 2008 comments were addressed in the Draft Environmental Assessment. We understand that to construct a Solar Power System at Davis-Monthan Air Force Base (DMAFB), the project proponent will seek coverage under the Construction General Permit and the U.S. Army Corps of Engineers-issued Clean Water Act (CWA) section 404 permit, if applicable. After reviewing the Draft Environmental Assessment, the WQD would like to make you aware of some additional water quality facts.

As of December 5, 2002, Arizona has authorization from the U.S. Environmental Protection Agency (EPA) to operate the National Pollutant Discharge Elimination System (NPDES) Permit Program (Section 402 of the Clean Water Act) on the state level. That program, and the surface water permits issued, are referred to as the Arizona Pollutant Discharge Elimination System (AZPDES) Permit Program. The program includes individual permits as well as general permits for construction, deminimus discharges, and municipal (MS4) and industrial stormwater (Multi-Sector General Permit) discharges. Under the AZPDES Permit Program, the WQD issued a new Construction General Permit (AZG2008-001) on February 28, 2008. This permit replaces the previous construction general permit that was issued for a five-year term by ADEQ and expired February 27, 2008.

While not directly related to the solar power system, ADEQ is providing the following information regarding the Multi-Sector General Permit Program (MSGP). It is our understanding that DMAFB has MSGP coverage. Although EPA recently re-issued a new MSGP that became effective on September 29, 2008, to replace the expired MSGP 2000, EPA's MSGP 2008 is applicable in Arizona only to facilities located in Indian Country lands. Until the WQD replaces the MSGP 2000, facilities in Arizona that obtained coverage under the EPA MSGP 2000 before it expired on October 30, 2005 still have permit coverage under an administrative continuance. This status will not change until the WQD issues a new permit. Operators already covered under the MSGP 2000 must continue to implement their Stormwater Pollution Prevention Plan and comply with the requirements in the MSGP 2000. The WQD is developing a new Arizona-specific general permit, based in part on EPA's new MSGP 2008.

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Administrative procedures require a 30-day formal comment period before a final general permit can be issued. The WQD anticipates holding a public meeting on the proposed draft before the formal public notice process, and plans to initiate the public participation process for the new MSGP this winter, with a new MSGP expected to be issued in early 2009.

All facilities in Arizona subject to the permit will be required to apply or reapply when the WQD issues a new MSGP. MSGP 2000 permittees of record will be directly notified when the new permit becomes effective. Updates and information on the new MSGP are available at ADEQ's website, at: http://www.azdeq.gov/environ/water/permits/msgp.html

We appreciate the opportunity to review and provide comments. If you need further information, please contact Wendy LeStarge of my staff at 602.771.4836 or via e-mail at wl1@azdeq.gov, or myself at 602.771.4416 or via e-mail at lc1@azdeq.gov.

Sincerely,

Linda Taunt, Deputy Director
Water Quality Division

APPENDIX B
AIR EMISSIONS CALCULATIONS FOR THE PROPOSED ACTION

ACRONYMS, ABBREVIATIONS, AND SYMBOLS

µg/m³	Micrograms Per Cubic Meter
ACAM	Air Conformity Applicability Model
ADEQ	Arizona Department Of Environmental Quality
AFB	Air Force Base
AGL	Aboveground Level
Air Force	U.S. Air Force
CAA	Clean Air Act
CFR	Code Of Federal Regulations
CO	Carbon Monoxide
CY	Calendar Year
EAC	Early Action Compact
ETS/CEM	Emission Tracking System/Continuous Emissions Monitoring Data
HAPs	Hazardous Air Pollutants
lb	Pounds
MDEP	Massachusetts Department Of Environmental Protection
mg/m³	Milligrams Per Cubic Meter
mm	Millimeter
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
O_3	Ozone
Pb	Lead
PM_{10}	Particulate Matter With A Diameter Less Than Or Equal To 10 Microns
$PM_{2.5}$	Particulate Matter With A Diameter Less Than Or Equal To 2.5 Microns
ppm	Parts Per Million
PSD	Prevention Of Significant Deterioration
ROI	Region Of Influence
SER	Significant Emissions Rate
SIP	State Implementation Plan
SO2	Sulfur Dioxide
TP	Target Practice
tpy	Tons Per Year
TSP	Total Suspended Particulate
U.S.	United States
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
yr	Year

This appendix presents an overview of the Clean Air Act (CAA) and the State of Arizona air quality program. The appendix also discusses emission factor development and calculations, including the assumptions used for the air quality analyses presented in the Air Quality sections.

AIR QUALITY PROGRAM OVERVIEW

In order to protect public health and welfare, the U.S. Environmental Protection Agency (USEPA) has developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for six "criteria" pollutants (based on health-related criteria) under the provisions of the CAA Amendments of 1970. There are two kinds of NAAQS: Primary and Secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (40 Code of Federal Regulations [CFR] 50).

The CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the federal program. The Arizona Department of Environmental Quality (ADEQ) Air Quality Division administers the state's air pollution control program under the authority of the Federal CAA and Amendments, federal regulations, and state laws.

Arizona has adopted the federal NAAQS. The federal and State of Arizona ambient air quality standards are presented in Table B-1.

Based on measured ambient air pollutant concentrations, the USEPA designates areas of the United States (U.S.) as having air quality better than (attainment) the NAAQS, worse than (nonattainment) the NAAQS, and unclassifiable. The areas that cannot be classified (on the basis of available information) as meeting or not meeting the NAAQS for a particular pollutant are "unclassifiable" and are treated as attainment until proven otherwise. Attainment areas can be further classified as "maintenance" areas, which are areas previously classified as nonattainment but where air pollutant concentrations have been successfully reduced to below the standard. Maintenance areas are under special maintenance plans and must operate under some of the nonattainment area plans to ensure compliance with the NAAQS. All areas of the state are in compliance with the NAAQS.

A general conformity analysis is required if (1) the action's direct and indirect emissions have a potential to emit one or more of the six criteria pollutants at or above emission rates shown in Table B-2 or Table B-3, or (2) the action's direct and indirect emissions of any criteria pollutant represent 10 percent of a nonattainment or maintenance area's total emissions inventory for that pollutant.

Table B-1. Summary of National and State Ambient Air Quality Standards

Criteria Pollutant	*Averaging Time*	*Arizona Standards*	*Federal Primary NAAQS(8)*	*Federal Secondary NAAQS (8)*
Carbon Monoxide (CO)	8-hour(1)	9ppm	9 ppm (10 mg/m^3)	No standard
	1-hour(1)	35 ppm	35 ppm (40 mg/m^3)	No standard
Lead (Pb)	Quarterly	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)
Particulate Matter ≤10 Micrometers (PM_{10})	24-hour(2)	150 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
	Annual	50 $\mu g/m^3$ (8)	--	--
Particulate Matter <2.5 Micrometers ($PM_{2.5}$)	Annual(3)	15 $\mu g/m^3$	15 $\mu g/m^3$	15 $\mu g/m^3$
	24-hour(4)	35 $\mu g/m^3$ (9)	35 $\mu g/m^3$	35 $\mu g/m^3$
Ozone (O_3) (10)	1-hour(7)	0.12 ppm (235 $\mu g/m^3$)	0.12 ppm (235 $\mu g/m^3$)	0.12 ppm (235 $\mu g/m^3$)
	8-hour(5)	--	0.075 ppm (2008 std)	Same as Primary
	8-hour(6)	0.08 ppm (157 $\mu g/m^3$)	0.08 ppm (1997 std) (157 $\mu g/m^3$)	0.08 ppm (157 $\mu g/m^3$)
Sulfur Dioxide (SO_2)	Annual	0.03 ppm (80 $\mu g/m^3$)	0.03 ppm (80 $\mu g/m^3$)	No standard
	24-hour(1)	0.14 ppm (365 $\mu g/m^3$)	0.14 ppm (365 $\mu g/m^3$)	No standard
	3-hour(1)	0.5 ppm (1300 $\mu g/m^3$)	No standard	0.50 ppm (1300 $\mu g/m^3$)

Source: USEPA 2006 (Federal Standards); Arizona Administrative Code Chapter R18-2-201
ppm = parts per million
mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter

(1) Not to be exceeded more than once per year.
(2) Not to be exceeded more than once per year on average over three years.
(3) To attain this standard, the 3-year average of the weighted annual mean $PM^{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 ug/m^3.
(4) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 ug/m^3 (effective December 17, 2006).
(5) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008).
(6) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard-and the implementation rules for that standard -will remain in place for implementation purposes as the USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(7) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.
(b) As of June 15, 2005, the USEPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) Areas.
(8) In 2006, the federal annual PM_{10} standard of 50 mg/m3 was revoked; Arizona Administrative Code 17.08.
(9) In 2006, the $PM_{2.5}$ standard for the 24-hour averaging time was changed from 65 mg/m3 to 35 mg/m3.
(10) The USEPA replaced the 1-hour O_3 standard with the 8-hour O_3 standard in June 2005. The 1-hour standard still applies in a few areas; however, Tucson, Arizona is not one of them.

Table B-2. Emission Rates for Criteria Pollutants in Nonattainment Areas[1]

Pollutant		*Emission Rate (tons/year)*
Ozone (Volatile Organic Compounds [VOCs] or NO_x)		
	Serious nonattainment areas	50
	Severe nonattainment areas	25
	Extreme nonattainment areas	10
	Other ozone nonattainment areas outside an ozone transport region	100
Marginal and moderate nonattainment areas inside an ozone transport region		
	VOC	50
	NO_x	100
CO: All nonattainment areas		100
SO_2 or NO_2: All nonattainment areas		100
PM_{10}		
	Moderate nonattainment areas	100
	Serious nonattainment areas	70
$PM_{2.5}$		
	Direct emissions	100
	SO_2	100
	NO_x (unless determined not to be a significant precursor)	100
	VOC or ammonia (if determined to be significant precursors)	100
Pb: All nonattainment areas		25

Note: 1. *De minimis* threshold levels for conformity applicability analysis.
Source: USEPA 2006c

Table B-3. Emission Rates for Criteria Pollutants in Attainment (Maintenance) Areas[1]

Pollutant		*Emission Rate (tons/year)*
Ozone (NO_x, SO_2, or NO_2): All maintenance areas		100
Ozone (VOCs)		
	Maintenance areas inside an ozone transport region	50
	Maintenance areas outside an ozone transport region	100
CO: All maintenance areas		100
PM_{10}: All maintenance areas		100
$PM_{2.5}$		
	Direct Emissions	100
	SO_2	100
	NO_x (unless determined not to be a significant precursor)	100
	VOC or ammonia (if determined to be significant precursors)	100
Pb: All maintenance areas		25

Note: 1. *De minimis* threshold levels for conformity applicability analysis.
Source: USEPA 2006c

Each state is required to develop a state implementation plan (SIP) that sets forth how CAA provisions will be imposed within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state and includes control measures, emissions limitations, and other provisions required to attain and maintain the ambient air quality standards. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area.

In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds; that is, 100 or 250 tons per year (tpy) based on the source's industrial category. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase" at that source of any regulated pollutant. Table B-4 provides a tabular listing of the PSD significant emissions rate (SER) thresholds for selected criteria pollutants (USEPA, 1990).

Table B-4. Criteria Pollutant Significant Emissions Rate Increases Under PSD Regulations

Pollutant	*Significant Emissions Rate (tons/year)*
PM_{10}	15
$PM_{2.5}$	10
Total Suspended Particulate (TSP)	25
SO_2	40
NO_x	40
Ozone (VOCs)	40
CO	100

Source: Title 40 CFR Part 51.

The goals of the PSD program are to: (1) ensure economic growth while preserving existing air quality, (2) protect public health and welfare from adverse effects that might occur even at pollutant levels better than the NAAQS, and (3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by the CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase identified in Table B-5. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development.

The areas surrounding Davis-Monthan Air Force Base (AFB) are classified as Class I areas. Currently, there are no designated Class III areas in the U.S.

Table B-5. Federal Allowable Pollutant Concentration Increases Under PSD Regulations

Pollutant	*Averaging Time*	MAXIMUM ALLOWABLE CONCENTRATION (μg/m³)		
		Class I	*Class II*	*Class III*
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
SO_2	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO_2	Annual	2.5	25	50

Source: Title 40 CFR Part 51

The Monitoring section of the Air Quality Division monitors ambient air throughout the state in both metropolitan and rural areas. The networks are composed of individual monitoring sites that collect ambient air quality data in a variety of representative settings (ADEQ 2008).

The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards. Also included are areas where the ambient standards are being met, but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth.

The result of this attainment/maintenance analysis is the development of local and statewide strategies for controlling emissions of criteria air pollutants from stationary and mobile sources. The first step in this process is the annual compilation of the ambient air monitoring results. The second step is the analysis of the monitoring data for general air quality, exceedances of air quality standards, and pollutant trends.

REGULATORY COMPARISONS

In order to evaluate the air emissions and their impact to the overall region of influence (ROI), the emissions associated with the construction activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 National Emissions Inventory (NEI) data. Potential impacts to air quality were then identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10 percent criteria approach is used in the General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas, and although all counties considered in the analysis are attainment areas for the NAAQS, the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of the proposed actions emissions.

To provide a conservative evaluation, the impacts screening in this analysis used a more restrictive criteria than required in the General Conformity Rule. Rather than comparing emissions from construction activities to regional inventories (as required in the General Conformity Rule), emissions were compared to the individual parish potentially impacted, which is a smaller area.

PROJECT CALCULATIONS

Construction Emissions

Calculations for construction emissions were completed using the calculation methodologies described in the U.S. Air Force (Air Force) Air Conformity Applicability Model (ACAM). As previously indicated, a conformity determination is required since Pima County is designated as attainment and maintenance for carbon monoxide (CO).

The ACAM was used to provide a level of consistency with respect to emission factors and calculations. The ACAM evaluates the individual emissions from different sources associated with the construction phases. These sources include grading activities, construction worker trips, stationary equipment, such as saws and generators (U.S. Air Force, 2003).

The proposed action calls for the clearing and grading of land and the construction of the SPS for Davis-Monthan AFB.

GRADING ACTIVITIES

Grading activities are divided into grading equipment emissions and grading operation emissions.

Grading equipment emissions are combustive emissions from equipment engines and are calculated in the following manner:

$$VOC = .22 \text{ (lb/acre/day)} * Acres * DPY_1/2000$$

$$NO_x = 2.07 \text{ (lb/acre/day)} * Acres * DPY_1/2000$$

$$PM_{10} = .17 \text{ (lb/acre/day)} * Acres * DPY_1/2000$$

$$CO = .55 \text{ (lb/acre/day)} * Acres * DPY_1/2000$$

$$SO_2 = .21 \text{ (lb/acre/day)} * Acres * DPY_1/2000$$

Where: Acres = number of gross acres to be graded during Phase I construction

DPY_1 = number of days per year used for grading during Phase I construction

2000 = conversion factor from pounds to tons

All emissions are represented as tpy.

Grading operation emissions are calculated using a similar equation from the Sacramento Air Quality Management District and South Coast Air Quality Management District (U.S. Air Force, 2003). This calculation includes grading and truck hauling emissions.

Emission Calculation:

$$PM_{10}\ (tpy) = 60.7\ (lb/acre/day) * Acres * DPY_1/2000$$

Where: Acres = number of gross acres to be graded during Phase I construction

DPY_1 = number of days per year used for grading during Phase I construction

2000 = conversion factor from pounds to tons

The calculations assumed that there were no controls used to reduce fugitive emissions. Also, it was assumed that construction activities would occur within one calendar year (CY) in which the project would be implemented (365 days), and that grading activities would represent 50 percent of that total, or 182 days. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003).

CONSTRUCTION WORKER TRIPS

Construction worker trips during the construction phases of the project are calculated and represent a function of the number of residential units to be constructed and/or square feet of commercial construction.

Calculation:

$$Trips\ (trips/day) = .42\ (trip/unit/day) * Area\ of\ training\ facilities$$

Total daily trips are applied to the following factors depending on the corresponding years.

Year 2005 through 2009:

VOC_E = .016 * Trips

NOx_E = .015 * Trips

PM_{10E} = .0022 * Trips

CO_E = .262 * Trips

Year 2010 and beyond:

VOC_E = .012 * Trips

NOx_E = .013 * Trips

PM_{10E} = .0022 * Trips

CO_E = .262 * Trips

To convert from pounds per day to tons per year:

$$VOC\ (tons/yr) = VOC_E * DPY_{II}/2000$$

$$NOx\ (tons/yr) = NOx_E * DPY_{II}/2000$$

$$PM_{10}\ (tons/yr) = PM10_E * DPY_{II}/2000$$

$$CO\ (tons/yr) = CO_E * DPY_{II}/2000$$

Where: Commercial construction = total square footage of construction projects to be constructed in the given year of construction

2000 = conversion factor from pounds to tons

DPY_{II} = number of days per year during Phase II construction activities

It was estimated that the total square footage of grading would be 247 acres. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003).

STATIONARY EQUIPMENT

Emissions from stationary equipment occur when gasoline-powered equipment (e.g., saws, generators, etc.) are used at the construction site.

Emission Calculations:

$$VOC = .198 * (GRSQFT) * DPY_{II}/2000$$

$$NO_x = .137 * (GRSQFT) * DPY_{II}/2000$$

$$PM_{10} = .004 * (GRSQFT) * DPY_{II}/2000$$

$$CO = 5.29 * (GRSQFT) * DPY_{II}/2000$$

$$SO_2 = .007 * (GRSQFT) * DPY_{II}/2000$$

Where: GRSQF = gross square feet of commercial buildings to be constructed during Phase II

DPY_{II} = number of days per year during Phase II construction

2000 = conversion factor from pounds to tons

It was estimated that the total square footage of grading would be 247 acres. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (Air Force 2003).

MOBILE EQUIPMENT

Mobile equipment (such as forklifts and dump trucks) emissions include pollutant releases generated by the equipment during Phase II construction.

Emission Calculations:

$$VOC = .17 * (GRSQFT) * DPY_{II}/2000$$

$$NO_x = 1.86 * (GRSQFT) * DPY_{II}/2000$$

$$PM_{10} = .15 * (GRSQFT) * DPY_{II}/2000$$

$$CO = .78 * (GRSQFT) * DPY_{II}/2000$$

$$SO_2 = .23 * (GRSQFT) * DPY_{II}/2000$$

Where: GRSQF = gross square feet of training area to be constructed during Phase II

DPY_{II} = number of days per year during Phase II construction

2000 = conversion factor from pounds to tons

It was estimated that the total square footage of grading would be 247 acres. The emission factors were derived from the Sacramento Air Quality Management District and South Coast Air Quality Management District (U.S. Air Force, 2003).

VEHICLE EMISSIONS

Emissions for the cranes, trenchers, and drill rig were calculated in excel using emission factors from the Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (O'Brian 2003). It was assumed that the equipment would operate eight hours a day, five days a week. The following equation was used to calculate the emissions.

$Emission_x = EF_x * HR * (1/453.59) * (1/2000) * T$

Where: $Emission_x$ = Emission of criteria pollutant X (CO, NO_x, PM, SO_x, or VOC) (tons/year)

EF_x = Emission Factor for pollutant X (g/hp-hr)

HR = Horsepower rating (hp)

453.59 = conversion from grams to pounds

2000 = conversion from pounds to tons

T = Time equipment in operation (hrs/yr)

National Emissions Inventory

The NEI is operated under the USEPA's Emission Factor and Inventory Group, which prepares the national database of air emissions information with input from numerous state and local air agencies, tribes, and industries. The database contains information on stationary and mobile sources that emit criteria air pollutants and hazardous air pollutants (HAPs). The database includes estimates of annual emissions, by source, of air pollutants in each area of the country on a yearly basis. The NEI includes emission estimates for all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. Emission estimates for individual point or major sources (facilities), as well as county-level estimates for area, mobile, and other sources, are currently available for years 1996 and 1999 for criteria pollutants and HAPs.

Criteria air pollutants are those for which the USEPA has set health-based standards. Four of the six criteria pollutants are included in the NEI database:

CO

NO_x

SO_2

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

The NEI also includes emissions of VOCs, which are O_3 precursors, emitted from motor vehicle fuel distribution and chemical manufacturing, as well as other solvent uses. VOCs react with NO_x in the atmosphere to form ozone. The NEI database defines three classes of criteria air pollutant sources:

- **Point Sources**. Stationary sources of emissions, such as an electric power plant, that can be identified by name and location. A "major" source emits a threshold amount (or more) of at least one criteria pollutant and must be inventoried and reported. Many states also inventory and report stationary sources that emit amounts below the thresholds for each pollutant.
- **Area Sources**. Small point sources such as a home or office building, or a diffuse stationary source such as wildfires or agricultural tilling. These sources do not individually produce sufficient emissions to qualify as point sources. Dry cleaners are one example; for instance, a single dry cleaner within an inventory area typically will not qualify as a point source, but collectively the emissions from all of the dry cleaning facilities in the inventory area may be significant and therefore must be included in the inventory.
- **Mobile Sources**. Any kind of vehicle or equipment with a gasoline or diesel engine (such as an airplane or ship).

The following are the main sources of criteria pollutant emissions data for the NEI:

- For electric generating units—USEPA's Emission Tracking System/Continuous Emissions Monitoring Data (ETS/CEM) and Department of Energy fuel use data.
- For other large stationary sources—state data and older inventories where state data were not submitted.
- For on-road mobile sources—the Federal Highway Administration's estimate of vehicle miles traveled and emission factors from USEPA's MOBILE Model.
- For nonroad mobile sources—USEPA's NONROAD Model.
- For stationary area sources—state data, USEPA-developed estimates for some sources, and older inventories where state or USEPA data were not submitted.

State and local environmental agencies supply most of the point source data. USEPA's Clean Air Market program supplies emissions data for electric power plants.

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ACRONYMS AND ABBREVIATIONS, CONT'D

SPS	Solar Power System
SWPPP	Stormwater Pollution Prevention Plan
TEP	Tucson Electric Power
TPY	Tons Per Year
UFC	Unified Facilities Criteria
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USCB	United States Census Bureau
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WSCA	Wildlife of Special Concern in Arizona