



DEPARTMENT OF THE AIR FORCE  
AIR NATIONAL GUARD

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Dear Sir or Madam

The Arkansas Air National Guard (ARANG) at Fort Smith Regional Airport, Arkansas, has prepared a Draft Environmental Assessment (EA) for a proposal to implement the Base Realignment and Closure (BRAC) aircraft and mission conversion, as well as construction and demolition projects in support of this mission change (Attachment 1).

The environmental analysis for the Proposed Action is being conducted by the ARANG in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, we request your participation by reviewing this Draft EA, and solicit your comments concerning the proposal and any potential environmental consequences of the action. Section 5.0 of this EA analyzes the cumulative impacts of this and other actions in the region of influence (ROI). If there are other known actions in the ROI that are not included in Section 5.0 please list those actions in your comments. A listing of Federal and state agencies that have been contacted is attached (Attachment 2). If there are any additional agencies that you feel should review and comment on the Draft EA, please indicate these in your response to us.

Any questions concerning the proposal should be directed to our consultant, Science Applications International Corporation (SAIC). The point of contact is Ms. Kate L. Bartz. She can be reached at (520) 326-0951 if you have any questions or concerns. Please forward your written comments to Ms. Bartz, in care of SAIC, 2617 East 7<sup>th</sup> Street, Tucson, Arizona 85716, no later than November 30, 2006. Thank you for your assistance.

Sincerely

HARRY A. KNUDSEN, JR.  
Chief, Environmental Planning Branch

Attachments:

1. Draft Environmental Assessment for Proposed Aircraft and Mission Conversion
2. Distribution list

**DRAFT**

ENVIRONMENTAL ASSESSMENT

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PROPOSED BASE REALIGNMENT AND  
CLOSURE (BRAC) AIRCRAFT AND MISSION  
CONVERSION  
AT THE 188<sup>th</sup> FIGHTER WING  
ARKANSAS AIR NATIONAL GUARD

FORT SMITH REGIONAL AIRPORT  
ARKANSAS

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NATIONAL GUARD BUREAU

27 October 2006

# DRAFT

## ACRONYMS AND ABBREVIATIONS

|                   |                                                                                    |                     |                                                        |
|-------------------|------------------------------------------------------------------------------------|---------------------|--------------------------------------------------------|
| °F                | degrees Fahrenheit                                                                 | L <sub>eq</sub>     | Equivalent Noise Level                                 |
| µg/m <sup>3</sup> | micrograms per cubic meter                                                         | L <sub>eq(24)</sub> | 24-hour equivalent noise level                         |
| 188 FW            | 188 <sup>th</sup> Fighter Wing                                                     | L <sub>eq(8)</sub>  | 8-hour equivalent noise level                          |
| 188 TFG           | 188 <sup>th</sup> Tactical Fighter Group                                           | LF                  | linear feet                                            |
| 188 TRG           | 188 <sup>th</sup> Tactical Reconnaissance Group                                    | L <sub>max</sub>    | Maximum Sound Level                                    |
| 188 TRS           | 188 <sup>th</sup> Tactical Reconnaissance Squadron                                 | mm                  | millimeter                                             |
| AAM               | Annual Arithmetic Mean                                                             | MOA                 | Military Operations Areas                              |
| ACHP              | Advisory Council on Historic Preservation                                          | MSL                 | mean sea level                                         |
| ADC               | Animal Damage Control                                                              | MTR                 | Military Training Routes                               |
| ADEQ              | Arkansas Department of Environmental Quality                                       | NAAQS               | National Ambient Air Quality Standards                 |
| AFB               | Air Force Base                                                                     | NAGPRA              | Native American Graves Protection and Repatriation Act |
| AFI               | Air Force Instruction                                                              | NEPA                | National Environmental Policy Act                      |
| AFIERA            | Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis | NGB                 | National Guard Bureau                                  |
| AFOSH             | Air Force Occupational Safety and Health                                           | NHPA                | National Historic Preservation Act                     |
| AGL               | above ground level                                                                 | NO <sub>2</sub>     | nitrogen dioxide                                       |
| AIRFA             | American Indian Religious Freedom Act                                              | NO <sub>x</sub>     | nitric oxides                                          |
| ANG               | Air National Guard                                                                 | NPDES               | National Pollutant Discharge Elimination System        |
| ANHC              | Arkansas Natural Heritage Commission                                               | NRCS                | Natural Resources Conservation Service                 |
| APE               | area of potential effect                                                           | NRHP                | National Register of Historic Places                   |
| APHIS             | Animal Plant Health Inspection Service                                             | O <sub>3</sub>      | ozone                                                  |
| AQCR              | Air Quality Control Region                                                         | P.L.                | Public Law                                             |
| ARANG             | Arkansas Air National Guard                                                        | PAA                 | Primary Assigned Aircraft                              |
| AST               | Above-ground Storage Tank                                                          | Pb                  | lead                                                   |
| AT/FP             | Anti-Terrorism/Force Protection                                                    | PM <sub>10</sub>    | particulate matter less than 10 microns in diameter    |
| BAI               | backup aircraft inventory                                                          | PM <sub>2.5</sub>   | particulate matter less than 2.5 microns in diameter   |
| BASH              | bird-airstrike hazard                                                              | POL                 | petroleum, oil, and lubricants                         |
| BMP               | Best Management Practices                                                          | POV                 | privately-owned vehicle                                |
| BRAC              | Base Realignment and Closure                                                       | ppb                 | parts per billion                                      |
| CAA               | Clean Air Act                                                                      | ppm                 | parts per million                                      |
| CE                | Civil Engineer                                                                     | PSD                 | prevention of significant deterioration                |
| CEQ               | Council on Environmental Quality                                                   | PVC                 | polyvinyl chloride                                     |
| CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act              | RCRA                | Resource Conservation and Recovery Act                 |
| CERFA             | Community Environmental Response Facilitation Act                                  | ROI                 | region of influence                                    |
| CFR               | Code of Federal Regulations                                                        | RPZ                 | Runway Protection Zone                                 |
| CIP               | Capital Improvement Plan                                                           | RRR                 | rapid runway repair                                    |
| CO                | carbon monoxide                                                                    | RTS                 | Regional Training Site                                 |
| CWA               | Clean Water Act                                                                    | SAP                 | satellite accumulation point                           |
| dB                | decibel                                                                            | SARA                | Superfund Amendments and Reauthorization Act           |
| dBA               | A-weighted decibel                                                                 | SEL                 | Sound Exposure Level                                   |
| DoD               | Department of Defense                                                              | SF                  | square feet                                            |
| DOL               | U.S. Department of Labor                                                           | SHPO                | State Historic Preservation Officer                    |
| DOPAA             | Description of Proposed Action and Alternatives                                    | SIC                 | Standard Industrial Code                               |
| EA                | Environmental Assessment                                                           | SIP                 | State Implementation Plan                              |
| EIAP              | Environmental Impact Analysis Process                                              | SO <sub>2</sub>     | sulfur dioxide                                         |
| EIS               | Environmental Impact Statement                                                     | SO <sub>x</sub>     | sulfur oxides                                          |
| EO                | Executive Order                                                                    | SQG                 | small quantity generator                               |
| EOD               | explosive ordnance disposal                                                        | SWDA                | Solid Waste Disposal Act                               |
| EPCRA             | Emergency Planning and Community Right-to-know Act                                 | U.S.                | United States                                          |
| ERP               | Environmental Restoration Program                                                  | UFC                 | Unified Facilities Criteria                            |
| ESA               | Endangered Species Act                                                             | USACE               | United States Army Corps of Engineers                  |
| FAA               | Federal Aviation Administration                                                    | USAF                | United States Air Force                                |
| FFCA              | Federal Facility Compliance Act                                                    | USC                 | United States Code                                     |
| FOD               | Foreign Object Debris                                                              | USDA                | U.S. Department of Agriculture                         |
| FONSI             | Finding of No Significant Impact                                                   | USEPA               | United States Environmental Protection Agency          |
| GA                | General Aviation                                                                   | USFS                | United States Forest Service                           |
| H <sub>2</sub> S  | hydrogen sulfide                                                                   | USFWS               | United States Fish and Wildlife Service                |
| HAP               | high accident potential                                                            | USGS                | United States Geological Survey                        |
| HVAC              | heating, ventilation, and air conditioning                                         | UST                 | Underground Storage Tank                               |
| HWMP              | Hazardous Waste Management Plan                                                    | UTA                 | Unit Training Assembly                                 |
| Hz                | hertz                                                                              | VOC                 | volatile organic compound                              |
| IICEP             | Interagency and Intergovernmental Coordination for Environmental Planning          | WS                  | Wildlife Services                                      |
| LATN              | Low Altitude Tactical Navigation                                                   |                     |                                                        |
| L <sub>dn</sub>   | Day-Night Average Sound Level                                                      |                     |                                                        |

**DRAFT FINDING OF NO SIGNIFICANT IMPACT  
FOR  
PROPOSED AIRCRAFT AND MISSION CONVERSION  
AT THE 188<sup>TH</sup> FIGHTER WING  
ARKANSAS AIR NATIONAL GUARD  
FORT SMITH REGIONAL AIRPORT, ARKANSAS**

**PURPOSE:** The purpose of the Proposed Action is to implement the decisions of the 2005 BRAC Commission Final and Approved Recommendations for the 188<sup>th</sup> Fighter Wing (188 FW). The Proposed Action would convert the 188 FW's current fleet of 15 F-16C fighter aircraft to 18 A-10 aircraft. Additionally, implementation of the Proposed Action would provide the 188 FW with properly sized and configured facilities that are required to effectively accomplish the aircraft conversion and mission changes, as described in Air National Guard (ANG) Handbook 32-1084, *Facility Requirements*.

**PROPOSED ACTION:** Under the Proposed Action, the 188 FW would undergo the aircraft conversion and implement necessary construction projects associated with the 2005 BRAC recommendations. Additionally, several facilities that are either outdated or are in the footprint of proposed new facilities would be demolished. Under the Proposed Action, the number of operations (both military and civilian) at Fort Smith Regional Airport would increase by approximately 2.4 percent.

**NO ACTION ALTERNATIVE:** Under the No Action Alternative, the 188 FW would maintain their existing facilities and would not build any of the new facilities proposed. In general, the No Action Alternative would require that the 188 FW continue to operate under unnecessarily inefficient conditions, and that Anti-Terrorism/Force Protection (AT/FP) requirements continue to be unmet. Deficiencies could continue to impair the 188 FW's ability to successfully conduct their mission and to maintain wartime readiness and training.

**SUMMARY OF FINDINGS:**

Potential impacts associated with the Proposed Action have been assessed with regard to the following environmental resource areas:

**Noise.** As a result of the Proposed Action, the 188 FW will convert from 15 F-16C to 18 A-10 aircraft. The number of daily operations at Fort Smith Regional Airport will increase from approximately 205 to 210. Land area exposed to elevated noise levels (greater than Day-Night Average Sound Level [L<sub>dn</sub>] 65) will decrease by approximately 1,020 acres. Additionally, noise at specific point receptors at locations around the airport will similarly decrease. Construction noise emanating off-site as a result of the Proposed Action will probably be noticeable in the

immediate construction site vicinity, but is not be expected to create adverse impacts. Impacts from noise will not be significant.

**Land Use/Visual Resources.** The proposed aircraft and mission conversion and associated facility construction at the Arkansas Air National Guard (ARANG) installation at Fort Smith Regional Airport will not create any adverse impacts to land use. The Proposed Action will not introduce any new land uses at the installation or the surrounding region, and therefore will not be incompatible with any on installation or nearby land uses. Under the Proposed Action, approximately 1,020 acres of land will no longer be exposed  $L_{dn}$  65 or greater. The proposed construction and demolition projects are expected to enhance overall installation planning and compatibility of functions on the 188 FW installation. Some existing incompatibilities will be corrected. Impacts to land use and visual resources will not be significant.

**Air Quality.** Under the Proposed Action, volatile organic compound (VOC), carbon monoxide (CO), and particulate matter less than 10 microns in diameter ( $PM_{10}$ ) annual emissions will increase slightly, while nitrogen dioxide ( $NO_x$ ) and sulfur dioxide ( $SO_x$ ) will decrease slightly from current levels as a result of the aircraft conversion. Emissions associated with implementation of construction and demolition projects that are components of the Proposed Action will increase ambient air pollutant concentrations on a localized, short-term basis. However, their relatively low magnitude will not result in any significant air quality impacts in Sebastian County or the Metropolitan Fort Smith Interstate Air Quality Control Region (AQCR).

**Socioeconomics/Environmental Justice.** Conversion to the new aircraft will not have any direct impact on socioeconomics of the region; however, construction generated as a result of the conversion will occur over the period of the next five years and will involve expenditures of over \$14 million on labor, materials, etc. Potential direct impacts will include the creation of construction jobs over the entire construction period, associated direct earnings, expenditures on materials and fuels, as well as secondary effects leading to the creation of additional jobs and earnings. These potential impacts will be temporary, occurring for the duration of the construction period only. No permanent or long-lasting socioeconomic impacts will result from implementation of the Proposed Action. No disproportionately high and adverse human health or environmental effects on minority and low-income populations have been identified. In addition, there are no known environmental health or safety risks associated with the Proposed Action that will disproportionately affect children. Impacts to socioeconomics and environmental justice will not be significant.

**Safety.** The overall probability of a Class A mishap involving an A-10 aircraft is only slightly more than one-half that of an F-16 aircraft, as a result, no adverse impacts to flying safety are anticipated as a result of the Proposed Action. Implementation of the Proposed Action will 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 will minimize the relatively low risk associated with these construction activities. All projects have been sited outside any quantity-distance (QD) arcs, as appropriate. Additionally, the proposed projects will include measures to enhance and correct AT/FP shortfalls as part of the facility designs. Impacts to safety will not be significant.

***Hazardous Materials and Waste Management.*** Training requirements and sortie levels will remain similar to current operations; therefore, the amount of hazardous materials and petroleum products used will remain generally the same as the current situation. The proposed construction and demolition projects associated with the Proposed Action will generate construction and demolition waste that will be recycled and/or taken to a local demolition landfill, as appropriate. There are no capacity issues with the existing landfills. Hazardous materials and wastes will be handled, stored, and disposed of in accordance with applicable regulations. Any asbestos-containing material, lead-based paint, or contaminated soils associated with Environmental Restoration Program (ERP) sites will be removed and disposed of per applicable regulations.

***Infrastructure.*** The proposed construction and demolition projects associated with the Proposed Action will result in some temporary interruption of utility services and minor hindrance of transportation and circulation during construction activities. These impacts will be temporary, occurring only for the duration of the construction period. In general, infrastructure at the 188 FW installation will improve under the Proposed Action.

***Earth Resources.*** There will be approximately 4.1 acres of surface disturbance over the course of the construction program associated with the Proposed Action. The grading of existing soil and placement of structural fill for new facilities will not substantially alter existing soil conditions at the installation because, to a large extent, the construction described above is planned for areas where surface disturbance has previously occurred. Best Management Practices (BMPs) will be used to limit soil movement, stabilize runoff, and control sedimentation. Impacts to earth resources as a result of either the Proposed Action will not be significant.

***Water Resources.*** Under the Proposed, there will be a net increase of approximately 2.2 acres of impervious surface. The 188 FW will update their Storm Water Pollution Prevention Plan to include these projects and will obtain coverage under a National Pollutant Discharge Elimination System (NPDES) Construction Storm Water permit in accordance with the Water Division of the Arkansas Department of Environmental Quality (ADEQ), as appropriate. Adherence to the requirements of the permit will include implementation of BMPs to minimize the potential for exposed soils or other contaminants from construction activities to reach nearby surface waters. Impacts to water resources will not be significant.

**Biological Resources.** Impacts within the 188 FW main cantonment area will result in disturbance of about 4.1 acres that are highly altered by man and does not likely contain any native vegetation. The disturbance would occur primarily in previously developed urban grassland habitat all within the main cantonment area. There are no special qualities associated with existing habitat on the installation that would result in an impact to existing fauna due to proposed construction or demolition activities. There will be no impacts to wetlands. Impacts to biological resources will not be significant.

**Cultural Resources.** Activities associated with either the Proposed Action will not impact archaeological or traditional resources. All facility demolitions and modifications will be coordinated with the Arkansas State Historic Preservation Office (SHPO) to determine eligibility for inclusion in the National Register of Historic Places (NRHP) prior to implementation. Impacts to traditional cultural resources are not expected. Impacts to cultural resources will not be significant.

**PUBLIC INVOLVEMENT:** The National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) 1500-1508, and 32 CFR 989 require public review of the EA before approval of the Finding of No Significant Impact (FONSI) and implementation of the Proposed Action. A notice of availability for public review of the Draft EA was published in the Fort Smith Times Record on November 1 and will be published again on November 12, 2006. The Draft EA is available for public review at the Fort Smith Public Library (Main Branch and Windsor Branch). The public review period will last for 30 days.

**FINDING OF NO SIGNIFICANT IMPACT (FONSI):** Based on my review of the facts and analysis in the Environmental Assessment, I conclude that the Proposed Action will not have a significant impact either by itself or considering cumulative impacts. Accordingly, the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ), and 32 CFR 989, et seq. have been fulfilled, and an Environmental Impact Statement (EIS) is not necessary and will not be prepared.

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DAVID C. VAN GASBECK  
Executive Secretary  
Environmental Protection Committee

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Date

**DRAFT**

**ENVIRONMENTAL ASSESSMENT**

**PROPOSED BASE REALIGNMENT AND  
CLOSURE (BRAC) AIRCRAFT AND MISSION  
CONVERSION**

**AT THE 188<sup>th</sup> FIGHTER WING  
ARKANSAS AIR NATIONAL GUARD**

**FORT SMITH REGIONAL AIRPORT  
ARKANSAS**

**PRIVACY ADVISORY**

Public comments on this Draft Environmental Assessment (EA) are requested. Letters or other written or oral comments provided to the Arkansas Air National Guard (ARANG) at Fort Smith Regional Airport may be published in the Final EA. As required by law, comments will be addressed in the Final EA and made available to the public. Any personal information provided to ARANG will be used only to identify your intent to make a comment or to fulfill requests for copies of the Final EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EA. However, only the names of the individuals making comments and their specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

**NATIONAL GUARD BUREAU**

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## 1.0 PURPOSE AND NEED

### 1.1 INTRODUCTION

The 188<sup>th</sup> Fighter Wing (188 FW) of the Arkansas Air National Guard (ARANG), is a tenant on Fort Smith Regional Airport, Fort Smith, Arkansas. The installation occupies approximately 141 acres of land leased from the airport, including approximately 20 acres used as a Fire Training Area located separately from the main installation. The main cantonment area comprises 121 contiguous acres located on the northern portion of the airport, which is situated within the city limits of Fort Smith, Arkansas (Figure 1.1-1).

In a national emergency, the 188 FW may be ordered to active duty by the President of the United States (U.S.). The primary federal mission of the 188 FW is to achieve and maintain the level of operational readiness that will provide trained and equipped combat-ready tactical units, capable of global deployment, ready for immediate integration into the active United States Air Force (USAF) to assure air offense, air defense, or joint action with ground forces.

On the state level, upon orders from the Governor of Arkansas, the 188 FW is available to assist local authorities in the event of a disaster, disturbance, or other emergency. The 188 FW is capable of supporting rescue and relief operations, aiding in recovery from natural disasters, along with protecting the citizens of Arkansas and their property.

As a result of recent decisions related to the 2005 Base Realignment and Closure (BRAC) Commission Final and Approved Recommendations, the 188 FW proposes to implement an aircraft conversion and related construction projects that would include construction of several new facilities, modifications to existing facilities, and demolition of several outdated facilities. The proposal does not include any increase in personnel or any substantial increases to airspace operations. The proposed action includes:

- Conversion from current Primary Assigned Aircraft (PAA) of 15 F-16C fighter aircraft and a backup aircraft inventory (BAI) of 2 F-16Cs to a PAA of 18 A-10s and a BAI of three A-10s.
- Construction of an above-ground magazine storage facility.
- Construction of a munitions trailer maintenance shop.
- Construction of a flight simulator facility.
- Construction of a fuel cell/corrosion control/load crew training facility.

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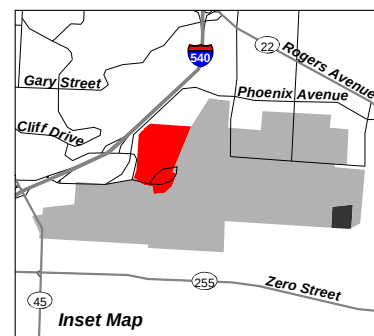
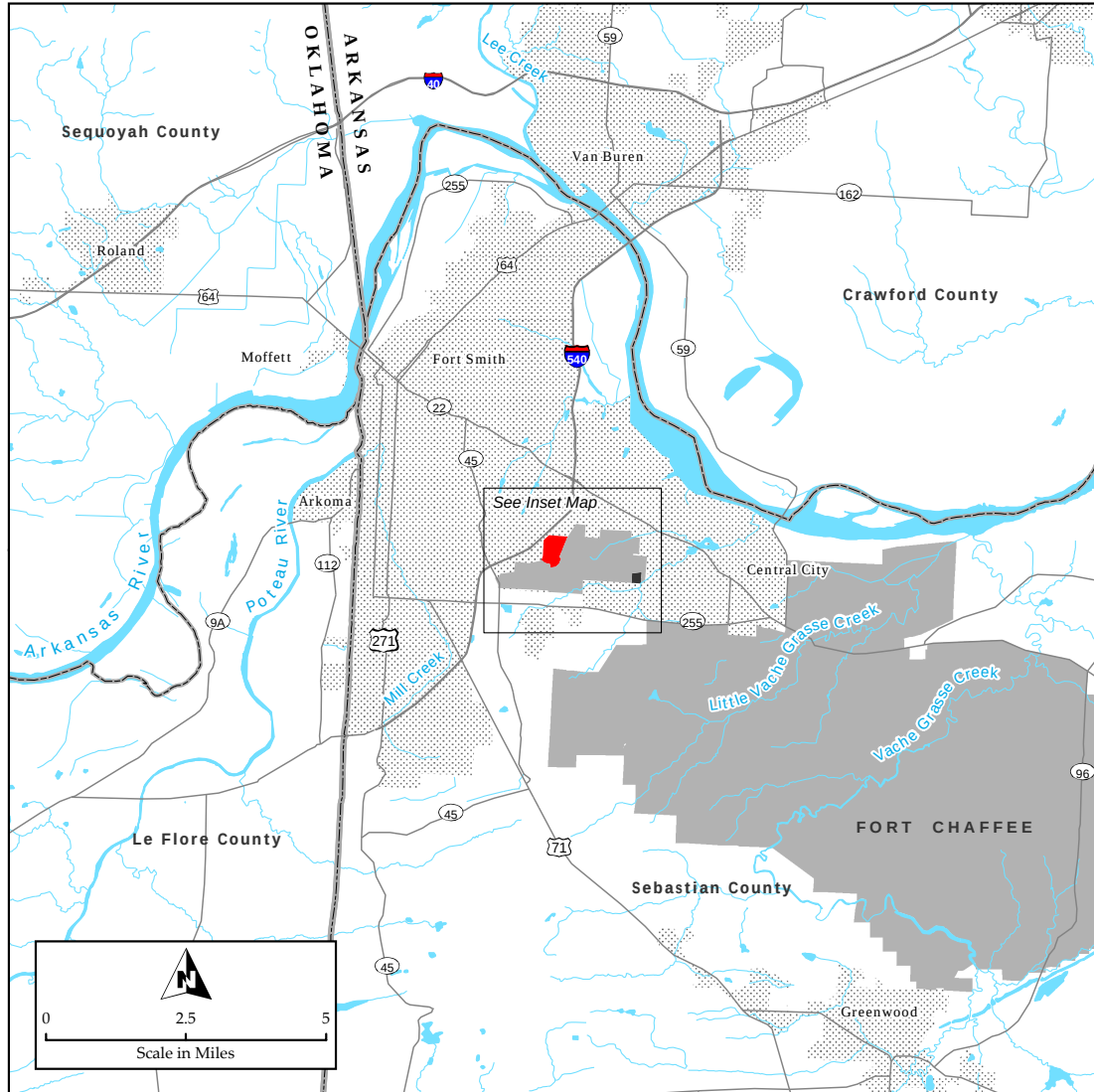


**Figure 1.1-1. Regional Location of Fort Smith, Arkansas**

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- Improvements/upgrades to the Petroleum, Oils, and Lubricants (POL) facility.
- Replacement of the jet engine inspection maintenance facility.
- Addition/Alteration to Building 200 (aircraft hangar).
- Construction of a base supply warehouse.
- Replacement of the fire/crash rescue station.
- Construction of a water tower parking area.
- Construction of a covered storage area for the supply facility.
- Repairs to the aircraft arresting gear.

In accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321-4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] §§ 1500-1508), and Air Force Instruction (AFI) 32-7061 *Environmental Impact Analysis Process*, the 188 FW is preparing an Environmental Assessment (EA) that will consider the potential consequences to the human and natural environment that may result from implementation of these projects.

## 1.2 PURPOSE AND NEED FOR THE ACTION

The purpose of the Proposed Action is to implement the decisions of the 2005 BRAC Commission Final and Approved Recommendations for the 188 FW. The Proposed Action would convert the 188 FW's current PAA of 15 F-16C fighter aircraft and a BAI of 2 F-16Cs to a PAA of 18 A-10s and a BAI of three A-10s. Additionally, implementation of the Proposed Action would provide the 188 FW with properly sized and configured facilities that are required to effectively accomplish the aircraft conversion and mission changes, as described in ANG Handbook 32-1084, *Facility Requirements*. The proposed construction is necessary due to the different facility requirements of the A-10 versus the F-16, and because several facilities at the 188 FW installation are outdated. Many of the 188 FW facilities are over 20 years old and no longer adequately support current or future mission requirements. Several existing facilities are not adequately sized or configured to accommodate the proposed change in aircraft.

The proposed new facilities and facility modifications would enable the 188 FW's ability to maintain a level of wartime readiness necessary to support the aircraft conversion and mission

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change. The following paragraphs describe the purpose and need for each of the listed construction projects.

*Construct Above Ground Magazine Storage Facility (BRAC).* The A-10 weapons system cannot be accommodated within the existing magazine storage facilities at the 188 FW installation due to a lack of adequate space. The existing magazine storage facility is designed for 20 millimeter (mm) rounds associated with F-16 aircraft and therefore is not large enough to accommodate the 30 mm munitions associated with the A-10, as specified in ANG Handbook 32-1084, *Facility Requirements*. Failure to provide an adequately sized facility would result in safety issues, as well as negatively affect the unit's ability to meet mission requirements. Therefore, the Proposed Action would provide a new, adequately sized above ground magazine storage facility to accommodate 30 mm rounds.

*Construct Munitions Trailer Maintenance Shop (BRAC).* The existing trailer maintenance shop, located in one of the four bays comprising Building 223, does not provide adequate space to accommodate increased maintenance requirements for A-10 munitions training. Building 223 will not accommodate an addition for the necessary additional square footage as specified in ANG Handbook 32-1084. Failure to provide an adequately sized trailer maintenance shop will negatively affect training and mission readiness. As such, the 188 FW requires a new, adequately sized munitions trailer maintenance shop which would be constructed under the Proposed Action.

*Construct A-10 Flight Simulator Facility (BRAC).* The 188 FW requires a properly configured, full-mission A-10 simulator with enhanced visual simulation capabilities in association with the proposed aircraft conversion. The flight simulator is essential for training in emergency procedures which, for safety reasons, cannot be performed during actual flight operations. The existing F-16 flight simulator is located within the Squadron Operations Facility (Building 220). This facility cannot be adequately modified to accommodate the much larger A-10 simulator. Additionally, upon conversion to the A-10, aircraft the Squadron Operations Facility would be lacking required square footage per ANG Handbook 32-1084. Failure to provide a proper A-10 simulator would impact training and mission readiness, and result in high training costs due to the need to send personnel on temporary duty to complete training at other locations. Therefore, the Proposed Action would result in the construction of a new, adequately sized flight simulator facility.

*Construct Fuel Cell/Corrosion Control/Load Crew Training Facility (BRAC).* Due to the proposed aircraft conversion, the 188 FW requires a properly sized and configured facility in which maintenance crews can perform corrosion control and fuel cell maintenance functions and load crews can train for A-10 aircraft. The facility must be able to accommodate one A-10 aircraft in each of three bays and provide interior fire protection. The existing fuel cell and

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corrosion control facilities are too small and cannot sufficiently be modified to accommodate A-10 aircraft and no load crew training currently exists; therefore, it has been determined that a new facility is the only option for supporting these critical maintenance activities. If adequate facilities are not provided, then the 188 FW would be unable to properly maintain A-10 aircraft at their installation, resulting in premature aircraft component failure and degradation of aircrew training and overall mission readiness.

*Improvements to POL Facility.* The 188 FW requires several upgrades to its POL facility to correct existing shortfalls. Existing shortfalls include: inadequate space for classroom training in the POL Operations Building; lack of overhead lighting in the fuel truck parking area; lack of adequate secondary containment in the fuel truck parking area and military service station; a lack of adequate security fencing surrounding parts of the POL area; an oil/water separator that does not have sufficient capacity; and exposure of equipment and personnel to inclement weather due to lack of canopies, enclosures, etc. These shortfalls result in several issues that can negatively affect mission accomplishment; lead to safety and security issues; can potentially result in the release of fuel to the environment; and can lead to degradation of equipment. Therefore, the 188 FW proposes to correct these shortfalls through the following projects: construct an addition to the POL Operations Building to provide classroom training space; install lighting in the fuel truck parking area; provide adequate secondary containment in the truck parking area and military service station; install a new security fence; replace the existing oil/water separator with a new one that provides sufficient capacity; and construct canopies and enclosures for personnel and equipment.

*Replace Jet Engine Inspection and Maintenance Facility.* The 188 FW requires a properly configured and adequately sized Jet Engine Inspection and Maintenance Shop in support of the proposed aircraft conversion. The existing facility is over 30 years old and in need of repair and exhibits several deficiencies including: structural cracking throughout the facility; numerous leaks in the roof; an inadequate electrical system that cannot support the additional modernization and computerization requirements; inefficient floor space; inadequate insulation, ventilation, and plumbing systems. Due to these numerous deficiencies, it has been determined that the existing facility cannot be adequately upgraded and that a new facility is required. The Proposed Action would provide a new, properly sized and configured facility designed to accommodate jet engine inspection needs associated with the proposed aircraft conversion.

*Addition/Alteration to Building 200.* Building 200, which serves as the Aircraft Maintenance Hangar, is approximately 50 years old and requires several repairs in order to adequately meet mission requirements. Although the building is considered structurally sound, deficiencies associated with this facility include: the electrical system is at its capacity in several areas of the building and cannot support the additional modernization and computerization required for required functions; there are no restrooms for females on the first floor of the facility; utilities

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and walls are located such that they compromise aircraft maintenance space; the ratio of shop space to office space is not consistent with mission requirements; the heating, ventilation, and air conditioning (HVAC) system does not adequately serve the building; asbestos is present in several locations of the building. Therefore, under the Proposed Action, Building 200 would be renovated such that it meets current utilities and mission function requirements. Additionally, Building 200 does not currently provide sufficient space for new mission requirements associated with the conversion to A-10 aircraft. Therefore, additions on the south and west sides would provide required space necessary for A-10 maintenance.

*Construct Base Supply Warehouse.* The existing Base Supply Warehouse (Building 108) was constructed in 1980 and generally does not meet existing and proposed mission requirements. It has been determined that the deficiencies of the existing building are such that it cannot be adequately renovated to meet mission requirements. Therefore, the Proposed Action includes construction of a new Base Supply Warehouse that meets mission requirements.

*Replace Fire/Crash Rescue Station.* The existing Fire/Crash Rescue Station (Building 201) is over 25 years old and is outdated, and is estimated to provide only about half of the space needed for the 188 FW's proposed mission change. Due to several deficiencies with the existing building, the 188 FW has determined that construction of a new Fire Crash/Rescue Station is the most logical means by which to provide an up-to-date, sufficiently sized Fire Crash/Rescue Station.

*Construct Water Tower Parking Area.* The Water Tower Parking Lot is a main parking area for the 188 FW, particularly during Unit Training Assembly (UTA) weekends. This parking lot is starting to fail as several cracks are visible throughout the lot. This deterioration increases the potential for Foreign Object Debris (FOD) to migrate to the flight line. The 188 FW Master Plan has also identified a need for additional parking at the installation. As such, the 188 FW proposes to make needed repairs to the existing Water Tower Parking Area and to expand this parking area to provide additional parking between Falcon Way and Building 418.

*Construct Supply Covered Storage.* Due to a lack of sufficient covered storage space, equipment utilized by the 188 FW is currently stored outdoors and exposed to inclement weather. This can result in mission degradation due to damage to equipment. Therefore, the Proposed Action includes installation of a covered storage shed on the existing Supply Warehouse Open Storage area.

*Repair Aircraft Arresting Gear.* As directed by Federal Aviation Administration (FAA) requirements, which dictate removal of two-roller edge sheaves because they present a wheel abutment hazard since they are not flush with airfield runway edges, the USAF is preparing to install three-roller edge sheaves on all installations having two-roller systems such as the airfield at Fort Smith Regional Airport used by the 188 FW. The purpose of these sheaves is to guide the

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tape from the aircraft arresting braking system to the pendant cable that interfaces with the aircraft hook during an arrestment cycle. In addition to its flush runway edge design, the three-roller system has the added benefit that it allows an aircraft to engage the system from either end of the runway.

## 1.3 LOCATION AND DESCRIPTION OF THE 188 FW

The 188 FW of the ARANG is located on approximately 141 acres at the Fort Smith Regional Airport in Fort Smith, Arkansas. The airport is located approximately 4 miles southeast of downtown Fort Smith. The airport lies entirely within Fort Smith City limits. The airport is situated to the south and east of Phoenix Avenue; north of Zero Street; and west of Massard Road. Leigh Avenue serves as the primary access to the ARANG installation.

## 1.4 SUMMARY OF KEY ENVIRONMENTAL REQUIREMENTS

### 1.4.1 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 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 this EA to address the environmental issues related to the proposed activities. The USAF implementing procedures for NEPA are contained in 32 CFR 989 et. seq., *Environmental Impact Analysis Process*.

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## 1.4.2 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 United States Fish and Wildlife Service (USFWS) under Section 7 of the Act.

## 1.4.3 CLEAN AIR ACT

The Clean Air Act (CAA) (42 USC §§ 7401–7671, as amended) provided the authority for the United States 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<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), 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. Conformity applicability will be addressed in this EA.

## 1.4.4 WATER RESOURCES REGULATORY REQUIREMENTS

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. Section 404 of the CWA, and Executive Order (EO) 11990, *Protection of Wetlands*, regulate development activities in or near streams or wetlands. Section 404 regulates development in streams and wetlands and requires a permit from the United States Army Corps of Engineers (USACE) for dredging and filling in wetlands. 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.

## 1.4.5 CULTURAL RESOURCES REGULATORY REQUIREMENTS

The National Historic Preservation Act (NHPA) of 1966 (16 USC § 470) established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation

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(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. 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 Native Americans for maintaining their traditional culture. Section 106 of NHPA requires federal agencies to consult with State Historic Preservation Officers (SHPO) 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 (NAGPRA) (25 USC §§ 3001–3013) requires consultation with Native American tribes prior to excavation or removal of human remains and certain objects of cultural importance.

## 1.4.6 OTHER REGULATORY LEGISLATION 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*. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires federal agencies to evaluate the effects of actions on migratory birds with an emphasis on species of concern.

## 1.4.7 ENVIRONMENTAL COORDINATION

EO 12372, *Intergovernmental Review of Federal Programs*, requires intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), the proponent must notify concerned federal, state, and local agencies and allow them sufficient time to evaluate potential environmental impacts of a proposed action. Comments from these agencies are subsequently incorporated into the Environmental Impact Analysis Process (EIAP).

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In a recently formulated policy to address EO 13084, *Consultation and Coordination with Indian Tribal Governments*, the Department of Defense (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.

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## **2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES**

### **2.1 INTRODUCTION**

The 188 FW currently maintains 67 permanent facilities at the installation on approximately 141 acres at the airport (Figure 2.1-1). Due to the decisions contained in the 2005 BRAC Commission Final and Approved Recommendations, the 188 FW anticipates that it would convert from a PAA 15 F-16C fighter aircraft and a BAI of two F-16Cs to a PAA of 18 A-10s and a BAI of three A-10s. No personnel increases and no substantial changes to the number of aircraft operations or airspace are included in the Proposed Action. The Proposed Action includes the proposed aircraft conversion and implementation of improvements that would include construction and renovation of the facilities related to the aircraft conversion, and current facility deficiencies introduced in Sections 1.1 and 1.2 and further described in Section 2.2.

The F-16 is a multi-role fighter aircraft that is effective for both air-to-air combat as well as air-to-surface attack missions. In an air combat role, the F-16's maneuverability and combat radius exceed that of most other fighter aircraft. The 188 FW currently flies approximately 2,592 sorties and 2,850 hours annually.

The A-10 can survive direct hits from armor-piercing and high explosive projectiles measuring up to 23 mm. They can be used against all types of ground targets, including tanks and other armored vehicles. These single-seat aircraft feature twin-engines (two General Electric TF34-GE-100 turbofans) that each provide 9,065 pounds of thrust. Their flight ceiling is 35,000 feet with a range of 800 miles (695 nautical miles) and maximum speed of 420 miles per hour. The dimensions of the A-10 aircraft are: 53.3 feet long, 14.68 feet high; and a wingspan of 57.5 feet. The A-10 is armed with one 30 mm GAU-8/A seven barrel Gatling gun; up to 16,000 pounds of mixed ordnance including a 500 pound Mk-82 and 2,000 pound Mk-84 series low-high drag bombs, incendiary cluster bombs, combined effects munitions, mine dispensing munitions, AGM-65 Maverick missiles and laser-guided electro-optically guided bombs, infrared countermeasure flares, electronic countermeasure chaff, jammer pods, 2.75 inch rockets, illumination flares, and AIM-9 sidewinder missiles (Air National Guard [ANG] nda).

### **2.2 PROPOSED ACTION**

Under the Proposed Action, the 188 FW would undergo the aircraft conversion and implement construction projects (Table 2.2-1) and demolish outdated facilities (Table 2.2-2) associated with the 2005 BRAC recommendations. The proposed new facilities are described in the following sections, and would be sited as shown in Figure 2.2-1.

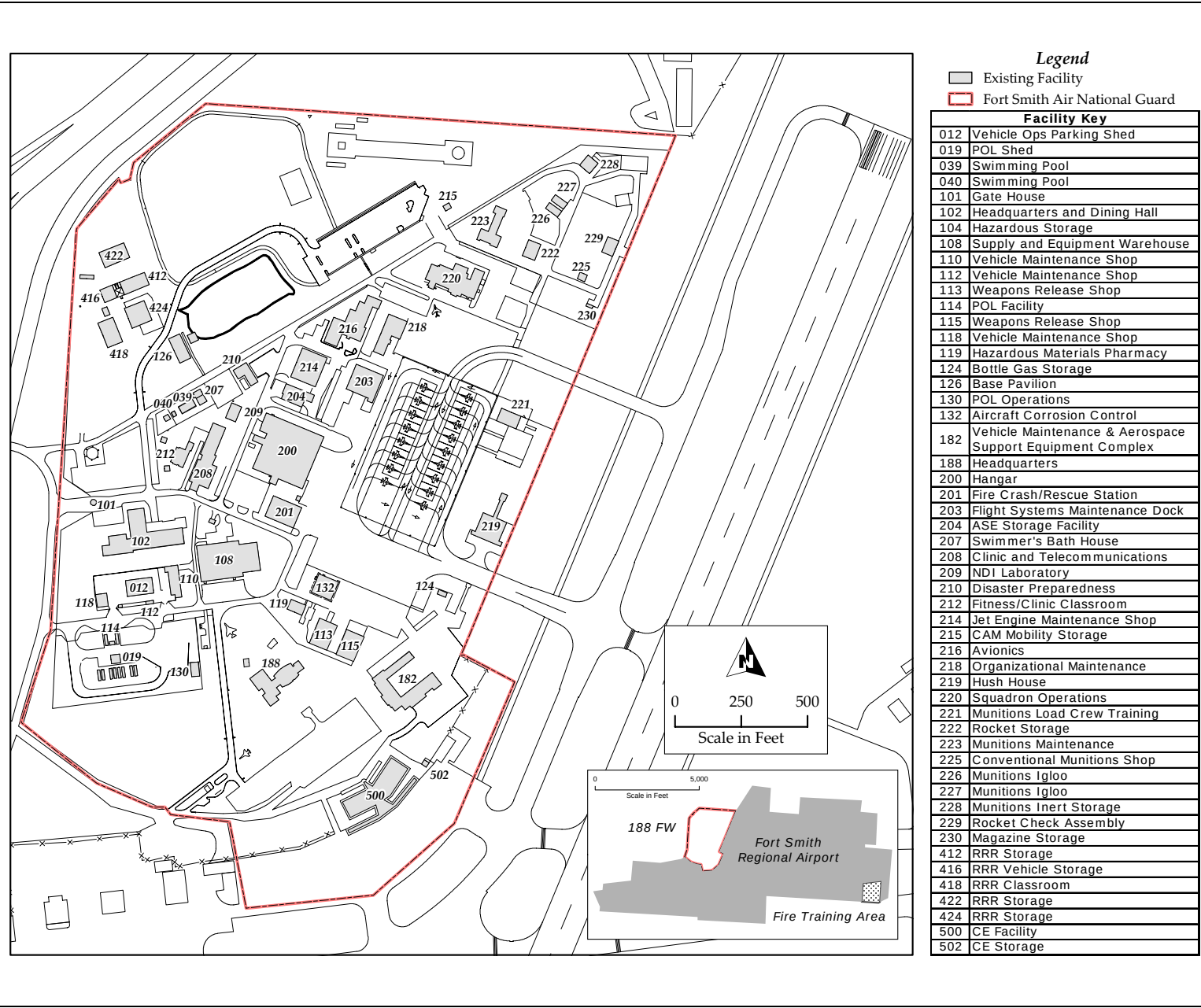


Figure 2.1-1. Existing Facilities at the Arkansas Air National Guard, Fort Smith Regional Airport

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**Table 2.2-1. List of Projects Included in the Analysis**

| <b>EA Action Item</b> | <b>Project Number</b>     | <b>Project Title</b>                                              | <b>Facility and/or Addition Size</b>                                  | <b>Project Description</b>                                                                                                                                                                                                                                       |
|-----------------------|---------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                     | HKRZ029254                | Construct Above Ground Magazine Storage Facility                  | 1,798 SF                                                              | Construct a new Above Ground Magazine Storage facility to accommodate 30 mm gun requirements for A-10 aircraft. Project includes demolition of Building 230.                                                                                                     |
| 2                     | HKRZ069027                | Construct Munitions Trailer Maintenance Shop                      | 1,200 SF                                                              | Construct a new facility to provide adequate space for munitions trailer maintenance associated with A-10 aircraft. Project includes demolition of Building 225.                                                                                                 |
| 3                     | HKRZ059317                | Construct Flight Simulator Facility                               | 1,800 SF                                                              | Construct a new A-10 flight simulator facility adjacent to the new Squadron Operations building to provide training for aircrews.                                                                                                                                |
| 4                     | HKRZ069001/<br>HKRZ059318 | Construct Fuel Cell/Corrosion Control/Load Crew Training Facility | 29,203 SF                                                             | Construct a three-bay aircraft hangar for corrosion control and fuel cell maintenance functions, and munitions load crew training facility for A-10 aircraft. Project includes demolition of Buildings 132, 203, and 221.                                        |
| 5                     | HKRZ062007                | POL Facility Improvements                                         | 1,200 SF (expansion of POL Operations)<br>2,000 SF (repair pavements) | Comprises several projects within POL area including: expand existing POL Operations Building, install outdoor lighting, install secondary containment, install canopies, replace oil/water separator, install new security fence, and repair pavements.         |
| 6                     | HKRZ069148                | Replace Jet Engine Inspection Maintenance Facility                | 10,000 SF                                                             | Construct a new properly configured and adequately sized jet engine and maintenance facility to replace existing facility. Project includes demolition of Building 214.                                                                                          |
| 7                     | HKRZ992033                | Addition/Alteration to Building 200                               | 43,591 SF (interior/roof renovation)<br>5,500 SF (addition)           | Renovate interior and repair roof of Building 200 (aircraft maintenance hangar) to provide properly configured space and utilities systems for A-10 aircraft. Also construct addition to Building 200 to provide space for weapons release and supply functions. |
| 8                     | HKRZ029255                | Construct Base Supply Warehouse                                   | 34,000 SF                                                             | Construct new adequately sized supply warehouse to replace the existing warehouse (Building 108), which would be demolished under this project.                                                                                                                  |
| 9                     | HKRZ039028                | Replace Fire/Crash Rescue Station                                 | 19,000 SF                                                             | Construct new adequately sized Fire/Crash Rescue Station to replace the existing station (Building 201), which would be demolished under this project.                                                                                                           |
| 10                    | HKRZ062001/<br>HKRZ032027 | Repair/Construct Water Tower Parking Area                         | 40,000 SF (additional parking)<br>45,621 SF (replacement)             | Replace existing Water Tower Parking Lot pavements and construct additional parking adjacent to this area.                                                                                                                                                       |
| 11                    | HKRZ062006                | Construct Supply Covered Storage                                  | 2,500 SF                                                              | Construct a pre-engineered storage shed in the existing location of the concrete slab used for supply warehouse open storage.                                                                                                                                    |
| 12                    | HKRZ050224                | Repair Aircraft Arresting Gear                                    | N/A                                                                   | Remove existing two-roller edge sheaves and associated concrete, anchoring bolts, etc., and replace with three-roller edge sheaves and associated concrete.                                                                                                      |

SF = square feet

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**Table 2.2-2. Proposed Demolition Projects for the 188 FW**

| <b><i>Building Number</i></b> | <b><i>Facility</i></b>          | <b><i>Approximate Area</i></b> | <b><i>Year Built</i></b> |
|-------------------------------|---------------------------------|--------------------------------|--------------------------|
| 039                           | Swimming Pool                   | 2,048 SF                       | 1956                     |
| 040                           | Swimming Pool                   | 192 SF                         | 1956                     |
| 108                           | Supply and Equipment Warehouse  | 28,923 SF                      | 1980                     |
| 113                           | Weapons Release Shop            | 6,720 SF                       | 1972                     |
| 115                           | Weapons Release Shop            | 6,720 SF                       | 1976                     |
| 119                           | Hazardous Materials             | 2,400 SF                       | 1987                     |
| 132                           | Aircraft Corrosion Control      | 6,000 SF                       | 1996                     |
| 201                           | Fire Crash/Rescue Station       | 9,500 SF                       | 1979                     |
| 203                           | Flight Systems Maintenance Dock | 11,000 SF                      | 1978                     |
| 207                           | Swimmers' Bath House            | 732 SF                         | 1956                     |
| 214                           | Jet Engine Maintenance Shop     | 12,200 SF                      | 1974                     |
| 221                           | Munitions Load Crew Training    | 4,000 SF                       | 1982                     |
| 225                           | Conventional Munitions Shop     | 792 SF                         | 1989                     |
| 230                           | Magazine Storage                | 270 SF                         | 1996                     |
| <b><i>Total</i></b>           |                                 | 91,497 SF                      |                          |

SF = square feet

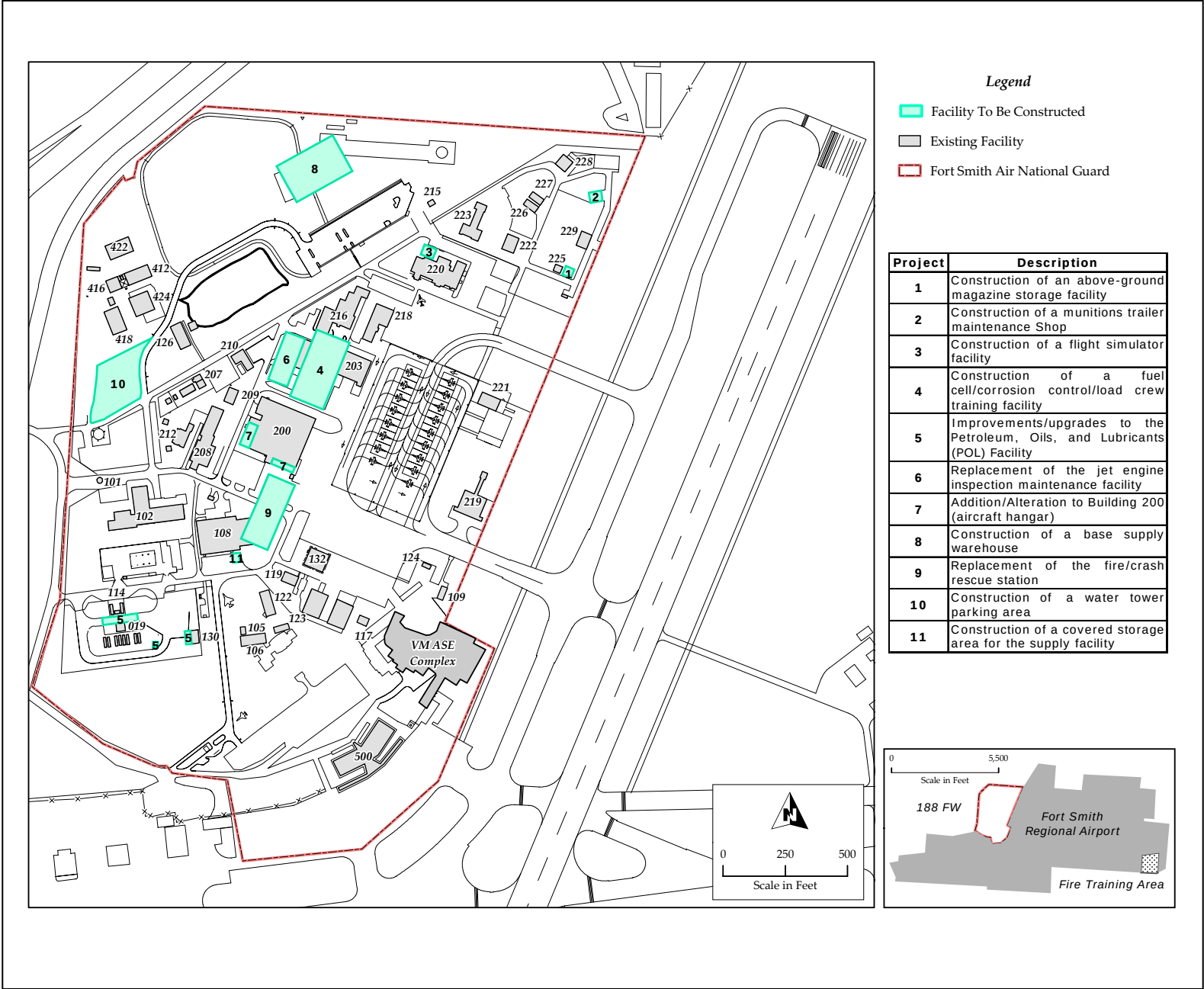
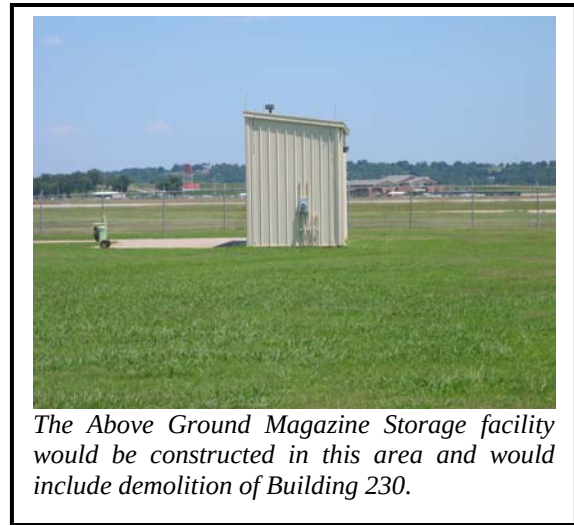


**Figure 2.2-1. Proposed Facilities at the Arkansas Air National Guard, Fort Smith Regional Airport**

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## 2.2.1 CONSTRUCT ABOVE GROUND MAGAZINE STORAGE

This project involves several actions associated with the construction of a new above ground magazine storage facility to accommodate the A-10 weapons system. A new, 1,800 square foot (SF) Above Ground Magazine Storage Facility would be built in the northeast area of the 188 FW property. This facility would consist of a reinforced concrete foundation and slab, masonry walls with steel frame, and a water-shedding standing seam metal roof, as well as all interior utilities, exterior pavement, utilities and communications, and Anti-Terrorism/Force Protection (AT/FP) measures. In order to maintain a 100-foot clear zone required for munitions storage, Buildings 225 and 230, which are adjacent, would be demolished.



## 2.2.2 CONSTRUCT MUNITIONS TRAILER MAINTENANCE SHOP

Under the Proposed Action, several changes would be undertaken to the Munitions Shop in support of the training and maintenance requirements of the new A-10 aircraft. This project would relocate the maintenance shop from Building 223 to a new facility, while the conventional munitions shop would expand into that vacated space. A new 1,200 SF Munitions Trailer facility would be constructed in the northwestern portion of the 188 FW installation. This facility would consist of a reinforced concrete foundation and slab, masonry walls with steel frame, and a water-shedding standing seam metal roof, as well as all interior utilities, exterior pavement, utilities and communications, and AT/FP measures.

## 2.2.3 CONSTRUCT FLIGHT SIMULATOR FACILITY

A 1,800 SF Flight Simulator Facility would be constructed in support of the new A-10 aircraft mission. The new flight simulator facility would be located in a new building adjacent to and connected with the Squadron Operations building. This facility would consist of a reinforced concrete foundation and slab, masonry walls with steel frame, and a standing seam metal roof that matches the squadron operations. All interior utilities, exterior pavement, utilities and communications, and AT/FP measures would be included. A secured covered walkway would connect Building 220 to the new facility.

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## 2.2.4 CONSTRUCT FUEL CELL/CORROSION CONTROL/LOAD CREW TRAINING FACILITY

Under the Proposed Action, several projects would be undertaken to provide properly sized and configured space in which the maintenance crews can perform corrosion control and fuel cell maintenance functions, as well as train on munitions loading and unloading procedures, for the A-10 aircraft. The facility would be sized to receive one A-10 aircraft in each of the three bays and have interior fire protection. Demolition of three buildings would be required to accommodate the new facility: Buildings 132 (1,827 SF), 203 (3,352 SF), and 221 (1,220 SF). Two bays would be constructed and dedicated to the Fuel Cell/Corrosion Control crews, and one bay for the munitions training crew, for a total of 29,200 SF. This facility would consist of a reinforced concrete foundation and slab, masonry walls with steel frame, and a water-shedding standing seam metal roof. All interior utilities, exterior pavement, utilities and communications, and AT/FP measures would be included. Following demolition and construction activities, the site would be restored and landscaped.

## 2.2.5 PETROLEUM, OILS, AND LUBRICANTS FACILITY IMPROVEMENTS



*The oil/water separator in the center of this picture would be replaced with a large capacity oil/water separator.*

Several upgrades to the POL facility would occur under the Proposed Action. These include: construction of a 1,200 SF addition to the POL Operations Building to provide classroom training space; installation of outdoor lighting in the fuel truck parking area; installation of 50 linear feet (LF) of curbing to provide secondary containment in the truck parking area and curbing for secondary containment at the military service station; installation of a new 7-foot high chain link and barbed wire security fence in the northwest side of the POL area; replacement of approximately 2,000

SF of concrete pavement; replacement of the existing 50 gallon per hour capacity oil/water separator with a new large capacity unit; and construct canopies and enclosures for personnel and equipment.

## 2.2.6 REPLACE JET ENGINE INSPECTION MAINTENANCE FACILITY

Under the Proposed Action, this project would be undertaken to provide a properly sized and configured Jet Engine Inspection and Maintenance Shop to support A-10 aircraft. The existing 12,000 SF Jet Engine Shop (Building 214) would be demolished and a new 10,000 SF Shop would be constructed in its place. This new facility would consist of a reinforced concrete foundation and slab, masonry walls with steel frame, and a standing seam metal roof. The new

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building would match the existing architectural style. All interior utilities, exterior pavement, utilities and communications, and AT/FP measures would be included. Included with the new building would be covered storage, created from pre-engineered clear span sheds on a concrete slab foundation.

## 2.2.7 ADDITION/ALTERATION TO BUILDING 200

Under this project, the existing hangar (Building 200) would be repaired and modified to provide adequate space to support maintenance for the A-10 aircraft mission. Additions and alterations would include modification of the functional floor space through removal and construction of interior partition walls, latrine modifications, roof repairs, HVAC repairs, improvements to the interior electric system, as well as upgrades to the fire suppression system. Exterior asbestos siding and other asbestos insulation would be removed and replaced. Space that is available due to relocation of Security Forces would be reconfigured for aircraft maintenance. This project includes the rental of a temporary trailer to facilitate repair activities.



## 2.2.8 CONSTRUCT BASE SUPPLY WAREHOUSE

The new Base Supply Warehouse would consist of a 34,000 SF pre-engineered low bay structure built upon spread reinforced concrete footings with reinforced concrete floor slab on grade. The roof and exterior wall treatments would be constructed to match existing installation structures (i.e., standing seam metal roof, brick veneer, and insulated metal panels). This project would also include all necessary utilities and mechanical systems, communication support, fire protection, pavements, and other site improvements. The existing Base Supply Warehouse (Building 108) would be demolished under this project.

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## 2.2.9 REPLACE FIRE/CRASH RESCUE STATION

The new Fire/Crash Rescue Station would consist of a 19,000 SF pre-engineered low bay structure built upon spread reinforced concrete footings with reinforced concrete floor slab on grade. The roof and exterior wall treatments would be constructed to match existing installation structures (i.e., standing seam metal roof, brick veneer, and insulated metal panels). This project would also include all necessary utilities and mechanical systems, communication support, fire protection, pavements, and other site improvements. The existing Fire/Crash Rescue Station (Building 201) would be demolished under this project.



*Building 201, the existing Fire/Crash Rescue Station, would be demolished upon construction of a new facility.*

## 2.2.10 REPLACE/CONSTRUCT WATER TOWER PARKING AREA

Under this project, the Water Tower Parking lot would be repaired and additional parking would be provided adjacent to this parking lot. The existing parking lot material would be removed and disposed. The lot would then be excavated, backfilled, and compacted with fill. The base course would also be installed and compacted. Finally, concrete pavement would be installed over the fill material, resulting in a repaired lot of 5,069 SY. The additional parking would include 40,000 SF of concrete pavement to accommodate approximately 130 vehicles.



*This gravel area would be paved as part of the water tower parking area project.*

## 2.2.11 CONSTRUCT SUPPLY COVERED STORAGE

The Supply Covered Storage facility would consist of a 2,500 SF pre-engineered shed that would be erected on the existing Supply Warehouse Open Storage site which consists of a concrete pad.

## 2.2.12 REPAIR AIRCRAFT ARRESTING GEAR

This project entails replacement of the existing two-roller runway edge sheaves at Fort Smith Regional Airport with three-roller runway edge sheaves. This process includes removal of the

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existing edge sheaves as well as the concrete, grout, and anchoring bolts of the two-roller edge sheaves. Installation of the new three-roller edge sheaves includes re-grouting around the entire sheave housing; pouring new grout around the sheaves; pouring concrete for the ramps that will be flush with the face and top of the sheaves (gradually tapering along the edge of the runway until they are flush with the runway surface); installing “I” beams along the sides of the sheave housing; and installing other finishing components.

## 2.2.13 DEMOLITION PROJECTS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

As a component of constructing new facilities for the ARANG, some existing facilities would be demolished that are obsolete or deteriorated and/or in the footprint of the new facilities. It is expected that 14 facilities (039, 040, 108, 113, 115, 119, 132, 201, 203, 207, 214, 221, 225, and 230) on the ARANG leasehold would be demolished under this proposal (Table 2.2-2 and Figure 2.2-2).

## 2.3 NO ACTION ALTERNATIVE

Under the No Action alternative, the 188 FW would maintain their existing facilities, would not build the new facilities proposed, and would not undergo an aircraft conversion. Under the No Action alternative, these deficiencies would continue to impair the 188 FW’s ability to successfully conduct its mission and to maintain wartime readiness and training. In addition, the 188 FW would not be able to accomplish its BRAC-directed aircraft conversion by converting to A-10 aircraft. Aside from not undergoing the mission conversion and constructing facilities in support of the conversion, the following deficiencies related to the 188 FW’s current mission would remain:

- The Aircraft Maintenance facilities would continue to lack sufficient space and be improperly configured for several important functions related to the support of aircraft.
- The Fire Department would continue to operate out of a facility that lacks sufficient space for training and mobility needs.

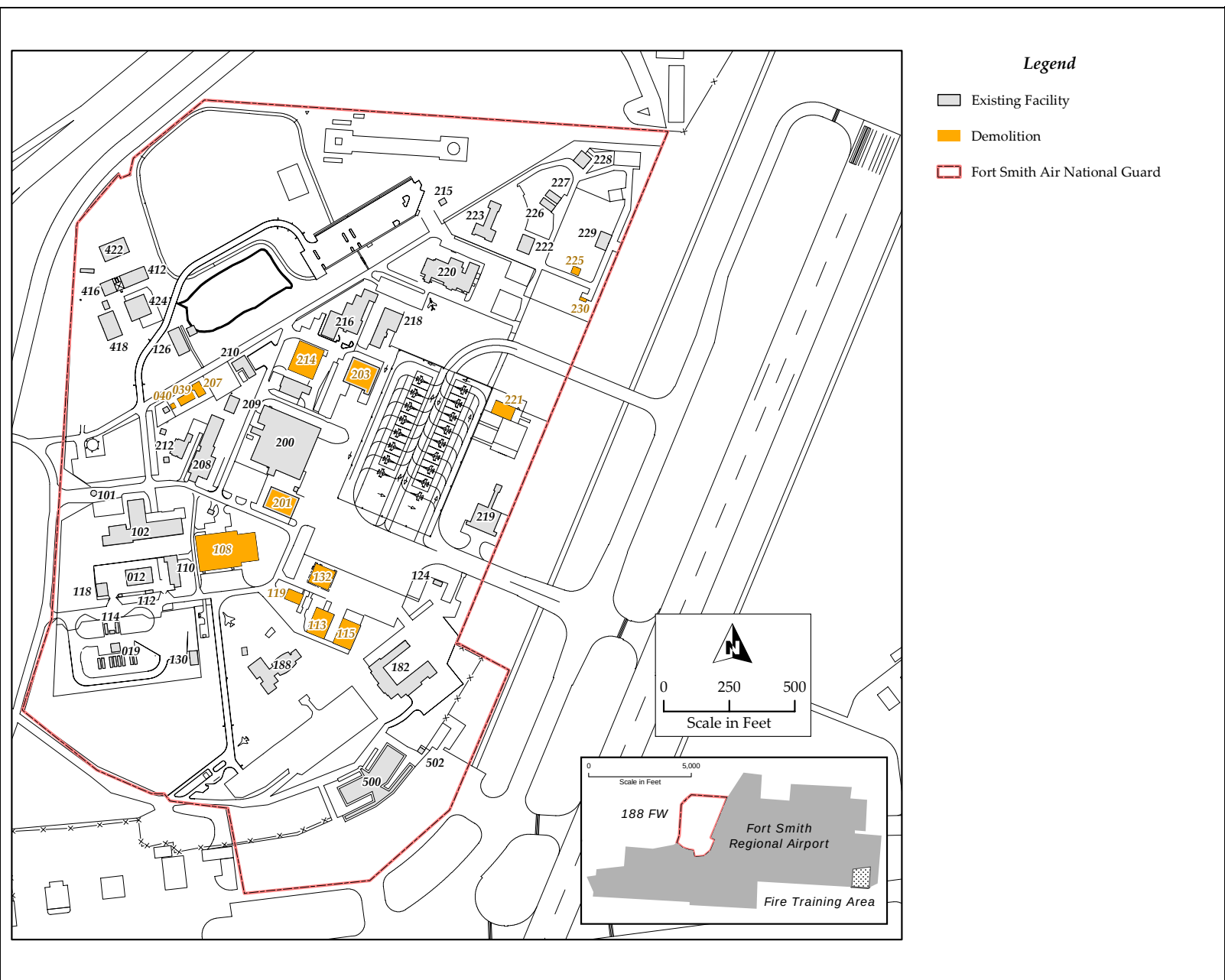


**Figure 2.2-2. Buildings Proposed for Demolition at the Arkansas Air National Guard, Fort Smith Regional Airport**

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## 3.0 EXISTING CONDITIONS

Chapter 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 its alternatives are described in Chapter 4.0.

In compliance with 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: noise, land use and visual resources, air quality, socioeconomics and environmental justice, safety, solid and hazardous materials and wastes, infrastructure, earth resources, water resources, biological resources, and cultural resources.

### 3.1 NOISE

#### 3.1.1 DEFINITION OF 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. It may be 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 relatively established paths (e.g., highways, railroads, and aircraft flight tracks around 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 (e.g., 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

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zeros are added before or after the decimal point, converting these numbers to their logarithms greatly simplifies calculations that use these numbers.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined through the use of “A-weighting.” The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000 to 4,000 Hz range. The human ear is most sensitive to frequencies in this range, and sounds measured with these instruments are termed “A-weighted”, and are shown in terms of A-weighted decibels (dBA).

The duration of a noise event, and the number of times noise events occur, are also important considerations in assessing noise impacts.

As a basis for comparison when noise levels are considered, it is useful to note that at distances of about three feet, noise from normal human speech ranges from 63 to 65 dB, operating kitchen appliances range from about 83 to 88 dB, and rock bands approach 110 dB.

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.

The metrics supporting the assessment of noise from aircraft operations and construction activities associated with the proposals assessed in this document are the maximum sound level ( $L_{\max}$ ), the Sound Exposure Level (SEL), and Time-Averaged Sound Levels. Each metric represents a “tier” for quantifying the noise environment, and is briefly discussed below.

### 3.1.1.1 Maximum Sound Level

The  $L_{\max}$  metric defines peak noise levels.  $L_{\max}$  is the highest sound level measured during a single noise event (e.g., an aircraft overflight), and is the sound actually heard by a person on the ground. For an observer, the noise level starts at the ambient noise level, rises up to the maximum level as the aircraft flies closest to the observer, and returns to the ambient level as the aircraft recedes into the distance. Maximum sound level is important in judging a noise event’s interference with conversation, sleep, or other common activities.

This document considers noise from aircraft operating around airfields. Around airfields, the primary operational modes of aircraft are departures (take-offs) and arrivals (landings). Table

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3.1-1 shows  $L_{\max}$  values at various distances associated with typical military and civilian aircraft currently operating at Fort Smith Regional Airport.

**Table 3.1-1. Representative Maximum Sound Levels**

| <i>Aircraft and Power Type</i> | <i><math>L_{\max}</math> Values (in dBA) At Varying Distances (In Feet)</i> |              |              |              |              |               |
|--------------------------------|-----------------------------------------------------------------------------|--------------|--------------|--------------|--------------|---------------|
|                                | <i>500</i>                                                                  | <i>1,000</i> | <i>2,000</i> | <i>3,000</i> | <i>5,000</i> | <i>10,000</i> |
| F-16 Afterburner Takeoff       | 122.3                                                                       | 114.2        | 105.9        | 100.8        | 94.1         | 84.1          |
| F-16 Standard Takeoff          | 112.0                                                                       | 104.3        | 96.1         | 90.8         | 83.9         | 73.3          |
| F-16 Landing                   | 88.7                                                                        | 81.7         | 74.0         | 68.9         | 62.1         | 51.7          |
| A-10 Takeoff                   | 100.9                                                                       | 93.2         | 84.6         | 78.4         | 71.7         | 60.7          |
| A-10 Landing                   | 97.0                                                                        | 88.9         | 78.8         | 70.3         | 60.1         | 46.4          |
| B-727 Takeoff                  | 112.8                                                                       | 106.0        | 98.8         | 94.2         | 88.0         | 78.7          |
| B-727 Landing                  | 86.6                                                                        | 79.4         | 71.9         | 67.1         | 60.8         | 51.1          |
| B-737 Takeoff                  | 110.8                                                                       | 104.0        | 96.7         | 92.0         | 85.8         | 76.3          |
| B-737 Landing                  | 85.4                                                                        | 77.3         | 69.7         | 64.8         | 58.3         | 48.4          |
| SAAB 340 Takeoff               | 86.4                                                                        | 79.8         | 73.0         | 68.7         | 63.2         | 54.6          |
| SAAB 340 Landing               | 77.1                                                                        | 70.4         | 63.5         | 59.1         | 53.5         | 45.1          |

Source: OMEGA108

## 3.1.1.2 Sound Exposure Level

$L_{\max}$  alone may not represent how intrusive an aircraft noise event is because it does not consider the length of time that the noise persists. The SEL metric combines intensity and duration into a single measure. It is important to note, however, that SEL does not directly represent the sound level heard at any given time, but rather provides a measure of the total exposure of the entire event. Its value represents all of the acoustic energy associated with the event, as though it was present for one second. Therefore, for sound events that last longer than one second, the SEL value will be higher than the  $L_{\max}$  value. The SEL value is important because it is the value used to calculate other time-averaged noise metrics. Table 3.1-2 shows SEL values corresponding to the aircraft and power settings reflected in Table 3.1-1.

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**Table 3.1-2. Representative Sound Exposure Levels**

| <b><i>Aircraft and Power Type</i></b> | <b><i>SEL Values (in dBA) At Varying Distances (In Feet)</i></b> |                     |                     |                     |                     |                      |
|---------------------------------------|------------------------------------------------------------------|---------------------|---------------------|---------------------|---------------------|----------------------|
|                                       | <b><i>500</i></b>                                                | <b><i>1,000</i></b> | <b><i>2,000</i></b> | <b><i>3,000</i></b> | <b><i>5,000</i></b> | <b><i>10,000</i></b> |
| F-16 Afterburner Takeoff              | 127.0                                                            | 120.7               | 114.2               | 110.2               | 104.8               | 96.6                 |
| F-16 Normal Takeoff                   | 116.6                                                            | 110.7               | 104.3               | 100.1               | 94.5                | 85.7                 |
| F-16 Landing                          | 94.8                                                             | 89.6                | 83.7                | 79.7                | 74.2                | 65.6                 |
| A-10 Takeoff                          | 102.8                                                            | 96.9                | 90.1                | 85.1                | 79.6                | 70.4                 |
| A-10 Landing                          | 98.2                                                             | 91.8                | 83.5                | 76.3                | 67.2                | 55.3                 |
| B-727 Takeoff                         | 117.0                                                            | 112.1               | 106.7               | 103.1               | 98.3                | 90.8                 |
| B-727 Landing                         | 92.1                                                             | 86.8                | 81.1                | 77.3                | 72.3                | 64.5                 |
| B-737 Takeoff                         | 115.0                                                            | 110.0               | 104.5               | 100.9               | 96.0                | 88.3                 |
| B-737 Landing                         | 90.2                                                             | 84.8                | 78.9                | 75.1                | 69.9                | 61.8                 |
| SAAB 340 Takeoff                      | 92.1                                                             | 87.3                | 82.3                | 79.1                | 74.9                | 68.1                 |
| SAAB 340 Landing                      | 82.4                                                             | 77.5                | 72.3                | 69.1                | 64.8                | 58.1                 |

Source: OMEGA108

## 3.1.1.3 Time-Averaged Cumulative Noise Metrics

The number of times noise events occur during given periods is also an important consideration in assessing noise impacts. The “cumulative” noise metrics supporting the analysis of multiple time-varying noise events are the Day-Night Average Sound Level ( $L_{dn}$ ) and the Equivalent Noise Level ( $L_{eq}$ ).

### *Day-Night Average Sound Level*

This metric sums the individual noise events and averages the resulting level over a specified length of time. Thus, it is a composite metric which considers the maximum noise levels, the duration of the events, the number of events that occur, and the time of day during which they occur. This metric adds 10 dB to those events that occur between 10:00 p.m. and 7:00 a.m. to account for the increased intrusiveness of noise events that occur at night when ambient noise levels are normally lower than during the daytime. This cumulative metric does not represent the variations in the sound level heard. Nevertheless, it does provide an excellent measure for comparing environmental noise exposures when there are multiple noise events to be considered.

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## *Equivalent Noise Level*

This metric, too, sums all of the individual noise events and averages them over a specified time period. Common averaging times are 8- and 24-hour periods [ $L_{eq(8)}$  and  $L_{eq(24)}$ ]. This metric assigns no penalty for the time of the noise event. However, if no noise events occur at night, calculations of  $L_{dn}$  and  $L_{eq}$  would be identical.

Finally, it should be noted that ambient background noise is not considered in the noise calculations that are presented below. There are two reasons for this. First, ambient background noise, even in wilderness areas, varies widely, depending on location and other conditions. For example, studies conducted in an open pine forest in the Sierra National Forest in California have measured up to a 10 dBA variance in sound levels simply due to an increase in wind velocity (Harrison 1973). Therefore, assigning a value to background noise would be arbitrary. Secondly, and probably most important, is that it is reasonable to assume that ambient background noise in the project's region of influence (ROI) would have little or no effect on the calculated  $L_{dn}$ . In calculating noise levels, louder sounds dominate the calculations, and overall, aircraft and other transportation-related noise would be expected to be the dominant noise sources characterizing the acoustic conditions in the region.

Using measured sound levels as a basis, the USAF developed several computer programs to calculate noise levels resulting from aircraft operations. Sound levels calculated by these programs have been extensively validated against measured data, and have been proven to be highly accurate.

In this document, the sound levels calculated for aircraft operations in an airfield environment are all  $L_{dn}$ .  $L_{dn}$  metrics are the preferred noise metrics of the Department of Housing and Urban Development, the Department of Transportation, the FAA, the USEPA, and the Veteran's Administration.

Ignoring the nighttime penalty for the moment,  $L_{dn}$  may be thought of as the continuous or cumulative A-weighted sound level which would be present if all of the variations in sound level which occur over the given period were smoothed out so as to contain the same total sound energy. While  $L_{dn}$  does provide a single measure of overall noise impact, it is fully recognized that it does not provide specific information on the number of noise events or the specific individual sound levels which occur. For example, an  $L_{dn}$  of 65 dB could result from a very few noisy events, or a large number of quieter events. Although it does not represent the sound level heard at any one particular time, it does represent the total sound exposure. Scientific studies and social surveys have found the  $L_{dn}$  to be the best measure to assess levels of community annoyance associated with all types of environmental noise. Therefore, its use is endorsed by the scientific community and governmental agencies (American National Standards Institute 1980,

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1988; USEPA 1974; Federal Interagency Committee on Urban Noise 1980; Federal Interagency Committee on Noise 1992).

Additional technical information on the methodology and concept of aircraft noise measurement and modeling, as well as data on noise effects, can be found in Appendix B.

The ROI for the noise assessments are the areas around Fort Smith Regional Airport that are exposed to aviation-related noise resulting from activities in the region.

## 3.1.2 EXISTING CONDITIONS

Public annoyance is the most common concern associated with exposure to elevated noise levels. When subjected to  $L_{dn}$  levels of 65 dBA, approximately 12 percent of the persons so exposed will be “highly annoyed” by the noise. At levels below 55 dBA, the percentage of annoyance is significantly lower (less than three percent), and at levels above 70 dBA, it is significantly higher (greater than 25 percent) (Finegold et al. 1994). Table 3.1-3 shows the percentage of the population expected to be highly annoyed at a range of noise levels.

**Table 3.1-3. Percentage of Population Highly Annoyed By Elevated Noise Levels**

| <i>Noise Exposure (<math>L_{dn}</math> in dBA)</i> | <i>Percent Highly Annoyed</i> |
|----------------------------------------------------|-------------------------------|
| < 65                                               | < 12                          |
| 65 – 70                                            | 12 – 21                       |
| 70 – 75                                            | 22 – 36                       |
| 75 – 80                                            | 37 – 53                       |
| 80 – 85                                            | 54 – 70                       |
| > 85                                               | > 71                          |

Source: Finegold et al. 1994

### 3.1.2.1 Aircraft Activity

The following terms are defined to provide a better understanding of how data are developed for input to the various noise models used to calculate noise.

Around an airfield, ***aircraft operations*** are categorized as takeoffs, landings, or closed patterns (which could include activities referred to as touch-and-gos or low approaches). Each takeoff or landing constitutes one operation. A ***closed pattern*** occurs when the pilot of the aircraft approaches the runway as though planning to land, but then applies power to the aircraft and continues to fly as though taking off again. The pilot then flies a circular or rectangular track around the airfield, and again approaches for landing. In some cases, the pilot may actually land on the runway before applying power, or in other cases, the pilot simply approaches very close to

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the ground. In either event, since a closed pattern operation essentially consists of a landing and a takeoff, it is considered two operations. A *sortie* is defined as a takeoff, performance of a mission, and a landing. During mission performance the aircraft may fly in several elements of airspace during one sortie.

Fort Smith Regional Airport is located approximately 4 miles southeast of downtown Fort Smith and is entirely within the city limits of Fort Smith. Under baseline conditions, the airport supports military and civil aviation activity, conducting approximately 63,000 annual operations. This equates to approximately 205 daily operations. Considering all types of flight activities, a scenario representing an “average day’s” operations was developed. The operations considered include arrivals (landings), departures (takeoffs), and closed patterns. Noise calculations consider the frequency of flight operations, runway utilization, and the flight tracks and flight profiles flown by each aircraft. The numbers and types of representative operations considered are shown in Table 3.1-4.

**Table 3.1-4. Average Daily Operations at Fort Smith Regional Airport<sup>1,2</sup>**

| Aircraft         | Daily Operations |        |            |        |                 |       |          |
|------------------|------------------|--------|------------|--------|-----------------|-------|----------|
|                  | Arrivals         |        | Departures |        | Closed Patterns |       | Total    |
|                  | Day              | Night  | Day        | Night  | Day             | Night |          |
| F-16             | 10.1832          | 0.1028 | 10.1832    | 0.1028 | 4.1160          | 0     | 29.5772  |
| Other Military   | 24.3610          | 0.2440 | 24.3610    | 0.2440 | 41.8080         | 0     | 91.0179  |
| Air Carrier      | 0.5680           | 0.0036 | 0.3770     | 0.0036 | 0               | 0     | 0.9521   |
| Air Taxi         | 10.4029          | 0.1049 | 10.4021    | 0.1056 | 0               | 0     | 21.0155  |
| General Aviation | 28.3030          | 0.2870 | 22.3610    | 0.2270 | 16.4900         | 0     | 67.6680  |
| Total            | 73.8181          | 0.7423 | 67.6843    | 0.6830 | 62.4140         | 0     | 205.3415 |

Notes: 1. Daily operations are based on averages of annual operations; therefore, numbers do not round.

2. Annual operations are based on 365 civilian flying days and 260 military flying days, resulting in approximately 63,000 annual operations.

Sources: Fort Smith Regional Airport 2003; Fort Smith Airport Commission 1996.

These levels and types of activity are then combined with information on climatology, maintenance activities, and aircraft flight parameters, and processed through the USAF’s BASEOPS/NOISEMAP (Moulton 2005) computer models to calculate  $L_{dn}$ . Once noise levels are calculated, they are plotted on a background map in 5-decibel increments from 65 dBA to 85 dBA, as applicable. Noise contours associated with current activities at Fort Smith Regional Airport are shown in Figure 3.1-1. The land area (in acres) encompassed by each contour is shown in Table 3.1-5.

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**Table 3.1-5. Land Area Exposed To Indicated Sound Levels (Baseline Conditions)**

| <i>Sound Level (In <math>L_{dn}</math>)</i> | <i>Acres of Land <sup>1</sup></i> |
|---------------------------------------------|-----------------------------------|
| 65 – 70                                     | 1,470.2                           |
| 70 – 75                                     | 758.6                             |
| 75 – 80                                     | 390.6                             |
| 80 – 85                                     | 211.1                             |
| > 85                                        | 283.1                             |

Note: 1. Land areas exposed to indicated sound levels. Total area exposed to  $L_{dn}$  65 or greater is approximately 3,114 acres

Source: Wasmer and Maunsell 2002.

In order to assess further noise exposure from aviation activity, several locations were selected for specific analysis. These locations included a sampling of points in the Fort Smith urban area around the runways used by the FAA for noise monitoring, and represented residential neighborhoods where land uses could be sensitive to elevated noise levels. Noise exposure at these points is shown in Table 3.1-6, and the location of the points is depicted in Figure 3.1-1.

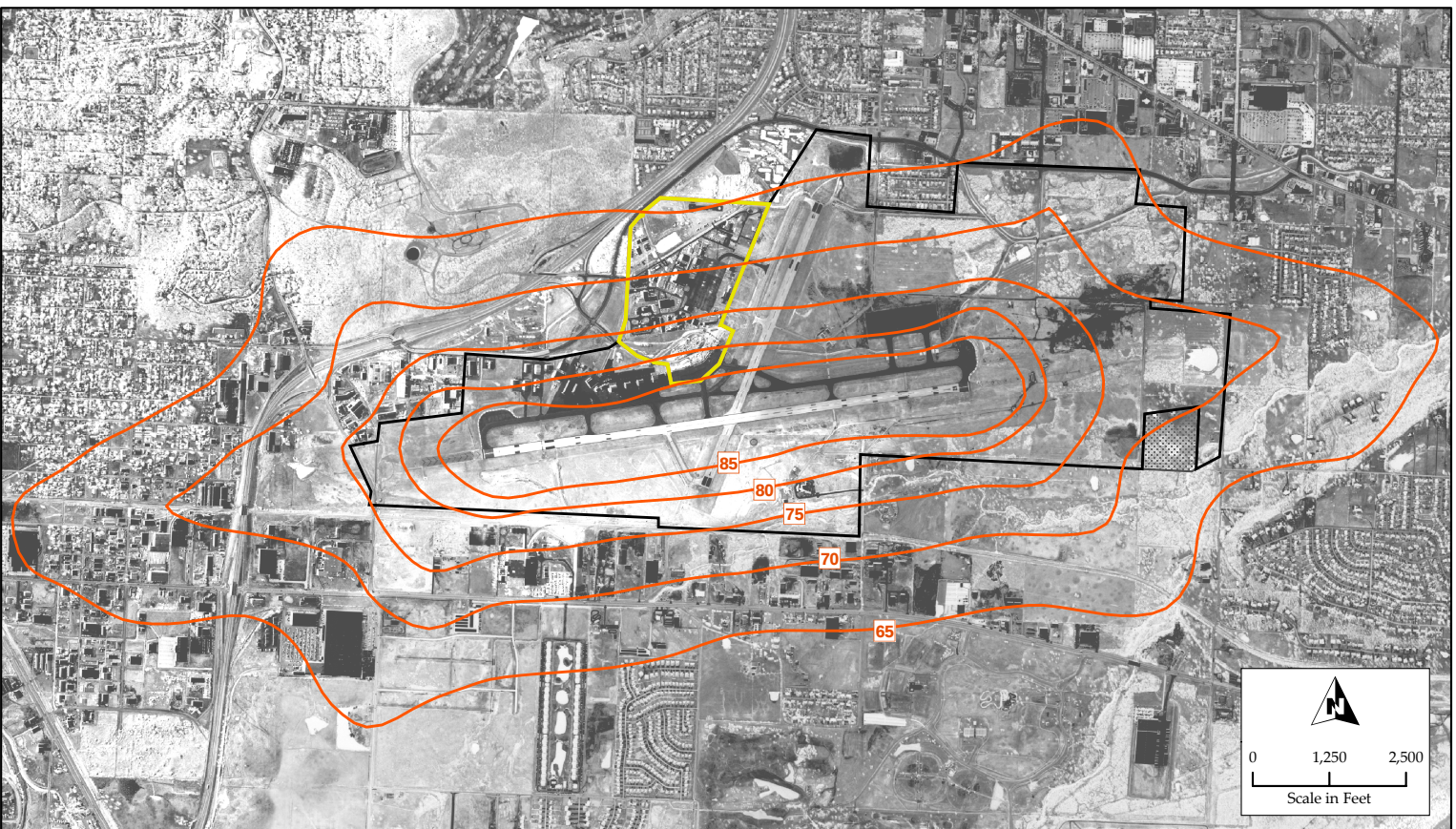
**Table 3.1-6. Specific Point Noise Exposure**

| <i>Point ID</i> | <i>Description</i>                                                        | <i>Exposure (in <math>L_{dn}</math>)</i> |
|-----------------|---------------------------------------------------------------------------|------------------------------------------|
| SP01            | 9201 Moody Road, residential area east of airport                         | 63.1                                     |
| SP02            | 8847 Meandering Way, residential area east of airport                     | 68.5                                     |
| SP03            | 3217 South 74 <sup>th</sup> Street, residential area northeast of airport | 54.2                                     |
| SP04            | 5300 South Zero Street, residential area south of airport                 | 68.7                                     |
| SP05            | 5174 32 <sup>nd</sup> Street, Temple Baptist Church                       | 67.8                                     |
| SP06            | 5712 Jenny Lind Road, residential area west of airport                    | 61.8                                     |

Source: Moulton 2005.

## 3.1.2.2 Ground-Based Activity

Some additional noise results from day-to-day activities associated with operations, maintenance, and the industrial functions associated with the operation of the airport. These noise sources include the operation of ground-support equipment, and other transportation noise from vehicular traffic. However, this noise is generally localized in industrial areas on or near the airfield, or on established lines of communication supporting traffic to-and-from the airfield. Noise resulting from aircraft operations remains the dominant noise source in the airfield region.



*Legend*

-  F-16 DNL Contour
-  Fort Smith Air National Guard
-  Fort Smith Regional Airport
-  Fire Training Area

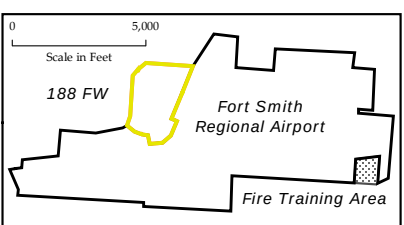


**Figure 3.1-1. Existing Noise Contours at Fort Smith Regional Airport**

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## 3.2 LAND USE AND VISUAL RESOURCES

### 3.2.1 DEFINITION OF THE RESOURCE

The attributes of land use considered in this analysis include general land use patterns, land ownership, land management plans, and special use areas. General land use patterns characterize the types of uses within a particular area including agricultural, residential, military and recreational. Land ownership is a categorization of land according to type of owner. The major land ownership categories include private, state, and federal. Land management plans include those documents prepared by agencies to establish appropriate goals for future use and development. As part of this process, sensitive land use areas are often identified by agencies as being worthy of more rigorous management.

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

### 3.2.2 EXISTING CONDITIONS

#### 3.2.2.1 Land Use

Fort Smith Regional Airport is located within the limits of the City of Fort Smith and Sebastian County, Arkansas. The airport property is owned and managed by the Fort Smith Airport Commission, which is appointed by the City of Fort Smith. The 188 FW installation is bordered by the airport to the east and south, and city property to the north and west. Land use surrounding the airport property is under the jurisdiction of the City of Fort Smith Planning Commission. The City of Fort Smith amended its Comprehensive Plan in May 2005 (City of Fort Smith 2002).

Lands surrounding the airport comprise a variety of zoning designations including residential, agricultural/open, parks/recreational, commercial, industrial, and institutional (Fort Smith Airport Commission 2005).

Off airport land use to the north of Runway 01/19 land use is residential. Between the airport and Rogers Avenue, further north, lie large areas of residential and commercial land use. Rogers Avenue is a highly developed commercial/retail corridor leading northwest to the central business district. To the south of the airport, along Zero Street, there are industrial uses and a large open area. South of Zero Street are residential, commercial, and parks/recreational uses

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(including the 1,300-acre Ben Geren Regional Park). To the west of the airport are commercial, industrial, and agricultural/open land uses. A large-scale retail development is located on airport property along Phoenix Avenue, west of the 188 FW installation. Land uses to the east consist of residential uses and agricultural/open land uses. Southeast of the airport is the Fort Chaffee Military Reservation (Fort Smith Airport Commission 2005).

The 188 FW of the ARANG occupies approximately 141 acres of land leased from the airport, including 20 acres used as a Fire Training Area located separately from the main cantonment area. The main cantonment area is located on the northwest portion of the airport, and the Fire Training Area is located on the southeast portion of the airport. The operational, logistic, and administrative facilities of the 188 FW are located on the 121-acre cantonment area. The Fire Training Area currently supports fire training activities including a fire training pit. Prior to its use as a Fire Training Area starting in 2000, the Fire Training Area site was used for small-scale farming and horse pasture (ARANG 2003a).

Factors that have most strongly influenced land use patterns at the 188 FW installation are the location and orientation of the aircraft parking ramp and the internal roadway system. The current land use pattern at the installation has developed over the past 50 years based on changing missions and aircraft inventories. Facilities construction and modification during this period occurred in a conservative manner to meet specific and immediate needs without a long-range planning strategy (ARANG 2003b). As such, the 188 FW proposed to implement construction projects associated with their installation (2003) that included construction of several new facilities.

Major land use types within the main cantonment area of the 188 FW installation currently include the Regional Training Site (RTS) in the northern portion of the installation; munitions storage in the northeast portion of the installation; the aircraft parking ramp and aircraft maintenance facilities (e.g., hangar and aircraft related maintenance shops) in the eastern and central portion of the installation; civil engineering in the southern portion of the installation; and industrial and administrative uses on the western portion of the installation.

## 3.2.2.2 Visual

The land area occupied by the main cantonment area of the 188 FW lies on the northwest edge of the airport. Facilities on the installation can be characterized as institutional and industrial in nature, and are generally consistent with the remainder of the facilities on the airport. Buildings within the installation have been constructed over a period of almost 50 years, with the oldest having been constructed in 1955 and the most recent in 2005. Buildings have been constructed from a variety of materials including brick, cinder block, and metal, and are generally in muted

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colors (e.g., brick, tan, gray). Landscaping within the installation is sporadic, with plantings provided only at a few buildings and selected areas of the installation (ARANG 2003a).

To the east and south of the installation, the viewshed encompasses the air-side and land-side facilities of the airport (i.e., runways, the control tower, and other support facilities). There are no substantial natural landforms or man-made structures dominating the viewshed. Offsite views of the 188 FW installation cantonment area are provided by Phoenix Avenue. The most prominent visual feature of the installation is the 188 FW water tower, located near Phoenix Avenue. Views of the installation from Phoenix Avenue are generally limited to motor vehicle travelers, and by on and off installation landscaping. Limited views of the Fire Training Area are provided along Massard Road.

## 3.3 AIR QUALITY

This section discusses air quality considerations and conditions in the area around the 188 FW installation at Fort Smith Regional Airport, in Sebastian County, Arkansas. It addresses air quality standards and describes current air quality conditions in the region.

### 3.3.1 DEFINITION OF THE RESOURCE

**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 six “criteria” pollutants: O<sub>3</sub>, NO<sub>2</sub>, CO, SO<sub>2</sub>, particulate matter less than 10 microns in diameter (PM<sub>10</sub>), particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>), and Pb. The NAAQS are defined in terms of concentration (e.g., parts per million [ppm] or micrograms per cubic meter [µg/m<sup>3</sup>]) 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, areas are considered to be in maintenance status for a period of 10 or more years. Areas are designated as unclassifiable for a pollutant when there

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is insufficient ambient air quality data for the USEPA to form a basis for an attainment designation. For the purpose of applying air quality regulations, unclassifiable areas are treated similar to areas that are in attainment of the NAAQS.

**State Air Quality Standards.** Under the CAA, state and local agencies may establish ambient air quality standards and regulations of their own, provided these are at least as stringent as the federal requirements. The Arkansas Department of Environmental Quality (ADEQ) has adopted the NAAQS to regulate air quality in Arkansas and they have promulgated state standards for hydrogen sulfide (H<sub>2</sub>S). Table 3.3-1 summarizes the federal and state ambient air quality standards.

**State Implementation Plan.** The CAA of 1977 set provisions for the attainment and maintenance of the NAAQS. The CAA Amendments of 1990 established federal nonattainment classifications, emission control requirements, and compliance dates for nonattainment areas. The requirements and compliance dates are based on the severity of nonattainment classification. For nonattainment regions, individual states are required to establish 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 compliance with the NAAQS by specific deadlines.

**Prevention of Significant Deterioration.** Section 162 of the CAA further established the goal of prevention of significant deterioration (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 (non-mandatory) 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.

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**Table 3.3-1. Arkansas and Federal Ambient Air Quality Standards**

| <i>Air Pollutant</i>                    | <i>Averaging Time</i> | <i>Arkansas<br/>AAQS</i> | <i>FEDERAL (NAAQS)</i> |                       |
|-----------------------------------------|-----------------------|--------------------------|------------------------|-----------------------|
|                                         |                       |                          | <i>Primary</i>         | <i>Secondary</i>      |
| Carbon Monoxide (CO)                    | 8-hour                | 9 ppm                    | 9 ppm                  | ---                   |
|                                         | 1-hour                | 35 ppm                   | 35 ppm                 | ---                   |
| Nitrogen Dioxide (NO <sub>2</sub> )     | AAM                   | 0.053 ppm                | 0.053 ppm              | 0.053 ppm             |
| Sulfur Dioxide (SO <sub>2</sub> )       | AAM                   | 0.03 ppm                 | 0.03 ppm               | ---                   |
|                                         | 24-hour               | 0.14 ppm                 | 0.14 ppm               | ---                   |
|                                         | 3-hour                | 0.50 ppm                 | ---                    | 0.50 ppm              |
| Particulate Matter (PM <sub>10</sub> )  | 24-hr                 | 150 µg/m <sup>3</sup>    | 150 µg/m <sup>3</sup>  | 150 µg/m <sup>3</sup> |
| Particulate Matter (PM <sub>2.5</sub> ) | AAM                   | 15 µg/m <sup>3</sup>     | 15 µg/m <sup>3</sup>   | 15 µg/m <sup>3</sup>  |
|                                         | 24-hour               | 35 µg/m <sup>3</sup>     | 35 µg/m <sup>3</sup>   | 35 µg/m <sup>3</sup>  |
| Hydrogen sulfide (H <sub>2</sub> S)     | 8-hr (residential)    | 80 ppb                   | ---                    | ---                   |
|                                         | 8-hr (non-res.)       | 100 ppb                  | ---                    | ---                   |
|                                         | 5-min                 | 20 ppb                   | ---                    | ---                   |
| Ozone (O <sub>3</sub> )                 | 8-hour                | 0.08 ppm                 | 0.08 ppm               | ---                   |
| Lead (Pb) and Lead Compounds            | Calendar Quarter      | 1.5 µg/m <sup>3</sup>    | 1.5 µg/m <sup>3</sup>  | 1.5 µg/m <sup>3</sup> |

AAM = Annual Arithmetic Mean

ppm = parts per million; ppb = parts per billion; µg/m<sup>3</sup> = micrograms per cubic meter.

Sources: 40 Code of Federal Regulations 50; Arkansas Code, Title 8, Chapter 3.102; Arkansas Regulation 19, Chapter 3.

**Visibility.** CAA Section 169A 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.

**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:

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- (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 a 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 Sources Operating Permits.** Title V of the CAA Amendments of 1990 also requires states to issue Federal Operating Permits for major stationary sources. Under the Arkansas Air Pollution Control Code (Regulation #18) and the Arkansas Plan of Implementation of Air Pollution Control (Regulation #19), a major stationary source in an attainment or maintenance area is a source as defined in 40 CFR Part 70.2. The purpose of the permitting rule is to establish regulatory control over large, industrial activities and to monitor their impact upon air quality.

## 3.3.2 EXISTING CONDITIONS

**Climate.** Fort Smith is located on the Arkansas River at the state's western border with Oklahoma, between the Boston Mountains to the north and the Ouachita Mountains to the south. The climate in Sebastian County is described as subtropical humid continental, which is characterized by long, hot, and humid summers and mild winters. Factors influencing Arkansas weather patterns include moist air masses from the Gulf of Mexico and cool northern winds from the continental plains to the north.

Average temperatures in Fort Smith reach 80-85 degrees Fahrenheit (°F) in the summer with highs commonly reaching 90°F or higher. Daily high temperatures greater than 100°F occur approximately 10 days per year. Winters are generally mild with an average temperature of 40 to 45°F, highs in the high 40s and lows around freezing. Low temperatures of 10°F are not uncommon during arctic outbreaks in January. Typically, the first freeze occurs on October 30 and the last on April 3.

Precipitation is well distributed throughout the year, with average annual precipitation of 43.9 inches per year and an average of 97 days per year with some form of precipitation (approximately eight precipitation days per month). January is the driest month (2.4 inches) and

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May is the wettest (5.3 inches). Snow is rare, with an average amount of 6.2 inches per year. Prevailing winds typically come from the northeast at an average speed of 6 to 9 miles per hour (National Oceanic and Atmospheric Administration 2004; Talimena Scenic Drive Association 2003; Wildernet 2004; City-Data 2004).

**Regional Air Quality.** Sebastian County, according to 40 CFR 81.63, is part of the Metropolitan Fort Smith Interstate Air Quality Control Region (AQCR), which includes counties in Oklahoma and Arkansas. A review of federally published attainment status for Arkansas in 40 CFR 81.304 indicated that this region is designated as attainment (i.e., meeting national standards) for all criteria pollutants, and therefore conformity requirements are not applicable and will not be addressed.

Mandatory PSD Class I areas established under the CAA Amendments of 1977 for the states of Arkansas and Oklahoma are listed in 40 CFR 81.404 and 81.424, respectively. These are areas where visibility has been determined to be an important issue by the Administrator, in consultation with the Secretary of the Interior. According to the USEPA, sulfates and nitrates from utility and industrial boilers are the main pollutants of concern in Arkansas forests (USEPA 2002). The nearest mandatory PSD Class I areas to the project area are:

- Caney Creek Wilderness, located in Polk County, Arkansas. This 14,460-acre area is managed by the United States Forest Service (USFS) and is located in the Ouachita National Forest, approximately 108 kilometers (67 miles) south-southeast of Fort Smith.
- Upper Buffalo Wilderness, located in Newton County, Arkansas. This 12,018-acre area is managed by the USFS and is located in the St. Francis National Forest, approximately 192 kilometers (119 miles) east-northeast of Fort Smith.
- Hercules-Glade Wilderness, located in Taney County, Missouri. This 12,315-acre area is managed by the USFS and is located in the Mark Twain National Forest, approximately 199 kilometers (123 miles) northeast of Fort Smith.

**Current Air Emissions.** Air emissions at the 188 FW installation are from mobile and stationary sources. The mobile sources include aircraft operations, ground support equipment, and motor vehicles. Stationary sources include external combustion, fuel storage and dispensing operations, internal combustion engines, engine test cell, chemical usage, painting, degreasers, woodworking, abrasive blasting, and fuel cell maintenance. Table 3.3-2 summarizes the emissions that occurred from stationary and mobile sources at the 188 FW during calendar year 2002 (ARANG 2004a). Although Pb is also a criteria pollutant, it is rarely quantified in emission inventories, as it was mostly eliminated in fuels during the 1970s and in paint products over a decade ago. Emissions of Pb at the 188 FW installation at Fort Smith amounted to 35.1

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pounds per year and are not shown in Table 3.5-2. Most of the lead emissions occurred from painting operations (ARANG 2004a).

**Table 3.5-2. Baseline Emissions Estimates for the 188 FW, Fort Smith Regional Airport, for Calendar Year 2002**

|                    | <i>ANNUAL EMISSIONS (TONS PER YEAR)</i> |              |                       |                       |                        |
|--------------------|-----------------------------------------|--------------|-----------------------|-----------------------|------------------------|
|                    | <i>VOC</i>                              | <i>CO</i>    | <i>NO<sub>x</sub></i> | <i>SO<sub>2</sub></i> | <i>PM<sub>10</sub></i> |
| Stationary Sources | 3.30                                    | 12.49        | 3.66                  | 0.20                  | 0.43                   |
| Mobile Sources     | 11.28                                   | 48.14        | 38.83                 | 3.07                  | 5.04                   |
| <b>Total</b>       | <b>14.58</b>                            | <b>60.63</b> | <b>42.49</b>          | <b>3.27</b>           | <b>5.47</b>            |

Source: ARANG 2004a.

## 3.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

### 3.4.1 DEFINITION OF THE RESOURCE

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Economic activity typically encompasses employment, personal income and industrial growth. Impacts on these fundamental socioeconomic components can influence other issues such as housing availability, utility capabilities and fire and police protection.

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

Because children may suffer disproportionately from environmental health risks and safety risks, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was introduced in 1997 to prioritize the identification and assessment of environmental health risks and safety risks that may affect children, and to ensure that federal 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, childcare centers, etc.).

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## 3.4.2 EXISTING CONDITIONS

### 3.4.2.1 Population and Employment

The 188 FW installation occupies approximately 141 acres of leased land at Fort Smith Regional Airport. The airport is located in the City of Fort Smith, in Sebastian County, Arkansas. The main cantonment area lies on the northwest side of the airport, which is situated about four miles southeast of the Fort Smith Central Business District (ARANG 2003b). The original facilities were developed in the mid 1950s. Since then the airfield has supported primarily fighter aircraft and has undergone substantial changes, alterations, and construction of facilities to support their mission over the years. These facilities will be updated and maintained as necessary by the ARANG in future short- and long-range plans to support their continuing mission.

Sebastian County, the ROI for this analysis, is the fourth most populous county in Arkansas, with a 2000 population of 115,071 persons, an increase of approximately 15.5 percent from 1990 (U.S. Census Bureau 2000). According to the 2000 Census, there were 45,300 households in the ROI with an average household size of 2.49 persons. There were 49,311 housing units, with a vacancy rate of 8.1 percent (U.S. Census Bureau 2000). The City of Fort Smith, with a 2000 population of 80,268 persons, accounts for approximately 70 percent of the county population.

The civilian labor force in the ROI amounted to 55,627 persons in 2000, with a total employment figure of 53,010 workers (U.S. Census Bureau 2000). The unemployment rate was 3.0 percent in 2000, compared to 3.7 percent and 5.3 percent in Arkansas and the U.S., respectively. In 2000, Sebastian County had a per capita personal income of \$18,424, compared to the state and national averages of \$16,904 and \$21,587, respectively (U.S. Census Bureau 2000).

The manufacturing industry was the largest employer in the county in 2000, accounting for 25.9 percent of the workforce (U.S. Census Bureau 2000). Education, health, and social services accounted for 19.4 percent, followed by retail trade with 11.4 percent of the workforce. The construction industry contributes 3,058 jobs, or 5.8 percent of total county employment.

Armed Forces employment represented 0.3 percent of county employment in 2000, accounting for 298 workers (U.S. Census Bureau 2000). The day-to-day work force at the 188 FW totals 335 personnel (ARANG 2003b). The workforce includes 217 Technicians, 64 Active Guard Reserves, and 54 state employees. There are a total of 991 traditional guardsmen (ARANG 2003b).

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## 3.4.2.2 Environmental Justice

Disadvantaged groups within the ROI, including low-income and minority communities, are specifically considered in order to assess the potential for disproportionate occurrence of impacts. For the purposes of this analysis, disadvantaged groups are defined as follows:

- *Minority Population:* Persons of Hispanic origin of any race, Blacks, American Indians, Eskimos, Aleuts, Asians, or Pacific Islanders.
- *Low-Income Population:* Persons living below the poverty level, according to income data collected in the 2000 Census.
- *Youth Population:* Children under the age of 18 years.

Based on 2000 Census data, the incidence of persons and families in the ROI with incomes below the poverty level was comparable to national levels and somewhat lower than state levels (U.S. Census Bureau 2000). In the ROI during 2000, 13.6 percent of persons were living below the poverty level, compared to 15.8 percent of persons in the state and 12.4 percent of persons in the nation.

Minority persons represent 18 percent of the ROI population. Hispanic or Latino persons account for most of the minority population in the ROI, representing 6.7 percent of the ROI population and 77.2 percent of the minority population. By comparison, minority persons represent 20.4 percent of the state population, with Blacks or African Americans accounting for 77.0 percent of the state minority population and Hispanic or Latino persons accounting for 15.9 percent of the state population. The youth population, which comprises children under the age of 18, accounts for 26.0 percent of the ROI population, compared to 25.4 percent at the state level.

Six public school districts encompass the Sebastian County area. These districts include 25 elementary, six middle and eight high schools (four of which are combined middle/high schools) (U.S. Census Bureau 2000). The 188 FW installation has no on-base housing and no facilities for children. There are no known facilities on the installation where children may be encountered on a regular basis.

## 3.5 SAFETY

### 3.5.1 DEFINITION OF THE RESOURCE

This section addresses ground, explosive, and flight safety associated with activities conducted by the 188 FW, located at Fort Smith Regional Airport, Fort Smith, Arkansas. Ground safety considers issues associated with human activities, and operations and maintenance activities that

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support unit operations. A specific aspect of ground safety addresses AT/FP considerations. Explosive safety discusses the management and use of ordnance or munitions associated with installation operations and training activities. Flight safety considers aircraft flight risks such as aircraft accidents and Bird-Aircraft Strike Hazards (BASH).

The ROI for safety is Fort Smith Regional Airport and the lands immediately adjacent to the airport.

## 3.5.2 EXISTING CONDITIONS

### 3.5.2.1 Ground Safety

Day-to-day operations and maintenance activities conducted by the 188 FW are performed in accordance with applicable USAF safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements.

The 188 FW has initial crash response responsibility on the airport, and shares overall response with the Fort Smith City fire department (personal communication, Howard 2006). The airfield itself is a joint-use facility, used by the 188 FW (ARANG) and the City of Fort Smith.

All 188 FW facilities have, or are programmed to have, all required fire suppression (e.g., automatic sprinklers) infrastructure in place, and hangars are equipped with automatic fire suppression capability. There are no equipment shortfalls or waivers in effect (personal communication, Howard 2006).

The DoD stipulates certain safety restrictions on land uses in the immediate vicinity of aviation operations around military airfields. At Fort Smith Regional Airport, all Clear Zones, Object Free Zones, and transitional surfaces bounding aircraft flight meet all requirements (personal communication, Howard 2006).

### 3.5.2.2 Anti-Terrorism/Force Protection

As a result of terrorist activities, the DoD and the USAF 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 (Unified Facilities Criteria [UFC] 4 010 01 2003; USAF nd). 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 the 188 FW facilities, were developed before such considerations became a critical concern. Thus, under current conditions, many units are not able to comply with all present AT/FP standards. However, as new construction occurs, it would

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incorporate these standards, and as facilities are modified, AT/FP standards would be incorporated to the maximum extent practicable.

## 3.5.2.3 Explosives Safety

Ordnance is handled and stored in accordance with USAF explosive safety directives (AFI 91-201), and all munitions maintenance is carried out by trained, qualified personnel using USAF-approved technical procedures. All ordnance required by the 188 FW for its day-to-day mission is stored on the installation. All storage facilities are fully licensed for the ordnance stored, and no safety waivers are in effect (personal communication, Howard 2006).

When an aircraft is configured for a mission, the ordnance mounted on the aircraft is in a “safe” configuration. Just prior to takeoff, the physical safeguards on the ordnance must be removed, and after landing, if ordnance is still present, these safeguards must be reinstalled. This process is termed “arming/de-arming.” At the Fort Smith Regional Airport, the Arm/De-Arm pad is located on the “hammer-head” at the end of the main runway. Although the Arm/De-Arm pad does not have required safety offsets, an earth berm provides adequate protection. Arming/De-Arming creates no safety issues (personal communication, Howard 2006).

If necessary, explosive ordnance disposal (EOD) technicians are available at Little Rock Air Force Base (AFB), and would support 188 FW requirements.

## 3.5.2.4 Flight Safety

The primary public concern with regard to flight safety is the potential for aircraft accidents. Such mishaps may occur as a result of mid-air collisions, collisions with manmade structures or terrain, weather-related accidents, mechanical failure, pilot error, or bird-aircraft collisions. Flight risks apply to all aircraft; they are not limited to the military. Flight safety considerations addressed include aircraft mishaps and bird-aircraft strikes.

### *Aircraft Mishaps*

The USAF defines four major categories of aircraft mishaps: Classes A, B, C, and E, which includes High Accident Potential (HAP). Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of \$1 million, or destruction of an aircraft. Class B mishaps result in total costs of more than \$200,000, but less than \$1 million, result in permanent partial disability or inpatient hospitalization of three or more personnel. Class C mishaps involve reportable damage of more than \$20,000, but less than \$200,000; an injury resulting in any loss of time from work beyond the day or shift on which it occurred, or occupational illness that causes loss of time from work at any time; or an occupational injury or illness resulting in permanent change of job. HAP events are any hazardous occurrence that has a high potential for

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becoming a mishap. Class C mishaps and HAP, the most common types of accidents, represent relatively unimportant incidents because they generally involve minor damage and injuries, and rarely affect property or the public (USAF 2004). This EA will focus on Class A mishaps because of their potentially catastrophic results.

It is impossible to predict the precise location of an aircraft accident, should one occur. Major considerations in any accident are loss of life and damage to property. The aircrew's ability to exit from a malfunctioning aircraft is dependent on the type of malfunction encountered. The probability of an aircraft crashing into a populated area is extremely low, however it can not be totally discounted. Several factors are relevant: the ROI and immediate surrounding areas have relatively low population densities; pilots of aircraft are instructed to avoid direct overflight of population centers at very low altitudes; and, finally, the limited amount of time the aircraft is over any specific geographic area limits the probability that impact of a disabled aircraft in a populated area would occur.

Secondary effects of an aircraft crash include the potential for fire and environmental contamination. Again, because the extent of these secondary effects is situationally dependent, they are difficult to quantify. The terrain overflown in the ROI is diverse. For example, should a mishap occur, highly vegetated areas during a hot, dry summer would have a higher risk of experiencing extensive fires than would more barren and rocky areas during the winter. When an aircraft crashes, it may release hydrocarbons. Those POLs not consumed in a fire could contaminate soil and water. The potential for contamination is dependent on several factors. The porosity of the surface soils will determine how rapidly contaminants are absorbed. The specific geologic structure in the region will determine the extent and direction of the contamination plume. The locations and characteristics of surface and groundwater in the area will also affect the extent of contamination to those resources.

F-16 aircraft carry a small quantity of hydrazine in a sealed canister that is designed to withstand crash impact damage. Hydrazine is a highly volatile propellant that contains toxic elements. It is carried on the F-16 as part of the emergency power unit. When used for this purpose, hydrazine is completely consumed, and poses no safety hazard. In any crash that is severe enough to rupture the canister, it is most likely that fire will also be involved. In this case, the hydrazine will also burn and be completely decomposed. In the unlikely event that the hydrazine should be released, but not consumed by fire, impacts on soils and groundwater are likely to be of minor consequence. Hydrazine absorbs water at room temperature. It is incombustible in solution with water at concentrations of 40 percent or less, and it evaporates at any given temperature at a rate slightly slower than water. Movement of hydrazine through natural soils has been shown to be slow and limited. Due to its absorption and natural decomposition processes, the probability of released hydrazine significantly contaminating groundwater is considered extremely low.

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However, if quantities of hydrazine were to reach a surface water body, aquatic life in those areas experiencing high concentrations could be significantly impacted.

The 188 FW maintains and operates an emergency power unit-servicing facility on its installation. No safety issues are associated with this operation (personal communication, Howard 2006).

Based on historical data on mishaps at all installations, and under all conditions of flight, the military services calculate Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory. It should be noted that these mishap rates do not consider combat losses due to enemy action.

The 188 FW operates F-16C aircraft. Since entering the USAF inventory, F-16C aircraft have flown more than 3,336,700 hours since Fiscal Year 1985. Over that period, 120 Class A mishaps have occurred and 113 aircraft have been destroyed. This results in a Class A mishap rate of 3.60 per 100,000 flight-hours, and an aircraft destroyed rate of 3.39 (Air Force Safety Center 2004).

It is estimated that the 188 FW flies approximately 2,850 hours annually. Based on a Class A mishap rate of 3.60 per 100,000 flying hours, a Class A mishap would be statistically predicted to occur once every 9.75 years. To place this into context, based on the number of sorties flown by the 188 FW, this equates to the probability of a Class A Mishap of 0.00004, or one chance in more than 25,000. It should also be noted that these rates are only statistically predictive. The causes of mishaps are due to many factors, not simply the amount of flying time of the aircraft.

While flying the F-16 aircraft over the last 15 years, the 188 FW has experienced four Class A Mishaps (personal communication, Anderson 2006).

## *Bird-Aircraft Strike Hazards*

Bird-aircraft strikes constitute a safety concern because of the potential for damage to aircraft or injury to aircrews or local populations if an aircraft crash should occur in a populated area. Aircraft may encounter birds at altitudes of 30,000 feet above mean sea level (MSL) or higher. However, most birds fly close to the ground. Over 94 percent of reported bird strikes occur below 3,000 feet above ground level (AGL). Approximately 50 percent of bird strikes happen in the airport environment, and almost 15 percent occur during low-altitude flight training and use of weapons ranges (USAF BASH Team 2005).

Migratory waterfowl (e.g., ducks, geese, and swans) are the most hazardous birds to low-flying aircraft because of their size and their propensity for migrating in large flocks at a variety of elevations and times of day. Waterfowl vary considerably in size, from one to two pounds for

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ducks, five to eight pounds for geese, and up to 20 pounds for most swans. There are two normal migratory seasons, fall and spring. Waterfowl are usually only a hazard during migratory seasons. These birds typically migrate at night and generally fly between 1,500 to 3,000 feet AGL during the fall migration and from 1,000 to 3,000 feet AGL during the spring migration.

Along with waterfowl, raptors, shorebirds, gulls, herons, and songbirds also pose a hazard. In considering severity, the results of bird-aircraft strikes in restricted areas show that strikes involving raptors result in the majority of Class A and Class B mishaps related to bird-aircraft strikes. Raptors of greatest concern are vultures and red-tailed hawks. Peak migration periods for raptors, especially Eagles, are from October to mid-December and from mid-January to the beginning of March. In general, flights above 1,500 feet AGL would be above most migrating and wintering raptors.

Songbirds are small birds, usually less than one pound. During nocturnal migration periods, they navigate along major rivers, typically between 500 to 3,000 feet AGL.

The potential for bird-aircraft strikes is greatest in areas used as migration corridors (flyways) or where birds congregate for foraging or resting (e.g., open water bodies, rivers, and wetlands).

While any bird-aircraft strike has the potential to be serious, many result in little or no damage to the aircraft, and only a minute portion result in a Class A mishap. During the years 1985 to 2004, the USAF BASH Team documented 62,536 bird strikes. Of these, 25 resulted in Class A mishaps where the aircraft was destroyed. These occurrences constituted approximately 0.04 percent of all reported bird-aircraft strikes (USAF BASH Team 2005).

A severe BASH potential exists at Fort Smith Regional Airport due to its proximity to the Arkansas River and surrounding habitat. The river is a major attractant for both resident and migratory bird species.

Fort Smith Regional Airport is located approximately three miles southwest of the Arkansas River, a major pathway for migratory waterfowl and other potentially hazardous bird species. Airport staff have identified a number of bird and other wildlife species in the general vicinity of the airfield. In January 1998, the U.S. Department of Agriculture (USDA) Animal Plant Health Inspection Service (APHIS), Animal Damage Control (ADC) provided an on-site assessment of the airport and provided recommendations for reducing bird strike hazards. Biologists conducted a three-day assessment of bird and wildlife hazards at the airport. There has been no formal, long-term bird/wildlife hazard assessment at Fort Smith Regional Airport. With no seasonal survey data or extensive daily surveys, it is impossible to identify detailed bird movement patterns on the airport and in the general vicinity (188 FW 2002).

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The Arkansas River is an important migratory path for waterfowl (ducks and geese) as well as other potentially hazardous species such as American White Pelicans and Sandhill Cranes. Waterfowl typically migrate at night with movements concentrated at dawn and dusk. Other species such as pelicans are soaring birds and require thermal development to assist in movements. During fall (late October through December) and spring (March through early May), large flocks of birds will pass in the near vicinity of the airport. During these periods of time aircrew observations are important in identifying periods of severe bird activity. A municipal solid waste landfill is located within five miles southeast of the airport. Aircraft traffic patterns do not typically over fly the landfill and no substantial bird activity at the airport was identified with this facility (188 FW 2002).

The Fort Smith Regional Airport authority has identified habitat on the installation that attracts birds and other specific areas of wildlife concern at the airport. The largest bird attraction is the forested area on the northeast quadrant (east and west of 74<sup>th</sup> street) of the airport. This area has become a communal roosting area for blackbirds (Starlings, Grackles, and Blackbirds). USDA biologists estimate the roost at approximately 1 million birds. Additionally, the thick understory associated with this heavily fertilized ecosystem provides excellent cover for deer and other small mammals. A small pond located in an apartment complex northeast of the ANG installation provides habitat for a small flock of Canada Geese (approximately 12 birds). A larger pond on airport property located approximately 1,000 feet east of Runway 7/25 also supports a small population of breeding Canada Geese (188 FW 2002).

The Fort Smith Regional Airport provides habitat and terrain control to discourage nesting and gathering of birds. However, regarding the 188 FW, all other control processes and procedures are managed by the USDA, APHIS–Wildlife Services (APHIS-WS). During periods of high bird concentrations, flying activities are reduced, or totally curtailed, until the risk is reduced (188 FW 2002).

Data maintained by the 188 FW indicate that since 2002, the unit's aircraft have experienced 65 bird strikes (personal communication, Francis 2006)

## 3.6 SOLID AND HAZARDOUS MATERIALS AND WASTE

### 3.6.1 DEFINITION OF THE RESOURCE

This section describes the affected environment associated with hazardous materials and petroleum products, hazardous and petroleum wastes, environmental restoration program (ERP) sites, and solid waste at the construction and demolition areas.

The terms “hazardous materials” and “hazardous waste” refer to substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

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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. Petroleum products include petroleum-based fuels, oils, and their wastes. The ERP is a USAF program to identify, characterize, and remediate environmental contamination from past activities at USAF installations.

Issues associated with hazardous materials and waste typically center around waste streams, underground storage tanks (USTs), aboveground storage tanks (ASTs), and the storage, transport, use, and disposal of pesticides, fuels, lubricants, and other industrial substances. When such materials are improperly used in any way, they can threaten the health and well being of wildlife species, habitats, and soil and water systems, as well as humans. This section also considers solid waste.

The management of hazardous materials and hazardous waste is governed by specific environmental statutes. The key regulatory requirements include:

*Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 (42 USC 9601–9675)* as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. CERCLA/SARA regulates the prevention, control, and compensation of environmental pollution.

*Community Environmental Response Facilitation Act of 1992 (CERFA) (42 USC 9620)*. This act amended CERCLA to require that, prior to termination of federal activities on any real property owned by the federal government, agencies must identify real property where hazardous substances were stored, released, or disposed of.

*Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 (42 USC 11001–11050)*. EPCRA requires emergency planning for areas where hazardous materials are manufactured, handled, or stored and provides citizens and local governments with information regarding potential hazards to their community.

*Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901–6992)*. RCRA established standards and procedures for handling, storage, treatment, and disposal of hazardous waste, and for handling ASTs.

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*Federal Facility Compliance Act (FFCA) of 1992 (Public Law [P.L.] 102-426).* This act provides for a waiver of sovereign immunity on the part of federal agencies with respect to federal, state, and local requirements relating to RCRA solid and hazardous waste laws and regulations.

*Pollution Prevention Act of 1990 (42 USC 13101–13109).* This act encourages minimization of pollutants and waste through changes in production processes.

*USEPA Regulation on Identification and Listing of Hazardous Waste (40 CFR Part 261).* This regulation identifies solid wastes subject to regulation as hazardous and to notification requirements under RCRA.

*USEPA Regulation on Standards for the Management of Used Oil (40 CFR Part 279).* This regulation delineates requirements for storage, processing, transport, and disposal of oil that has been contaminated by physical or chemical impurities during use.

*USEPA Regulation on Designation, Reportable Quantities, and Notification (40 CFR Part 302).* This regulation identifies reportable quantities of substances listed in CERCLA and sets forth notification requirements for releases of those substances. It also identifies reportable quantities for hazardous substances designated in the CWA.

The ROI for hazardous materials, hazardous waste, and petroleum products encompasses areas that could be exposed to an accidental release of hazardous substances from the construction or demolition activities. Therefore, the ROI for this section is defined as the 141-acre installation property.

## 3.6.2 EXISTING CONDITIONS

This section describes the existing management of hazardous materials and petroleum products, hazardous and petroleum wastes, ERP sites, and solid wastes within the ROI.

### 3.6.2.1 Hazardous Materials and Petroleum Products

Hazardous materials and petroleum products are used throughout the installation for various functions, including POL operations, jet engine repair, avionics, and vehicle maintenance. These activities require the use of fuels (gasoline, diesel, and jet), oils, lubricants, cleaners, paints, sealants, and solvents. A Hazardous Materials Pharmacy (Building 119) is in operation to store hazardous materials used throughout the installation.

The 188 FW has an Oil and Hazardous Materials Spill Prevention and Response Plan that details responsibilities, actions, and responses to spills of hazardous materials should they occur (ARANG 2000a). The plan complies with DoD and federal regulations.

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Storage tanks have been used historically at the installation to store aviation fuel (JP-8), diesel, oil, and gasoline. There are ten ASTs currently in use at the installation. In addition, there are five oil/water separators in use at the installation.

A variety of herbicides, insecticides, and rodenticides are applied on the installation property by contractors. No pesticides are stored (with the exception of pre-mixed herbicides such as Roundup) or mixed on the installation.

## 3.6.2.2 Hazardous and Petroleum Wastes

Hazardous and petroleum wastes are generated throughout the installation during various day-to-day operations, including aircraft and vehicle maintenance and POL management and distribution. These hazardous and petroleum wastes include waste oils, recovered fuels, spent cleaners, strippers, acids, and solvents.

Where a waste is initially created or generated is known as a hazardous waste generation point. After generation, the hazardous waste must be transferred immediately to an initial (satellite) accumulation point (SAP) or an accumulation site. Waste cannot be accumulated or stored at the generation point unless the area has been designated as an approved accumulation area.

The 188 FW is regulated as a small quantity generator (SQG) of hazardous waste and maintains USEPA Identification Number AR1572825932. Hazardous waste generated at the installation is managed in accordance with the installation Hazardous Waste Management Plan (HWMP). There are currently 31 hazardous waste generation points and 22 SAPs on the 188 FW installation (ARANG 2004b).

## 3.6.2.3 Environmental Restoration Program Sites

The ERP established a process to evaluate past disposal sites, control the migration of contaminants, assess potential hazards to human health and the environment, and conduct environmental restoration activities. The ERP is conducted in accordance with Section 211 of SARA and the Defense ERP. The USAF coordinates ERP activities with the USEPA and the State of Arkansas.

There are currently no ERP sites located on the 188 FW installation. According to the *Environmental Baseline Survey for Proposed Property Transactions at the 188<sup>th</sup> Fighter Wing* (ARANG 2003a), most of the property within the installation is classified as Category 1, *No Release or Disposal Occurred*. (Seven categories in accordance with AFI 32-7066 have been developed based on the presence of hazardous substances or petroleum products or their derivatives.) The only exception is the former fire-training site that is currently beneath Buildings 226 and 227. This site is classified as Category 3, *Contamination Below Action*

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*Levels*, based on the results of a 1988 ERP investigation. However, it was concluded that the former fire training site does not pose any risk to human health or the environment, and this is considered a low-priority remediation site. Additionally, piping associated with a former 2,000 gallon gasoline AST is located beneath the Old Rental Car Facilities. Although there is the potential for unknown leaked gasoline below ground surface at this site, because this facility was constructed in 1990 and no evidence of contamination has been identified, the potential for contamination is considered low (ARANG 2003a).

## 3.6.2.4 Solid Waste

Municipal solid waste management and compliance at USAF 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 the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record-keeping and reporting; and pollution prevention. Source reduction, resource recovery, and recycling of solid waste are addressed in AFI 32-7080, *Pollution Prevention Program*.

The City of Fort Smith collects municipal solid (non-hazardous) waste generated at the installation. Picks ups occur once a week on Mondays and on Fridays prior to UTA weekends which occur once per month. The installation schedules large-roll-off dumpsters as needed.

The City owned and operated sanitary landfill has an expected operational life through the year 2070 and a disposal capacity of over 70,000,000 cubic yards (City of Fort Smith 2004).

## 3.7 INFRASTRUCTURE

### 3.7.1 DEFINITION OF THE RESOURCE

Infrastructure refers to the system of public works, such as transportation and utilities that provide the underlying framework for a community. Transportation and circulation refer to roadway and street systems, the movement of vehicles, pedestrian and bicycle traffic, and mass transit. Utilities include such amenities as water and power supply and waste management.

The infrastructure elements at the 188 FW installation at Fort Smith Regional Airport include both transportation and utility systems. The ROI for this resource primarily consists of the installation, with additional information presented for the surrounding metropolitan area where relevant.

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## 3.7.2 EXISTING CONDITIONS

### 3.7.2.1 Transportation

The 188 FW installation is located approximately 4 miles southeast of the Fort Smith central business district and within two miles of several major highways. One mile north of the installation, State Highway 22, also known as Rogers Avenue, runs in a northwest-southeast direction. About one mile south of the installation, State Highway 255, also known as Zero Street within the city limits, parallels the southern boundary of the airport and runs in an east-west direction. Immediately to the east, U.S. Interstate 540, a north-south road, passes within a half mile of the installation. The Union Pacific Railroad runs in an east-west direction immediately south of the airport property.

Rogers Avenue is the principal access route to the airport and the installation from Fort Smith's central business district. Rogers Avenue is a four-lane, principal arterial road. Several changes to the circulation system at the 188 FW installation have been completed recently in accordance with the installation Master Plan. The installation main gate is accessed from Airport Boulevard off of Phoenix Avenue, which generally runs east-west on the west side of the installation. Phoenix Avenue, which intersects U.S. Interstate 540 and State Highway 22, links the 188 FW installation to the regional ground transportation system from the west. U.S. Interstate 540, the primary north-south, four-lane highway in western Arkansas, provides access from other portions of Sebastian County.

Vehicles access Airport Boulevard, the road that provides access to the installation from the main entrance, from Phoenix Avenue. Falcon Way is a two-lane road that parallels the main drainage ditch in the northern portion of the installation. Falcon Way provides access to the Munitions Compound, Base Operations (Building 220), and the Regional Training Site (RTS) (ARANG 2003a). Super Sabre Street is a two-lane road that runs north-south and provides access between Voodoo Road and Falcon Way (ARANG 2003a).

Privately-owned vehicle (POV) parking is dispersed throughout the installation, with small parking lots provided adjacent to several buildings. Throughout the installation pedestrian walkways and bikeways are located randomly or do not exist at all, forcing pedestrians and bicyclers to proceed in roadways or through parking lots in a haphazard manner (ARANG 2003b).

### 3.7.2.2 Utilities

The following discussion summarizes the major utility systems.

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**Sanitary Sewer.** The sanitary sewer system at the installation is comprised of a gravity collection and transportation system, with 4-, 6-, and 8-inch service lines and 16- and 18-inch collector lines and mains. Newer buildings may have polyvinyl chloride (PVC) pipes. The system is considered to be in good operating condition, although service and maintenance problems do occur due to the age of the system (personal communication, Withers 2006).

**Water.** The primary water supply is provided by the City of Fort Smith via a 16-inch main that enters the installation from the west. Water is transported throughout the installation via a combination of concrete asbestos and PVC lines, with several small loops for redundancy. However, the supply main located in the northwest portion of the installation is not looped. The installation water distribution system is approximately 50 years old and is in need of upgrading. Several sections have previously been repaired, and require constant efforts to prevent overpressure of the distribution piping, which has inadequate capacity to handle the volume of water supplied by the City water supply. This leads to frequent breaks in the installation's distribution piping, causing many areas of the installation to be without water. If these deficiencies are not rectified, the installation could be without a water supply for its fire suppression system, potentially resulting in the loss of facilities, aircraft, and personnel if a fire were to occur. The secondary source of water at the installation is a water tower located on the installation, which has a capacity of 250,000 gallons. If the City water main were to sustain a major break, the water tower would be required to supply the entire installation until the main could be repaired (personal communication, Withers 2006).

**Storm Drainage.** The storm drainage system includes a network of surface inlets and underground pipes as well as open ditches. The southern half of the installation is drained to Massard Creek to the south via 8- to 36-inch diameter pipes. On the north half of the installation, storm water drains into a large drainage swale via storm drains. Excess water collected in the swale drains to an open drainage ditch that parallels Dike Road on the east side of the installation via a spillway. A concrete drainage ditch runs along the aircraft parking apron and drains to the east. The 188 FW storm drainage system is considered inadequate as localized flooding, ponding, and overflowing of existing drainage systems occur in some areas of the installation (personal communication, Withers 2006).

**Natural Gas.** The natural gas system is privately owned and operated by the Arkansas Oklahoma Gas Company. Natural gas is provided to the installation via an 8-inch gas main and is distributed by two 4-inch gas mains, with one going to the east and the other to the west. The gas main that serves the east side of the installation continues to the south and connects with another 8-inch main located south of the installation. Facilities at the installation use natural gas as the primary heating fuel, although some retain aboveground storage tanks (with fuel oil) for backup or supplemental heat. The natural gas system at the installation lacks necessary

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redundancy and zoning in the event that the system suffered a failure (personal communication, Withers 2006).

**Electricity.** Oklahoma Gas and Electric Company provides electricity to the ARANG installation via an above ground 12,470-volt primary. The primary supplies power to several onsite transformers, and is then distributed through a system of above ground primary and secondary lines. An underground primary was recently installed for the RTS facilities in the northwest corner of the installation. Because most electrical distribution lines serving the installation are overhead, this leads to problems with birds roosting around the installation, potentially resulting in a bird-aircraft strike incident (personal communication, Withers 2006).

## 3.8 EARTH RESOURCES

### 3.8.1 DEFINITION OF THE RESOURCE

Earth resources include soils, geology, 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. These resources may have scientific, historical, economic, and recreational value.

The ROI for earth resources in this EA includes the existing 188 FW leaseholds, situated generally on the northwestern and southeastern portions of the Fort Smith Regional Airport (Figure 1.1-1). The geologic description for the project site is general to the entire airport and 188 FW installation, while the soils and topographic discussions are site specific.

### 3.8.2 EXISTING CONDITIONS

#### 3.8.2.1 Geology

Fort Smith is located in the northwestern portion of Sebastian County, Arkansas, which is located in the west-central portion of Arkansas. Sebastian County is adjacent to the Oklahoma State line to the west and is bounded to the north by the Arkansas River, which forms the Arkansas Valley. The Arkansas Valley consists of rolling, flat-topped hills, long narrow ridges, and broad valleys. The hilltops and ridges are capped by hard sandstone. The hillsides and valleys are primarily underlain by shale (Natural Resources Conservation Service [NRCS] 1975). Linker and Mountainburg are the main soils on the hilltops in the region. The main soils on the ridges are Enders and Mountainburg, while Leadville, Taft, and Wrightsville are the main soils

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in the broad valleys within the Arkansas Valley. Soils are discussed in further detail in section 3.8.2.2, below.

A large part of the region is gently sloping valley fill and alluvial sediments ranging from young flood plains along the Arkansas River to old stream terraces in the broad valleys between hills (NRCS 1975). Beneath the alluvium lies the bedrock of the McAlester Formation. This formation is composed of shale with smaller amounts of siltstone, sandstone, and some local thin coal seams. The McAlester Formation ranges in thickness from 500 to 2,300 feet. Regionally, the Pennsylvanian-age strata area slopes to the south-southeast, except where local structures modify the existing relief (ARANG 2003b). The 188 FW installation lies within a tectonically inactive region of Arkansas. An inactive normal fault has been mapped running southwest to northeast across the northwest quarter of Sebastian County (ARANG 1999a).

## 3.8.2.2 Soils

Naturally occurring soil types underlying the 188 FW installation are typical of those found in the southern portions of the Fort Smith region. The predominant soil association at the installation is the Wrightsville general soil association (ARANG 2003b). A soil association is a landscape that has a distinctive proportional pattern of different, adjacent soils. This soil association consists of poorly drained, dominantly level, deep, loamy soils found on old stream terraces in broad valleys. 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 (NRCS 1975). The 188 FW installation has five distinct soil mapping units, which are described in more detail in the following paragraphs.

*Wrightsville complex*, 0-2 percent slopes. The Wrightsville complex, which comprises a majority of the 188 FW installation, is typically found on old stream terraces in broad valleys. A soil complex consists of areas of two or more soils so intrinsically mixed that they cannot be considered separate from each other. This specific complex is typically comprised of 65 to 80 percent Wrightsville soils and 10 to 25 percent soils that are similar to Wrightsville soils, except that they have a higher sodium content in the lower part of the subsoil. The remaining areas are small pockets of Messer, Taft, Leadvale, and Wing soils. The surface of the Wrightsville complex is characterized as dark, grayish brown silt loam while the subsurface is described as light brownish-gray, mottled silt loam. Due to their high silt content, these soils have a high shrink-swell potential. Runoff is slow and excess water is a severe limitation (NRCS 1975).

*Wrightsville-Messer complex*, 0-3 percent slopes. The soils in this complex are on old stream terraces in broad valleys. The complex is 55 to 70 percent level Wrightsville soils, in areas between low mounds, and 20 to 35 percent Messer soils on rounded mounds that are 2 to 3 feet higher than the Wrightsville soils and are 60 to 80 feet in diameter. The rest of the complex is

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spots of Leadvale, Taft, and Wing soils. Excess water is a severe limitation in the Wrightsville soils (NRCS 1975).

*Leadvale silt loam*, 3-8 percent slopes. This soil is on old stream terraces in broad valleys. The Leadville series consists of moderately well drained, nearly level and gently sloping soils on colluvial foot slopes and terraces. These soils formed in loamy sediment washed from uplands of weathered sandstone and shale. Erosion is considered a moderate hazard (NRCS 1975).

*Linker fine sandy loam*, 3-8 percent slopes. This soil is on hilltops, hillsides, and benches. The Linker series consists of well-drained, gently sloping soils. These soils formed in loamy material weathered from sandstone. Linker soils are low in natural fertility and permeability and water capacity are moderate (NRCS 1975).

*Taft silt loam*, 0-1 percent slopes. The Taft silt loam is also found on old stream terraces in broad valleys and was formed in loamy alluvium washed from uplands of weathered sandstone and shale. Taft soils are low in natural fertility and permeability is slow. This soil includes areas that have low, rounded mounds and spots of Barling, Leadvale, Sallisaw, Wing, and Wrightsville soils. Runoff is slow and excess water is known to be a severe limitation (NRCS 1975).

Soils underlying the main cantonment area are comprised mostly of the Wrightsville complex, in addition to the Leadvale Silt Loam and the Wrightsville-Messer complex (ARANG 2003b). Most of the original top-soil material within the existing 188 FW cantonment area has been disturbed, smoothed, filled-over or otherwise altered to facilitate development and may contain soils considered to be urban land – a soil type that includes lands that have been so altered by man or obscured by urban works and structures that identification of soils is not possible. Buildings, roadways, pavements, and other man-made structures obscure the original soil (NRCS 1975).

Soils underlying the 20-acre southeastern parcel that serves as the Fire Training Area are comprised of the Wrightsville complex in addition to the Taft silt loam, Linker fine sandy loam, and the Leadvale silt loam.

### 3.8.2.3 Topography

The regional topography of the Fort Smith area is dominated by gently rolling hills with flat river bottoms occurring along the Arkansas and Poteau Rivers, north and west of the 188 FW installation, respectively (ARANG 2003b). Slopes in this area range from one to 30 percent (NRCS 1975). Elevations in this area range from 400 feet MSL at the Arkansas River to approximately 750 feet above MSL northwest of the airport (ARANG 2003b).

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Topography within the 188 FW installation is characterized by nearly level to gently rolling terrain; however, the parcels are located on improved land with minor topographic variation (ARANG 2003b).

## 3.9 WATER RESOURCES

### 3.9.1 DEFINITION OF THE RESOURCE

Water resources analyzed in this EA include surface water and groundwater quantity and quality. Surface water resources include lakes, rivers, and streams and are important for a variety of reasons, including economic, ecological, recreational, and human health. Groundwater includes the subsurface hydrologic resources of the physical environment and is an essential resource. Groundwater properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

Other issues relevant to water resources include the downstream water and watershed areas affected by existing and potential runoff, and hazards associated with 100-year floodplains. 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). Floodplain values include natural moderation of floods, water quality maintenance, groundwater recharge, as well as habitat for many plant and animal species.

The ROI for water resources in this EA includes the existing 188 FW lease holdings, which are situated on the northwestern and southeastern portions of Fort Smith Regional Airport (Figure 2.2-1).

### 3.9.2 EXISTING CONDITIONS

#### 3.9.2.1 Surface Water

The Arkansas River flows eastward and forms the northern boundary of Sebastian County, as well as the Arkansas Valley. Its floodplain is a relatively narrow strip that parallels the course of the river. The flow of the Arkansas River is regulated by major flood control impoundments upstream and by a series of locks and dams that form navigable pools. The confluence of the Poteau River with the Arkansas River is located just west of Fort Smith, with the Poteau River forming the western boundary of Sebastian County (NRCS 1975).

The Arkansas Valley is drained by several streams including: James Fork Creek, Vache Grasse Creek, Little Vache Grasse Creek, Doctors Creek, Big Creek, Cherokee Creek, and Prairie Creek

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(NRCS 1975). Major tributaries that drain to the Arkansas River in the vicinity of Fort Smith include the Poteau River, Mill Creek, and Massard Creek (ARANG 2000b).

The 188 FW installation is located within two sub-watersheds of Massard Creek. Drainage from the installation is to tributaries of Massard Creek and Little Massard Creek, which both eventually flow into the Arkansas River. The installation is divided into four distinct storm water drainage basins, all of which slope from northwest to southeast (ARANG 2000b). All surface water from these four drainage basins on the cantonment area is eventually discharged through a network of in-ground conveyances and grass-lined ditches to an unnamed tributary of Massard Creek south of the installation (ARANG 2000b).

Runoff from the northern portion of the cantonment area drains south to a 1.62-acre detention pond in the north-central portion of the installation. This pond was created in 1973 by 188 FW personnel. The area was excavated to a depth of approximately 20 feet to serve as a reservoir to support fire-training activities. The pond is recharged via direct precipitation, storm water runoff, and inflow from the drainage. When volume exceeds capacity, outflow from the pond occurs via a spillway into a tributary to Massard Creek (ARANG 2002).

There are three small ponds (0.4, 0.2, and 0.1 acre in size) on the Fire Training Area parcel (ARANG 1999b). These ponds are manmade features created for agricultural purposes prior to ARANG acquisition of the parcel and have been evaluated by the USACE (ARANG 1999c). The USACE has reviewed the wetland delineation associated with these ponds and has concurred that these are artificial wetlands. It is unlikely that USACE would take jurisdiction over these artificial wetlands; however, coordination with the USACE would occur prior to any action that could impact these. Refer to Section 3.10.2, Biological Resources, for more detailed information on these ponds.

The existing storm drainage system includes a network of surface inlets and underground pipes as well as open ditches. The southern half of the installation is drained to Massard Creek to the south via 8- to 36-inch diameter pipes. On the north half of the installation, storm water drains into a large drainage swale via storm drains. Excess water collected in the swale drains to an open drainage ditch that parallels Dike Road on the east side of the installation via a spillway. A concrete drainage ditch runs along the aircraft parking apron and drains to the east (ARANG 2000b).

Storm water discharge from industrial activity at the 188 FW installation is covered by a National Pollutant Discharge Elimination System (NPDES) General Permit issued by the Water Division of the ADEQ.

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## 3.9.2.2 Floodplains

A floodplain is any land area susceptible to inundation by floodwaters from any source. Structures constructed in the 100-year floodplain can frequently be damaged as a result of flooding. Therefore, it is important to ensure that construction activities are not sited in the 100-year floodplain.

The main cantonment area of the 188 FW installation does not lie within any 100-year floodplain; however, the Fire Training Area does contain approximately 4.2 acres of floodplain in the southeast corner of the parcel associated with Massard Creek (Federal Emergency Management Agency 1996).

## 3.9.2.3 Groundwater

The Fort Smith area is underlain by two primary aquifers: the shallow, unconfined Arkansas River Alluvial Aquifer, and the deep, confined Western Interior Plains Confining System (United States Geological Survey [USGS] 2004). The shallow aquifer is composed of unconsolidated alluvial deposits from the Arkansas River and its tributaries, as well as consolidated rocks that underlie the region. This aquifer, which averages approximately 40 feet deep, can provide groundwater yields between 300 and 700 gallons per minute (ARANG 2003a, USGS 2004). Although the quality of water within the Arkansas River Alluvial Aquifer is suitable for most uses, large concentrations of iron and nitrate and excessive hardness locally make the water undesirable for some public supply and industrial uses (USGS 2004).

The Western Interior Plains confining system is part of a thick, geologically complex, sedimentary sequence that extends eastward from the Rocky Mountains to western Missouri and northern Arkansas. In northern Arkansas, the Western Interior Plains confining system underlies a wide area that extends southward between 60 and 80 miles from its northern margin at the Boston Mountains escarpment to the Ouachita Mountains. The confining system consists of a sequence of shale, sandstone, and limestone of Mississippian to Pennsylvanian age that thickens to more than 8,000 feet as it extends southwestward (USGS 2004).

On a regional scale, the rocks that compose the confining system have poor permeability and therefore function as a confining unit. Locally, however, individual geologic units or parts of units within the confining system yield as much as 19 gallons per minute to wells. As a result, the confining system is considered to be a minor aquifer. Rocks of the confining system that underlie the Arkansas Valley Section are dominated by siltstone and shale that are overlain by a weathered zone that ranges from 10 to 30 feet thick. Sandstone beds of the system that are in the Arkansas Valley Section are well-cemented by silica and iron, and are resistant to erosion and form higher ridges (USGS 2004). Wells accessing the deep confined aquifer in general produce low yields (ARANG 2000b).

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The quality of ground water in the Western Interior Plains confining system is highly variable but meets most secondary drinking-water standards and is considered to be suitable for domestic and livestock uses. The quality of the water generally is not considered to be adequate for municipal supply (USGS 2004).

The 188 FW installation is not located in an area of large groundwater resources, and there are no wells within 3 miles of the installation boundary. The installation and the City of Fort Smith obtain drinking water from surface waters with groundwater being used for other purposes. Shallow groundwater flow in the vicinity of the Base is to the east, toward the Arkansas River (ARANG 2000b).

## 3.10 BIOLOGICAL RESOURCES

### 3.10.1 DEFINITION OF THE RESOURCES

Biological resources include native or naturalized plants and animals and the habitats, including wetlands, in which they occur. The ROI for biological resources includes the approximately 141 acres of the 188 FW installation. Although the existence and preservation of biological resources are both intrinsically valuable, these resources also provide essential aesthetic, recreational, and socioeconomic values 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 Arkansas. Three categories of protection status are included in this section including 1) federal listed threatened and endangered species, 2) state listed species, and 3) other sensitive species.

**Federal 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 substantial portion of their range. Threatened species are those that could be listed as endangered in the near future.

**State Listed Wildlife and Vascular Plants.** The state of Arkansas Natural Heritage Commission (ANHC) is responsible for maintaining the most up-to-date and comprehensive source of information concerning rare plant and animal species, and high-quality natural communities of Arkansas (ANHC 2006). A comprehensive list of species occurring in Sebastian County and warranting protection or further study (beyond federal protection) can be found in Table 3.10-1.

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**Other Sensitive Species.** 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 Partners in Flight, or 3) listed species in 50 CFR 17.11 *Endangered and Threatened Wildlife*.

**Wetlands.** Wetlands are defined by the USACE and USEPA as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include marshes, bogs, and similar areas” (33 CFR 328.3[b]). Wetlands provide a variety of functions including groundwater recharge and discharge; floodflow attenuation; sediment stabilization; sediment and toxicant retention; nutrient removal and transformation; aquatic and terrestrial diversity and abundance; and uniqueness. Three criteria are necessary to define wetlands: vegetation (hydrophytes), soils (hydric), and hydrology (frequency of flooding or soil saturation). Jurisdictional wetlands are those subject to regulatory authority under Section 404 of the CWA and EO 11990, *Protection of Wetlands*.

## 3.10.2 EXISTING CONDITIONS

### 3.10.2.1 Vegetation

Fort Smith, Arkansas is located in the Arkansas River basin, along the Oklahoma-Arkansas border. This area is classified as Ozark-broadleaf forest-meadow province, according to Bailey (1995). Hardwoods such as oaks and hickories along with coniferous species and grasses are common to this province.

Local vegetation in the vicinity of Fort Smith is delineated with pines (*Pinus echinata*), oaks (*Quercus alba* and *Q. phellos*), willows (*Salix spp.*), agricultural crops (dry and pasture), and urban landscaping (grasses, low shrubs, and ornamental trees) according to USGS Gap Analysis Program analysis.

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**Table 3.10-1. Federal and State Protected Species in Sebastian County, Arkansas**  
(Page 1 of 2)

| <i>Species</i>                                              | <i>Federal Status<sup>1</sup></i><br>(USFWS) | <i>State Status<sup>1</sup></i> | <i>Probability of Occurrence in the Project Area</i>                                                                                                                                                                                                                         |
|-------------------------------------------------------------|----------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>INVERTEBRATES</b>                                        |                                              |                                 |                                                                                                                                                                                                                                                                              |
| American burying beetle ( <i>Nicrophorous americanus</i> )  | E                                            | INV                             | <b>May Occur</b> in the vicinity of Fort Smith Regional Airport. Found in a variety of habitat types, oak-pine woodland, open fields, open grasslands, oak-hickory forests, and edge habitat. Limiting factor for the beetle is the requirement of carrion for reproduction. |
| Beach-dune Tiger Beetle ( <i>Cicindela hirticollis</i> )    | -                                            | INV                             | Not likely to occur due to lack of sandy habitat.                                                                                                                                                                                                                            |
| Giant stag beetle ( <i>Lucanus elephas</i> )                | -                                            | INV                             | Not likely to occur due to lack of damp, decaying wood habitat.                                                                                                                                                                                                              |
| <b>BIRDS</b>                                                |                                              |                                 |                                                                                                                                                                                                                                                                              |
| Bald Eagle ( <i>Haliaeetus leucocephalus</i> ) <sup>2</sup> | T                                            | INV                             | Not likely to occur due to lack of carrion and large trees for roosting, perching, and nest.                                                                                                                                                                                 |
| Interior Least Tern ( <i>Sterna antillarum</i> )            | E                                            | INV                             | Not likely to occur due to lack of barren, sandy, rocky aquatic edge habitat.                                                                                                                                                                                                |
| Bewick's Wren ( <i>Thryomanes bewickii</i> )                | -                                            | INV                             | Not likely to occur due to lack of thickets, open country scrub, open and riparian woodland, and chaparral.                                                                                                                                                                  |
| Swainson's Warbler ( <i>Limnothlypis swainsonii</i> )       | -                                            | INV                             | Not likely to occur due to lack of dense woody understory.                                                                                                                                                                                                                   |
| Western Kingbird ( <i>Tyrannus verticalis</i> )             | -                                            | INV                             | Not likely to occur due to lack of open prairie habitat.                                                                                                                                                                                                                     |
| <b>MAMMALS</b>                                              |                                              |                                 |                                                                                                                                                                                                                                                                              |
| Eastern harvest mouse ( <i>Reithrodontomys humulis</i> )    | -                                            | INV                             | Not likely to occur due to lack of old field, wet meadow, and marsh habitat.                                                                                                                                                                                                 |
| <b>REPTILES</b>                                             |                                              |                                 |                                                                                                                                                                                                                                                                              |
| Ornate box turtle ( <i>Terrapene ornata ornata</i> )        | -                                            | INV                             | Not likely to occur due to lack of sandy-open habitat.                                                                                                                                                                                                                       |
| Northern scarlet snake ( <i>Cemophora coccinea copei</i> )  | -                                            | INV                             | Not likely to occur due to lack of moist forest soil habitat.                                                                                                                                                                                                                |
| Gulf crayfish snake ( <i>Regina rigida sinicola</i> )       | -                                            | INV                             | <b>May Occur</b> in the vicinity of Fort Smith Regional Airport; pond or marsh habitat is preferred by this species.                                                                                                                                                         |
| <b>FISH</b>                                                 |                                              |                                 |                                                                                                                                                                                                                                                                              |
| Goldeye ( <i>Hiodon alosoides</i> )                         | -                                            | INV                             | Not likely to occur due to the isolated nature of the ponds present at the 188 FW installation.                                                                                                                                                                              |
| Plains minnow ( <i>Hybognathus placitus</i> )               | -                                            | INV                             | Not likely to occur due to lack of lotic habitat.                                                                                                                                                                                                                            |
| Slenderhead Darter ( <i>Percina phoxocephala</i> )          | -                                            | INV                             | Not likely to occur due to lack of lotic habitat.                                                                                                                                                                                                                            |

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**Table 3.10-1. Federal and State Protected Species in Sebastian County, Arkansas**  
(Page 2 of 2)

| <i>Species</i>                                                       | <i>Federal Status<sup>1</sup></i><br>(USFWS) | <i>State Status<sup>1</sup></i> | <i>Probability of Occurrence in the Project Area</i>                                                          |
|----------------------------------------------------------------------|----------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------|
| Suckermouth minnow ( <i>Phenacobius mirabilis</i> )                  | -                                            | INV                             | Not likely to occur due to lack of lotic habitat.                                                             |
| Paddlefish ( <i>Polyodon spathula</i> )                              | -                                            | INV                             | Not likely to occur due to lack of lotic habitat.                                                             |
| <b>MOLLUSK</b>                                                       |                                              |                                 |                                                                                                               |
| Fat pocketbook ( <i>Potamilus capax</i> ) <sup>3</sup>               | E                                            | INV                             | Not likely to occur due to lack of lotic habitat.                                                             |
| <b>PLANTS</b>                                                        |                                              |                                 |                                                                                                               |
| Pregnant sedge ( <i>Carex gravida</i> var <i>gravida</i> )           | -                                            | INV                             | <b>May Occur</b> in the vicinity of Fort Smith Regional Airport; this species is found in floodplain habitat. |
| Scratch-daisy ( <i>Croptilon hookerianum</i> var. <i>validum</i> )   | -                                            | INV                             | Not likely to occur due to lack of open wooded habitat.                                                       |
| Smooth scouring rush ( <i>Equisetum laevigatum</i> )                 | -                                            | INV                             | Not likely to occur due to lack of moist prairie habitat.                                                     |
| Narrowleaf marsh-elder ( <i>Iva angustifolia</i> )                   | -                                            | INV                             | Not likely to occur due to lack of moist grassland habitat.                                                   |
| Scaly blazing star ( <i>Liatris squarrosa</i> var. <i>compacta</i> ) | -                                            | INV                             | Not likely to occur due to lack of extremely rocky open woodlands.                                            |
| Narrow-leaved puccoon ( <i>Lithospermum incisum</i> )                | -                                            | INV                             | Not likely to occur due to lack of semi-desert, foothill, canyon, shrubland, and woodland habitat.            |
| Prairie water-clover ( <i>Marsilea vestita</i> )                     | -                                            | INV                             | Not likely to occur due to lack of natural wetlands.                                                          |
| Drummond's sandwort ( <i>Minuartia drummondii</i> )                  | -                                            | INV                             | Not likely to occur due to lack of moist grassland habitat.                                                   |
| Maple-leaved oak ( <i>Quercus acerifolia</i> )                       | -                                            | ST                              | Not likely to occur due to lack of forest habitat.                                                            |
| Elmleaf goldenrod ( <i>Solidago delicatula</i> )                     | -                                            | INV                             | Not likely to occur due to lack of open prairie habitat.                                                      |
| Nuttall corn-salad ( <i>Valerianella nuttallii</i> )                 | -                                            | INV                             | Not likely to occur due to lack of shale substrate.                                                           |
| Drummond's rain lily ( <i>Zephyranthes chlorosolen</i> )             | -                                            | INV                             | Not likely to occur due to lack of proper soil types.                                                         |

Sources: USFWS 1997, ANHC 2004, NatureServe 2004

- Notes:
1. E = Endangered, T = Threatened, PT = Proposed Threatened, C = Candidate, INV = State inventory element of conservation concern, ST = State Threatened.
  2. The Bald Eagle is proposed for delisting.
  3. This species occurs statewide.

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During a 2002 wetland survey of the 188 FW main cantonment area, the following vegetation species were identified: buttercup (*Ranunculus bulbosus*), crimson clover (*Trifolium incarnatum*), white clover (*T. repens*), knotted clover (*T. striatum*), shamrock clover (*T. dubium*), rush (*Juncus acuminatus*), vetch (*Vicia villosa*), bluets (*Hedyotis spp.*), and perennial ryegrass (*Lolium perenne*) (ARANG 2002). The survey concluded that wetland vegetation is present on the 188 FW installation around the fringes of the detention pond located on the 188 FW main cantonment area (ARANG 2002). In general, vegetation within the 188 FW main cantonment area is limited to ornamental landscape species and the level of development and disturbance provides poor quality habitat for native plants.

## 3.10.2.2 Wildlife

Wildlife species likely to occur in the vicinity of Fort Smith Regional Airport are characteristic of generalist species adapted to urban environments. Various small mammals such as squirrels, rabbits, and fox, (*Sciurus spp.*, *Sylvilagus spp.*, and *Nyctereutes spp.*, respectively) and birds such as the American Robin (*Turdus migratorius*) and sparrow species (*Passer spp.*) likely utilize habitat provided within the 188 FW installation. Waterfowl and amphibian species may utilize the ponds present. Red-winged Black Birds (*Agelaius phoeniceus*) are common wetland species and may occur around the fringes of the ponds. The aquatic fauna associated with the ponds is unknown. Habitat for wildlife would be more likely to occur on the Fire Training Area than within the main cantonment area.

Fort Smith is located in between the Central and Mississippi migratory bird flyways. During spring and fall migrations avian fauna utilizing these routes would likely bleed over into the Fort Smith area as transient residents.

## 3.10.2.3 Threatened, Endangered and Other Sensitive Species

Federally listed species are defined in Section 3.10-1 above. Four federally and state listed and 24 state listed-only special species occur in Sebastian County and one federal species occurs statewide (see Table 3.10-1).

The ANHC recently updated its inventory of state species of concern. Of the 29 federal and state special status species, three may occur at the 188 FW installation: the American burying beetle (federally endangered and state inventory element of conservation concern), the gulf crayfish snake (state inventory element of conservation concern), and the pregnant sedge (state inventory element of conservation concern).

The American burying beetle is a generalist requiring carrion for breeding. This beetle is found in a variety of habitat types, including oak-pine woodland, open fields, open grasslands, oak-

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hickory forests, and edge habitat (USFWS 2004). Specific habitat requirements are not fully understood. The one limiting factor for the beetle is the requirement of carrion for reproduction. Adult beetles lay eggs in a 1 to 9 ounce carcass underground (USFWS 2004). Upon hatching, the larvae are provided with an immediate food source.

The crayfish gulf snake prefers marsh and pond habitat, and the pregnant sedge prefers floodplain habitat. The 188 FW main cantonment area does not contain appropriate pond habitat.

## 3.10.2.4 Wetlands and Other Aquatic Habitat

The 188 FW installation contains four small ponds; one (referred to as the detention pond) is located in the main cantonment area and the other three are located at the Fire Training Area (see Figure 2.2-2). The fringes of the detention pond may support a narrow strip of aquatic flora, but this is not classified as jurisdictional wetland habitat according to a 2002 wetland survey report for the 188 FW (ARANG 2002). The three ponds within the Fire Training Area were classified as “artificial wetlands” according to a 1999 wetland survey report (ARANG 1999c). During the surveys, no emergent vegetation was identified around any of the ponds (ARANG 2002; ARANG 1999c).

## 3.11 CULTURAL RESOURCES

### 3.11.1 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 and engineering resources, and traditional resources. Significant cultural resources (as defined in 36 CFR 60.4) are considered for potential adverse impacts from an action. Significant cultural resources are either eligible for listing, or are listed in, the NRHP. Significant traditional resources are identified by American Indian tribes or other groups, and may also be eligible for the NRHP.

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.

The ROI for analysis of the effects of the proposed new facilities and facility modifications on cultural resources consists of the existing 188 FW installation. The ROI for effects from the

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conversion from F-16Cs to A-10s consists of the area with the 65dB footprint of the A-10 aircraft.

## 3.11.2 EXISTING CONDITIONS

### 3.11.2.1 Historical Setting

The Fort Smith region has been inhabited for at least 12,000 years. It was first occupied by small nomadic bands that hunted large game and gathered wild plant foods. As the climate warmed, and large game animals declined, people became more dependent on deer and a variety of nuts and other plant foods. Eventually native seed plants were cultivated and settlement became more stationary, concentrating in the bottomlands and river valleys (Arkansas Archaeological Survey 2003). Ceramics were introduced and long-distance trade of raw materials and artifacts increased, as did population. With the introduction of maize cultivation, larger villages with mounds and other earthworks developed (Arkansas Archaeological Survey 2003).

During the late 1700s, the Cherokee Indians were pushed westward from their original homelands in North and South Carolina, northeastern Tennessee, and northern Georgia by Euroamerican expansion. They eventually settled along the St. Francis River in northeastern Arkansas and southeastern Missouri. By 1800 there were as many as 1,000 Cherokee Natives living in the St. Francis River Valley (Arkansas Archaeological Survey 2003). In this region, the Cherokee lived by hunting, agriculture, and trading with other native groups and Europeans in the area. A government post was established in 1805 at Spadra for the Cherokee to trade skins and bear oil for other goods (Arkansas Archaeological Survey 2003).

For the next decade, the Cherokee farmsteads were under constant attack from the Osage Indians who lived in southwestern Missouri and used most of northern Arkansas for their hunting grounds. In 1817, the Federal government established a reservation for the Arkansas Cherokee to protect them from the Osage. At the same time, the U.S. Army post of Fort Smith, one of the earliest U.S. military posts in the Missouri Territory, was constructed to stop Cherokee and Osage attacks (Arkansas Archaeological Survey 2003). Fort Smith was abandoned in 1824 (Arkansas Archaeological Survey 2003).

The Dwight Mission, founded in 1820 near the present day town of Russellville, was the first U.S. mission established for the Cherokee Indians west of the Mississippi River. In 1828, the Cherokees requested that the Dwight Mission be moved closer to the center of their territory. The mission was relocated west of Sallisaw Creek, 13 miles from the Arkansas River.

By 1828, the Territory of Arkansas was established resulting in further expansion of Euroamericans into established Cherokee lands. As a result of this pressure, in 1829, the people at Dwight Mission and most of the Cherokee moved 150 miles west into Oklahoma (Arkansas

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Archaeological Survey 2003). The Indian Removal Act of 1830 restationed approximately 53,000 Cherokee, Creek, Choctaw, and Chickasaw people who were being pushed westward by the incoming white settlers. During the winter of 1838, U.S. troops forced 13,000 to 17,000 Cherokee Indians to migrate to Indian Territory (Oklahoma). In 1838, the U.S. Army was again stationed at Fort Smith, using it as a checkpoint while moving thousands more Cherokee into Oklahoma along what is now called the Trail of Tears (Arkansas Archaeological Survey 2003). Today, the Fort Smith National Historic Landmark includes the remains of the first Fort Smith (1817-1824) (National Historic Landmarks Program 2006).

Sebastian County was established in 1851 with Fort Smith as one of two county seats (Arkansas Gen Web Project 2006). During the 1850s and 1860s Fort Smith played a key role in supplying western expansion and was an important location for both sides during the Civil War (National Park Service 2006). In the summer of 1871, the military again abandoned Fort Smith, leaving behind a prosperous and growing town.

The idea of a municipal airport in the Fort Smith area began in 1936 with the purchase of 320 acres. Runways were built for Fort Smith Municipal Airport in 1939. Major commercial air services began in 1952 (Fort Smith Airport 2006). The origin of the 188 FW dates to 1953 when the 184<sup>th</sup> Tactical Reconnaissance Squadron (184 TRS) originated and was recognized at Fort Smith. The unit was called “Rick's Rippers” honoring Maj. Gen. Earl T. Ricks, a highly decorated World War II Air Force pilot and former Adjutant General from Arkansas (Global Security 2006a). The squadron’s first mission was reconnaissance, flying the RB-26, a twin-engine modified bomber. In 1956, the 184 TRS changed to the RF-80 jet aircraft equipped with daylight photography equipment. The squadron began flying their first swept-wing jet, the RF-84F in 1957. The unit was re-designated the 188<sup>th</sup> Tactical Reconnaissance Group (188 TRG) in 1962. In 1970, as the unit continued to grow, the 188 TRG converted to the RF-101 and continued its reconnaissance mission until 1972 when they reorganized and became the 188<sup>th</sup> Tactical Fighter Group (188 TFG) flying the F-100. In 1976, the group became the Flying Razorbacks and was assigned the F-4C Phantom in April 1979 (Global Security 2006b). In 1961, the 188 TFG was activated for one year during the Berlin Crisis and acted as support for the Vietnamese airlift in 1975, as well as the Cuban boatlift in 1980. In 1988, with delivery of the F-16 Fighting Falcon, the unit became nationally known as entering the era of high technology. After restructuring within the ANG and the USAF, the 188 TFG was re-designated the 188<sup>th</sup> Fighter Group in 1992, and later the 188 FW (Global Security 2006b).

## 3.11.2.2 Cultural Resources

There are no NRHP-listed historic buildings or sites at Fort Smith Regional Airport or at the 188 FW installation (National Register Information System 2006). An archaeological and architectural inventory is currently in progress to identify and record any archaeological or

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architectural resources that may be present at the 188 FW. Archival research, surface survey and subsurface investigations have shown that the installation is highly disturbed by previous construction, earthmoving and other ground-disturbing activities, with the result that it is highly unlikely that there are intact, NRHP-eligible archaeological properties present on the installation. The 188 FW also has undertaken an architectural inventory with the object of determining the NRHP eligibility of approximately 35 Cold War era (constructed from 1946 to 1989) structures located at the 188 FW. Table 3.11-1 lists the Cold War era structures at the 188 FW by building number, construction date, current use, and preliminary NRHP eligibility determination. Preliminary findings indicate that the structures lack integrity; furthermore, there are no significant events or associations that would confer NRHP eligibility on them.

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**Table 3.11-1. Cold War Era Buildings and Structures at the 188 FW**  
(Page 1 of 2)

| <i><b>Building #</b></i> | <i><b>Facility category name</b></i>                         | <i><b>Construction year</b></i> | <i><b>Preliminary NRHP Eligibility</b></i> |
|--------------------------|--------------------------------------------------------------|---------------------------------|--------------------------------------------|
| 34                       | Water tank storage                                           | 1955                            | TBD                                        |
| 39                       | Swimming pool, consolidated                                  | 1956                            | TBD                                        |
| 40                       | Swimming pool, consolidated                                  | 1956                            | TBD                                        |
| 101                      | Traffic check house                                          | 1975                            | TBD                                        |
| 102                      | Audiovisual facility/Reserve Forces general training support | 1971                            | TBD                                        |
| 104                      | Documentation staging facility                               | 1955                            | TBD                                        |
| 108                      | Base supply administration                                   | 1980                            | TBD                                        |
| 110                      | Vehicle maintenance shop                                     | 1960                            | TBD                                        |
| 112                      | Vehicle maintenance shop                                     | 1970                            | TBD                                        |
| 113                      | Shop, weapons and release systems                            | 1972                            | TBD                                        |
| 115                      | Shop, weapons and release systems                            | 1976                            | TBD                                        |
| 118                      | Vehicle operations administration                            | 1982                            | TBD                                        |
| 119                      | Base hazardous storage                                       | 1987                            | TBD                                        |
| 127                      | Recreation pavilion                                          | 1988                            | TBD                                        |
| 128                      | Recreation pavilion                                          | 1989                            | TBD                                        |
| 200                      | Hangar, maintenance                                          | 1955                            | TBD                                        |
| 201                      | Fire crash/rescue station                                    | 1979                            | TBD                                        |
| 203                      | Fuel system maintenance dock                                 | 1978                            | TBD                                        |
| 204                      | Aircraft support equipment shop/storage facility             | 1964                            | TBD                                        |
| 205                      | Recreation pavilion                                          | 1982                            | TBD                                        |
| 206                      | Recreation pavilion                                          | 1982                            | TBD                                        |
| 207                      | Swimmers bath house                                          | 1956                            | TBD                                        |
| 208                      | Telecommunications facility/Medical Training Facility        | 1986                            | TBD                                        |
| 209                      | Shop, non-destructive inspection                             | 1988                            | TBD                                        |
| 210                      | Telecommunications facility/Medical Training Facility        | 1987                            | TBD                                        |
| 214                      | Shop, jet engine inspection and maintenance                  | 1974                            | TBD                                        |
| 216                      | Shop, avionics                                               | 1978                            | TBD                                        |
| 218                      | Shop, aircraft maintenance, organizational                   | 1982                            | TBD                                        |
| 219                      | Power check w/suppressor                                     | 1982                            | TBD                                        |

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**Table 3.11-1. Cold War Era Buildings and Structures at the 188 FW**  
**(Page 2 of 2)**

| <i><b>Building #</b></i> | <i><b>Facility category name</b></i>         | <i><b>Construction year</b></i> | <i><b>Preliminary NRHP Eligibility</b></i> |
|--------------------------|----------------------------------------------|---------------------------------|--------------------------------------------|
| 220                      | Base operations                              | 1975                            | TBD                                        |
| 221                      | Munitions load crew training                 | 1982                            | TBD                                        |
| 222                      | Storage magazine above ground type A, B, & C | 1975                            | TBD                                        |
| 225                      | Shop, conventional munitions                 | 1989                            | TBD                                        |
| 500                      | Base engineer administration                 | 1960                            | TBD                                        |
| 502                      | Civil Engineering Storage                    | 1980                            | TBD                                        |

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## 4.0 ENVIRONMENTAL CONSEQUENCES

This section of the EA assesses potential environmental consequences associated with the Proposed Action, the Alternative 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 NOISE

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 Chapter 2.0 and in consideration of the potentially affected environment, as characterized in Chapter 3.0.

#### 4.1.1 METHODOLOGY

Noise associated with aircraft operations at Fort Smith Regional Airport, other transportation-related noise, and construction activities associated with the Proposed Action will be considered and compared with current conditions to assess impacts. Additionally, aircraft noise in the military training airspace will be addressed. Data developed during this process will also support analyses in other resource areas.

Based on numerous sociological surveys and recommendations of federal interagency councils, the most common benchmark referred to is an  $L_{dn}$  of 65 dBA. This threshold is often used to determine residential land use compatibility around airports, highways, or other transportation corridors. Two other average noise levels are also useful:

- An  $L_{dn}$  of 55 dBA was identified by the USEPA as a level “. . . requisite to protect the public health and welfare with an adequate margin of safety” (USEPA 1974). Noise may be heard, but there is no risk to public health or welfare.
- An  $L_{dn}$  of 75 dBA is a threshold above which effects other than annoyance may occur. It is 10 to 15 dBA below levels at which hearing damage is a known risk (OSHA 1983). However, it is also a level above which some adverse health effects cannot be categorically discounted.

Public annoyance is the most common impact associated with exposure to elevated noise levels. When subjected to  $L_{dn}$  of 65 dBA, approximately 12 percent of persons so exposed will be “highly annoyed” by the noise. At levels below 55 dBA, the percentage of annoyance is correspondingly lower (less than 3 percent). The percentage of people annoyed by noise never drops to zero (some people are always annoyed), but at levels below 55 dBA it is reduced enough to be essentially negligible.

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## 4.1.2 IMPACTS

### 4.1.2.1 Proposed Action

Under the Proposed Action, neither transient military nor civil aircraft operations at Fort Smith Regional Airport would change appreciably from current conditions. However, regarding based military operations, the 188 FW would change missions, and convert from F-16C aircraft to A-10 aircraft. Aviation-related noise would continue to be the dominant noise source in the acoustic environment around Fort Smith Regional Airport. Additionally, the 188 FW would construct some new facilities, demolish older facilities, and upgrade other aspects of the installation's supporting infrastructure. There are several aspects of this proposal that have the potential to alter noise impacts in the ROI.

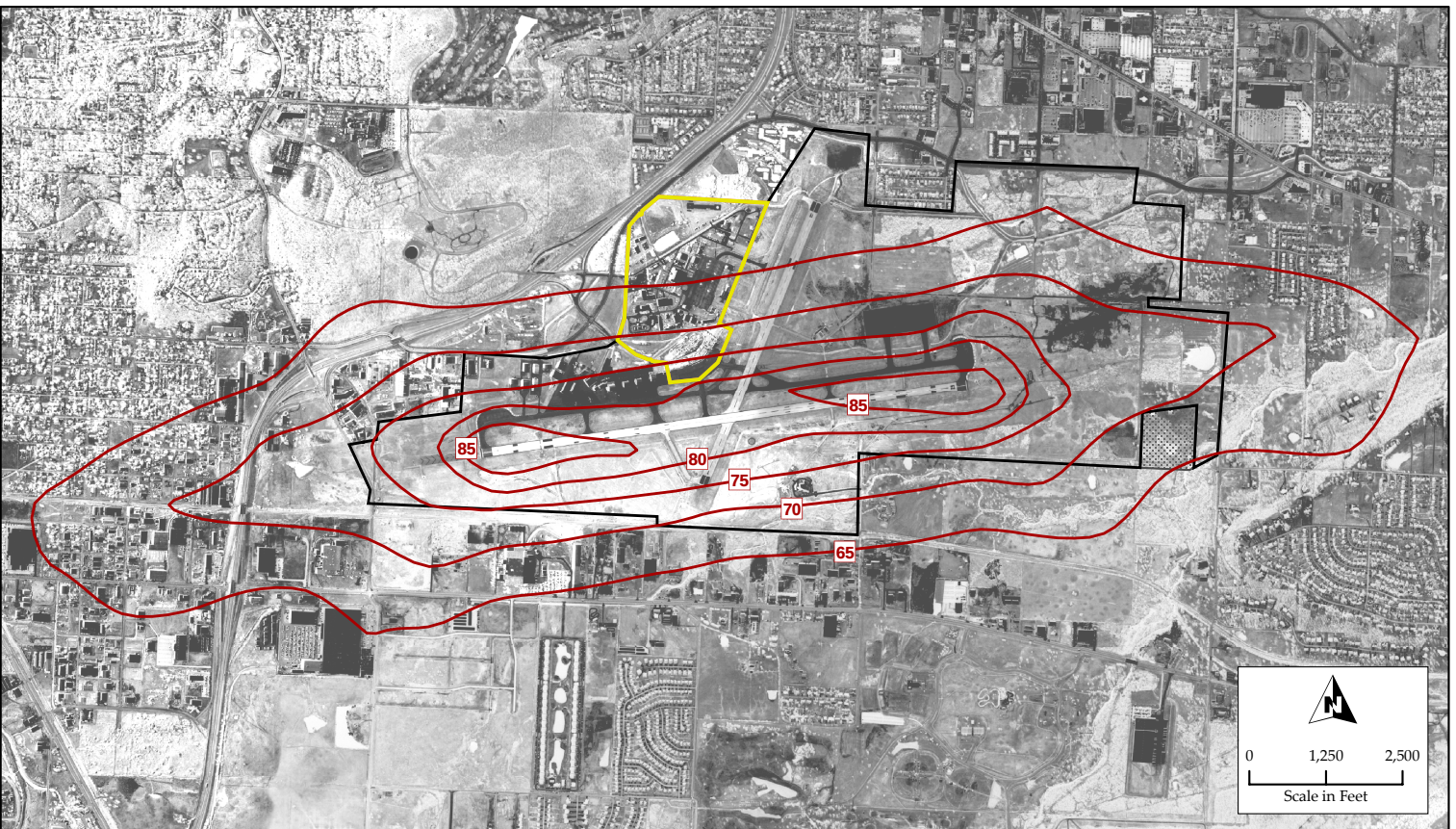
Under the Proposed Action, the 188 FW would convert from a PAA of 15 F-16 aircraft to a PAA of 18 A-10 aircraft. The number of daily operations flown by the 188 FW would increase from 24.688 to 29.5772. Table 4.1-1 reflects this change. Average daily operations at Fort Smith Regional Airport would increase from approximately 205 to 210, a 2.4 percent increase.

**Table 4.1-1. Average Daily Operations at Fort Smith Regional Airport  
under the Proposed Action <sup>1,2</sup>**

| Aircraft         | Daily Operations |        |            |        |                 |       |          |
|------------------|------------------|--------|------------|--------|-----------------|-------|----------|
|                  | Arrivals         |        | Departures |        | Closed Patterns |       | Total    |
|                  | Day              | Night  | Day        | Night  | Day             | Night |          |
| A-10             | 12.2196          | 0.1236 | 12.1740    | 0.1200 | 4.9400          | 0     | 29.5772  |
| Other Military   | 24.3610          | 0.2440 | 24.3610    | 0.2440 | 41.8080         | 0     | 91.0179  |
| Air Carrier      | 0.5680           | 0.0036 | 0.3770     | 0.0036 | 0               | 0     | 0.9521   |
| Air Taxi         | 10.4029          | 0.1049 | 10.4021    | 0.1056 | 0               | 0     | 21.0155  |
| General Aviation | 28.3030          | 0.2870 | 22.3610    | 0.2270 | 16.4900         | 0     | 67.6680  |
| Total            | 75.8544          | 0.7630 | 69.6751    | 0.7002 | 63.2380         | 0     | 210.2308 |

- Notes: 1. Daily operations are based on averages of annual operations; therefore, numbers do not round.  
2. Annual operations are based on 365 civilian flying days and 260 military flying days, resulting in approximately 63,000 annual operations.

Aircraft noise levels at Fort Smith Regional Airport resulting from this conversion are depicted in Figure 4.1-1, and are compared with the existing noise contours in Figure 4.1-2. The land areas exposed to elevated noise levels are compared with baseline conditions in Table 4.1-2. As shown, overall noise exposure around Fort Smith Regional Airport **decreases** under the Proposed Action.



*Legend*

-  A-10 DNL Contour
-  Fort Smith Air National Guard
-  Fort Smith Regional Airport
-  Fire Training Area

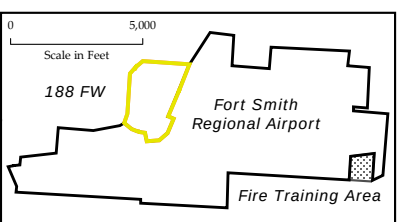


**Figure 4.1-1. Noise Contours for Proposed A-10 Aircraft,  
Fort Smith Regional Airport**

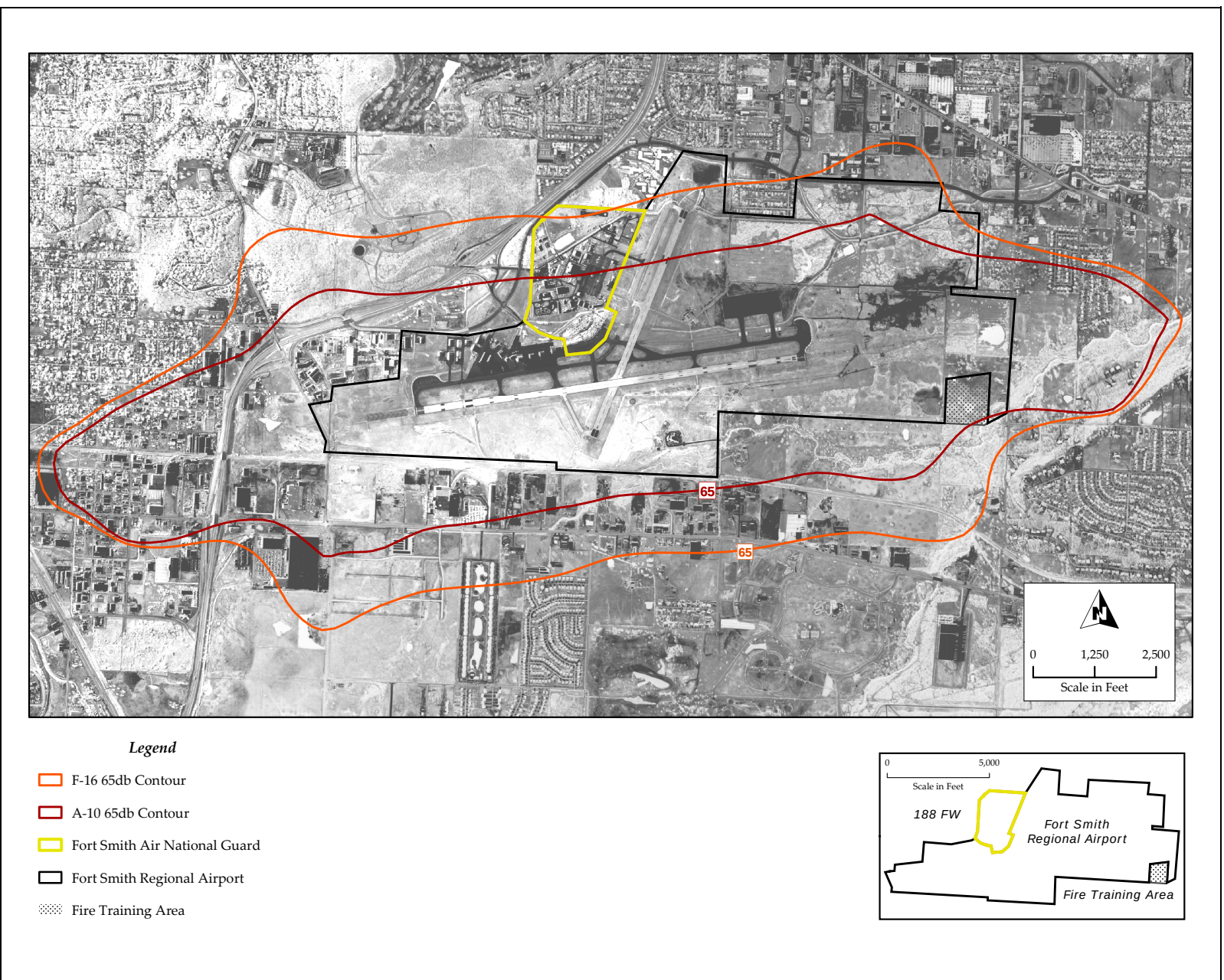


Figure 4.1-2. Comparison of F-16 and A-10 Noise Contours, Fort Smith Regional Airport

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**Table 4.1-2. Land Area Exposed To Indicated Sound Levels Under Aircraft Conversion**

| <i>Sound Level<br/>(in L<sub>dn</sub>)</i> | <i>Acres of Land<sup>1</sup></i> |                 | <i>Net Change<br/>(acres)</i> | <i>Percent Change</i> |
|--------------------------------------------|----------------------------------|-----------------|-------------------------------|-----------------------|
|                                            | <i>Current</i>                   | <i>Proposed</i> |                               |                       |
| 65 – 70                                    | 1,470.2                          | 1,059.6         | - 410.6                       | - 27.9                |
| 70 – 75                                    | 758.6                            | 552.8           | - 205.8                       | - 27.1                |
| 75 – 80                                    | 390.6                            | 230.6           | - 160.0                       | - 41.0                |
| 80 – 85                                    | 211.1                            | 185.4           | - 25.7                        | - 12.2                |
| > 85                                       | 283.1                            | 65.3            | - 217.8                       | - 76.9                |
| <b>Total &gt; 65</b>                       | <b>3,113.6</b>                   | <b>2,093.7</b>  | <b>- 1,019.9</b>              | <b>- 32.8</b>         |

Note: 1. Land areas exposed to indicated sound levels. Total area exposed to L<sub>dn</sub> 65 or greater is shown as Totals.

The same is true for noise exposure at specific points around Fort Smith Regional Airport. As shown in Table 4.1-3, noise exposure at those locations either remains the same, or decreases from current conditions.

**Table 4.1-3. Specific Point Noise Exposure under the Proposed Action**

| <i>Point ID</i> | <i>Description</i>                                                        | <i>Exposure (in L<sub>dn</sub>)</i> |                    | <i>Change<br/>(in L<sub>dn</sub>)</i> |
|-----------------|---------------------------------------------------------------------------|-------------------------------------|--------------------|---------------------------------------|
|                 |                                                                           | <i>Current</i>                      | <i>Alternative</i> |                                       |
| <b>SP01</b>     | 9201 Moody Road, residential area east of airport                         | 63.1                                | 62.8               | - 0.3                                 |
| <b>SP02</b>     | 8847 Meandering Way, residential area east of airport                     | 68.5                                | 68.5               | 0.0                                   |
| <b>SP03</b>     | 3217 South 74 <sup>th</sup> Street, residential area northeast of airport | 54.2                                | 49.6               | - 4.6                                 |
| <b>SP04</b>     | 5300 South Zero Street, residential area south of airport                 | 68.7                                | 63.4               | - 5.3                                 |
| <b>SP05</b>     | 5174 32 <sup>nd</sup> Street, Temple Baptist Church                       | 67.8                                | 67.2               | - 0.6                                 |
| <b>SP06</b>     | 5712 Jenny Lind Road, residential area west of airport                    | 61.8                                | 61.1               | - 0.7                                 |

Source: Moulton 2005.

Construction would most likely occur over an extended time frame, and at any one time, only a small number of projects would be expected to be ongoing simultaneously. Therefore, noise associated with active construction sites would be expected to be intermittent and of relatively limited duration. A hypothetical scenario was developed to assess potential noise associated with construction activities on a construction site. Primary noise sources during such activity would be expected to be heavy vehicles and earth moving equipment. Table 4.1-4 shows sound levels associated with typical heavy construction equipment under varying modes of operation.

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**Table 4.1-4. Typical Equipment Sound Levels**

| <i>Equipment</i> | <i>Sound Level (in dBA)<br/>Under Indicated Operational Mode<sup>1</sup></i> |                   |                          |
|------------------|------------------------------------------------------------------------------|-------------------|--------------------------|
|                  | <i>Idle Power</i>                                                            | <i>Full Power</i> | <i>Moving Under Load</i> |
| Forklift         | 63                                                                           | 69                | 91                       |
| Backhoe          | 62                                                                           | 71                | 77                       |
| Dozer            | 63                                                                           | 74                | 81                       |
| Front-End Loader | 60                                                                           | 62                | 68                       |
| Dump Truck       | 70                                                                           | 71                | 74                       |

Note: <sup>1</sup>Measured at 125 Feet

Source: USAF 1998.

For the assessment of construction noise, a hypothetical “construction area” was designated that approximated the estimated area that would be involved in supporting a major project under the proposal.

The first step in the analysis was to estimate equipment usage and calculate the total acoustic energy that would be expected to be generated on the site. These data also provided information on individual equipment item’s relative contribution to the total amount of acoustic energy generated on the site. Then individual equipment was spatially distributed throughout the construction zone considering “most likely” areas of operation. This yielded an equipment-weighted contribution to total site acoustic energy at different points throughout the site. With this spatial distribution, it was then possible to calculate a mean and standard deviation for the distribution along an axis running through the site.

These data were then used to normally distribute the total energy throughout the site. Finally, the normally distributed energy from multiple source points throughout the site was aggregated at a range of points at varying distances from the site edge. This allowed a determination at those points of the total acoustic energy that had emanated off-site.

Calculations based on this conservative scenario indicate an equivalent noise level over an eight-hour period ( $L_{eq(8)}$ ) of 67 dBA at a distance of 500 feet from the edge of the site. This is then normalized to an equivalent noise level over a 24-hour period ( $L_{eq(24)}$ ) of 62 dBA. Since no construction activity would be expected to occur at night, this would be equivalent to  $L_{dn}$  62. At a distance of 1,000 feet from the site, noise levels would be  $L_{eq(8)}$  62 dBA and  $L_{eq(24)}$  58 dBA. Due to the conservative nature of the scenario, and the fact that sound attenuation only due to spherical spreading was considered, actual levels emanating off-site would be expected to be lower.

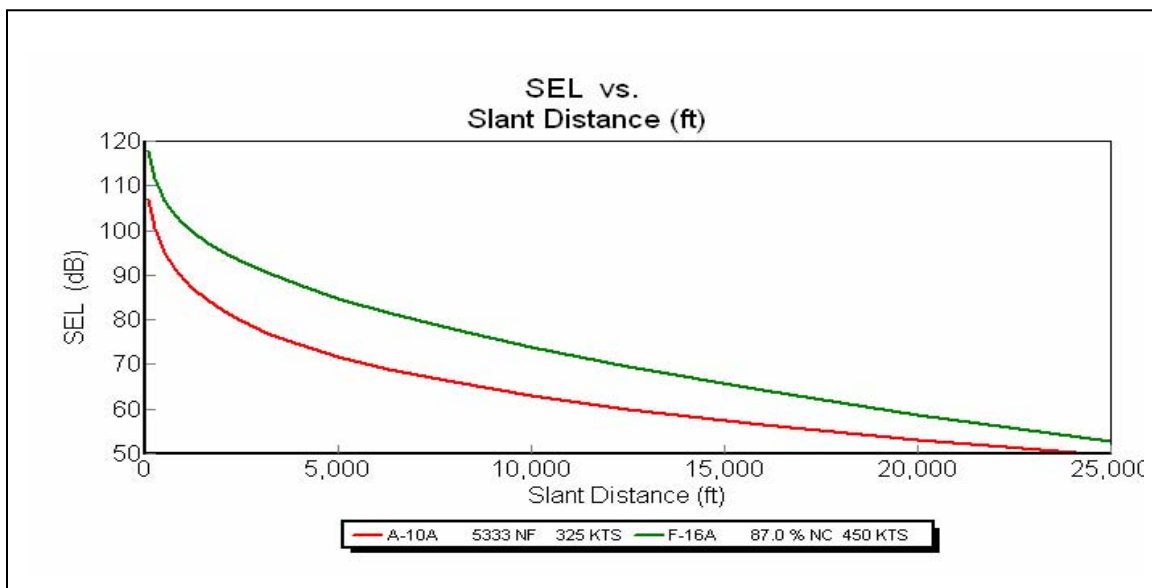
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It should be noted that the areas involving construction are situated within areas already exposed to elevated noise from airfield operations. All projects are located in, or proximate to, air-side locations directly supporting aircraft operations (runways, taxi-ways, parking ramps, etc.) These areas are well within the  $L_{dn}$  65 contour created by aircraft noise. Construction noise emanating off-site would probably be noticeable in the immediate site vicinity, but would not be expected to create adverse impacts, or alter noise contours associated with aircraft operations. Furthermore, construction-related noise is intermittent and transitory, ceasing at the completion of construction. The long-term acoustic environment on Fort Smith Regional Airport would not be expected to be influenced by construction activities.

Aircraft-generated noise within the military training airspace used by the 188 FW would also be modified. The F-16C is a multi-purpose fighter, supporting both air-to-air and air-to-ground operations. Conversely, the A-10 aircraft is an air-to-ground attack aircraft. Therefore, pilots make extensive use of low altitude Military Training Routes (MTRs), Low Altitude Tactical Navigation (LATN) areas, the lower altitude regime of Military Operations Areas (MOAs), and Restricted Areas supporting operations on air-to-ground bombing and gunnery ranges.

These operational considerations indicate that pilots flying the A-10 will spend more overall time in lower altitude regimes than if they were flying the F-16. However, there is a marked difference in the sound levels created by the two aircraft. Figure 4.1-3 compares the SELs of the two aircraft operating at the typical power settings that would be used within the military training airspace.

**Figure 4.1-3. A-10 and F-16 Noise Comparison.**



Source: OMEGA 108.

As shown, on-average, at most distances below 15,000 feet, the sound level of the A-10 is approximately 10 dB lower than the F-16. As a result, much of the airspace currently used by

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the 188 FW would be expected to experience somewhat decreased noise levels. The military training airspace projected for use after the aircraft conversion is projected to be the same as that currently used by the F-16s currently stationed at Fort Smith Regional Airport. No notable noise impacts in the military training airspace are predicted.

## 4.1.2.2 No Action Alternative

Under this alternative, neither the aircraft conversion nor the proposed construction activities would occur. Noise associated with aircraft operations at Fort Smith Regional Airport would remain as described in Section 3.1.2. Since no construction would occur, the noise associated with such activities would not result.

## 4.2 LAND USE AND VISUAL

### 4.2.1 METHODOLOGY

The methodology to assess impacts on individual land uses requires identifying those uses 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, proposed actions would alter the overall visual character of the area.

Significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action. In general, land use impacts would be significant if they would: 1) be inconsistent or in non-compliance with applicable land use plans or policies; 2) preclude the viability of existing land use; 3) preclude continued use or occupation of an area; 4) be incompatible with adjacent or vicinity land use to the extent that public health or safety is threatened.

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

### 4.2.2 IMPACTS

#### 4.2.2.1 Proposed Action

The proposed aircraft and mission conversion and associated facility construction at the ARANG installation at Fort Smith Regional Airport would not create any adverse foreseeable impacts to land use. The Proposed Action would not introduce any new land uses at the installation or the surrounding region, and therefore would not be incompatible with any on installation or nearby

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land uses. Under the Proposed Action, approximately 1,020 acres of land would no longer be exposed  $L_{dn}$  65 or greater, which could be regarded as a positive impact to the land uses surrounding the airport.

The 188 FW has coordinated proposed construction projects with the Fort Smith Regional Airport to ensure that encroachment beyond the Building Restriction Line or into the Runway Protection Zone does not occur (U.S. Department of Transportation/FAA 1989). Proposed facility design and location would improve functionality, which would support of the conversion of the 188 FW aircraft and mission, and therefore generally improve the efficiency of land use at the installation.

All proposed facilities would be architecturally compatible with existing facilities. While the proposed construction includes large structures, the size and type of buildings would be similar to other buildings on the installation or in any airport environment. Because the proposed structures would not be incongruent with the surrounding buildings or land uses, adverse impacts to visual resources would not be expected.

#### 4.2.2.2 No Action Alternative

Under the No Action Alternative, the aircraft and mission conversion would not occur and similarly, no facility development would occur. Land use and visual resources would remain as described in Section 3.7.2.

### 4.3 AIR QUALITY

#### 4.3.1 METHODOLOGY

Air emissions resulting from the Proposed Action were evaluated in accordance with federal, state, and local air pollution standards and regulations. The air quality impacts from a proposed activity or action would be significant if they:

- increase ambient air pollution concentrations above any NAAQS;
- contribute to an existing violation of any NAAQS;
- interfere with or delay timely attainment of NAAQS; or
- impair visibility within any federally mandated PSD Class I area.

The approach to the air quality analysis was to estimate the increase in emission levels as a result of implementation of the Proposed Action and the No Action alternative.

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According to USEPA's General Conformity Rule in 40 CFR Part 51, Subpart W, any proposed federal action that has the potential to impact air quality, as described above, in a nonattainment or maintenance area must undergo a conformity analysis. A conformity analysis is not required in an attainment area. Since Sebastian County is currently an attainment area for all criteria air pollutants, the Proposed Action does not require a conformity analysis.

As previously discussed, Section 169A of the CAA established the PSD regulations to protect air quality in regions that already meet the NAAQS. Certain national parks, monuments, and wilderness areas have been designated as PSD Class I areas, where appreciable deterioration in air quality is considered significant. The nearest PSD Class I area is the Caney Creek Wilderness area, operated by the USFS and is located approximately 108 kilometers (67 miles) south-southeast of the 188 FW. Since the project site is such a long distance away from this Class I area, the Proposed Action would not impact the air quality of this area.

## 4.3.2 IMPACTS

### 4.3.2.1 Proposed Action

The Proposed Action would involve the construction of new structures, demolition of existing structures, installation of new pavement, and upgrading of existing pavement. The 188 FW would also undergo a conversion from the current PAA of 15 F-16Cs to a PAA of 18 A-10s.

**Construction Emissions.** Emissions during the construction period were quantified to determine the potential impacts on air quality in the project area. Calculations of volatile organic compound (VOC), nitrogen oxides (NO<sub>x</sub>), CO, sulfur oxides (SO<sub>x</sub>) and PM<sub>10</sub> emissions were performed with the use of emission factors from the USEPA's *MOBILE6.2* and *NONROAD2005* models (USEPA 2005a, 2006b), and the *California Environmental Quality Air Quality Handbook* (South Coast Air Quality Management District 1993). Emissions resulting from building construction include contributions from engine exhaust (i.e., construction equipment, material handling, and workers' travel) and fugitive dust (e.g., from ground disturbance). Demolition emissions evaluated include contributions from fugitive dust and transport of demolition debris offsite. Grading emissions include fugitive dust from ground disturbance and combustive emissions from heavy equipment. Paving emissions consist of combustive emissions from bulldozers, rollers, and paving equipment, and emissions from dump trucks hauling pavement materials to the site. Estimated total emissions that would occur from demolition, grading, construction, and paving activities under the Proposed Action are presented in Table 4.3-1. These total emissions would occur over the duration of the construction period. For the most conservative analysis possible, all construction is assumed to occur during one calendar year (although construction and demolition is likely to be spread out over the course of five

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years). As a result, actual annual construction emissions would likely be substantially lower than the totals presented in Table 4.3-1.

**Table 4.3-1. Construction Emissions Under the Proposed Action**

| <i>Source</i> | <i>Emissions (In Tons)</i> |             |                       |                       |                        |
|---------------|----------------------------|-------------|-----------------------|-----------------------|------------------------|
|               | <i>VOC</i>                 | <i>CO</i>   | <i>NO<sub>x</sub></i> | <i>SO<sub>x</sub></i> | <i>PM<sub>10</sub></i> |
| Demolition    | 0.05                       | 0.31        | 1.48                  | < 0.01                | 0.33                   |
| Grading       | 0.11                       | 0.99        | 0.64                  | 0.09                  | 0.43                   |
| Construction  | 1.70                       | 5.43        | 24.99                 | 3.52                  | 1.77                   |
| Paving        | 0.10                       | 0.58        | 1.29                  | 0.17                  | 0.11                   |
| <b>TOTAL</b>  | <b>1.97</b>                | <b>7.31</b> | <b>28.39</b>          | <b>3.79</b>           | <b>2.65</b>            |

Emissions generated by demolition, grading, construction, and paving projects are temporary in nature and would end when construction is complete. Additionally, the project construction contractor would comply with *Arkansas Pollution Control and Ecology Commission, Regulation 18 - Arkansas Air Pollution Control Code, Chapter 9 - Control of Fugitive Emissions* (ADEQ 2006), to minimize fugitive dust emissions during construction. 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 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. Vehicular combustion emissions from construction worker commuting may be reduced by carpooling.

Emissions associated with implementation of construction and demolition projects that are components of the Proposed Action would increase ambient air pollutant concentrations on a localized, short-term basis. However, their relatively low magnitude would not result in any significant air quality impacts in Sebastian County or the Metropolitan Fort Smith Interstate AQCR.

**Operational Emissions.** Air emissions associated with the 188 FW installation would change as a result of the aircraft conversion. Although the number of operations at the Fort Smith Regional Airport is projected to increase by only 2.4 percent, A-10 aircraft are known to produce higher levels of CO, VOC, and PM<sub>10</sub> emissions and less NO<sub>x</sub> and SO<sub>x</sub> emissions compared to the F-16C aircraft. All other base emissions, including stationary and mobile sources have been assumed to remain relatively constant, although this is a conservative approach, as it is likely that any new equipment installed at the base would be more efficient and have lower emissions than the older

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equipment currently used. It is also possible that the installation or modification of any air emission sources, such as boilers and heaters, emergency generators, paint booths, degreasers, etc., may trigger permitting requirements with the ADEQ under Arkansas Regulations 18, 19, or 26.

Table 4.3-2 summarizes the projected changes in aircraft emissions under the Proposed Action. Factors used to estimate project aircraft emissions were obtained from the *Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations* (Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis 2003). The data in Table 4.3-2 show that the Proposed Action would increase VOC, CO, and PM<sub>10</sub> emissions and decrease NO<sub>x</sub> and SO<sub>x</sub> from current levels. These emission changes would not produce significant air quality impacts Sebastian County or the AQCR.

**Table 4.3-2. Annual Change in Operational Emissions As Result of Proposed Action**

| <i>Source</i>           | <b>Annual Change (In Tons) (1)</b> |              |                       |                       |                        |
|-------------------------|------------------------------------|--------------|-----------------------|-----------------------|------------------------|
|                         | <i>VOC</i>                         | <i>CO</i>    | <i>NO<sub>x</sub></i> | <i>SO<sub>x</sub></i> | <i>PM<sub>10</sub></i> |
| Aircraft                | 6.37                               | 35.76        | -24.61                | -1.06                 | 3.36                   |
| Aircraft Engine Testing | <0.01                              | 0.01         | -0.07                 | -0.01                 | 0.02                   |
| <b>TOTAL</b>            | <b>6.37</b>                        | <b>35.77</b> | <b>-24.68</b>         | <b>-1.07</b>          | <b>3.38</b>            |

Notes: (-) represents a reduction in emissions from current levels.

## 4.3.2.2 No Action Alternative

Under the No Action Alternative, no construction emissions would occur and the installation's operational emissions would be identical to current baseline presented in Section 3.4.2. As a result, the No Action Alternative would produce less than significant air quality impacts.

## 4.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

### 4.4.1 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 Sebastian County were analyzed, as presented in Section 3.4.2. 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, county figures are compared to regional and state demographics to determine proportional differences. Areas containing relatively high disadvantaged or youth populations are given

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special consideration regarding potential impacts in order to address the potential for disproportionately high or adverse human health or environmental effects on these communities.

Significance of the impact of expenditures are assessed in terms of their direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts varies depending on the location of a proposed action; for example, implementation of an action that creates 20 employment positions may be unnoticed in an urban area but may have significant impacts in a more rural region. If potential socioeconomic impacts would result in substantial shifts in population trends, or adversely affect regional spending or earning patterns, they would be significant. With regard to environmental justice, impacts would be significant if any disproportionately high and adverse human health and/or environmental effects would occur to identified minority and low-income populations.

## 4.4.2 IMPACTS

### 4.4.2.1 Proposed Action

Under the Proposed Action, the 188 FW would undergo a conversion from the F-16 to the A-10 aircraft, and would implement construction and demolition projects described in detail in Section 2.2. Conversion to the new aircraft would not have any direct impact on socioeconomics of the region; however, construction generated as a result of the conversion would occur over the period of the next five years and would involve expenditures of over \$14 million on labor, materials, etc. Potential direct impacts would include the creation of construction jobs over the entire construction period, associated direct earnings, expenditures on materials and fuels, as well as secondary effects leading to the creation of additional jobs and earnings. These potential impacts would be temporary, occurring for the duration of the construction period only. No permanent or long-lasting socioeconomic impacts would result from implementation of the Proposed Action (e.g., there would be no changes in assigned personnel).

As described in Section 4.4.2, disadvantaged groups within the ROI, including minority and low-income populations, do not represent a disproportionate segment of the ROI population. The youth population in the ROI is relatively similar to state levels. The Proposed Action evaluated in this EA is not expected to create significantly adverse environmental or health effects. Consequently, no disproportionately high and adverse human health or environmental effects on minority and 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.

### 4.4.2.2 No Action Alternative

Under the No Action alternative, the 188 FW would maintain their existing facilities, would not build any of the new facilities proposed, and would not undergo an aircraft and mission

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conversion. Failure to implement the proposed improvements would not generate any of the construction-related employment or earnings impacts associated with the Proposed Action. Implementation of the No Action alternative would not result in any significant adverse socioeconomic or environmental justice impacts.

## 4.5 SAFETY

### 4.5.1 METHODOLOGY

Impacts 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.

### 4.5.2 IMPACTS

#### 4.5.2.1 Proposed Action

Under the Proposed Action, the 188 FW would convert from the F-16 aircraft to the A-10 aircraft. To support this conversion, improvements, modifications, and other changes to facilities and the unit's supporting infrastructure will be required.

Since entering the USAF inventory in 1972, A-10 aircraft have flown approximately 4,350,300 hours. During this time, A-10 aircraft have experienced 100 Class A mishaps. These data reflect a Class A mishap rate per 100,000 flying hours of 2.30 (Air Force Safety Center 2006).

Based on flying data from other units equipped with the A-10 aircraft, it can be estimated that the 188 FW will fly approximately 4,900 hours per year. Considering the mishap rate of 2.30 per 100,000 hours, the probability of an A-10 aircraft being involved in a Class A mishap is 0.000023, or one such mishap every 8.9 years. To place this into context, it should be noted that the overall probability of a Class A mishap involving an A-10 aircraft is only slightly more than one-half that of an F-16 aircraft. No adverse impacts to flying safety are anticipated as a result of the Proposed Action.

Providing new facilities that are properly sited with adequate space and a modernized supporting infrastructure would generally enhance safety during the conduct of required training, maintenance and support procedures, security functions, and other daily operations conducted by the unit in support of the aircraft conversion.

Upgrades to maintenance and other support facilities, providing improvements, an enhanced work environment, and increased maintenance efficiency, would provide positive ground and flight safety impacts. In general, the construction of new facilities, modifications/alterations to

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existing facilities, and demolition of outdated facilities would be expected to address outstanding ground, AT/FP, explosive, and flight safety considerations at the unit.

Implementation of the Proposed Action would involve ground activities that may expose workers performing the required site preparation, grading, and building construction to some risk. The U.S. Department of Labor (DOL), Bureau of Labor Statistics maintains data analyzing fatal and non-fatal occupational injuries based on occupation. Due to the varying range of events classified as non-fatal injuries, the considerations described below focus on fatal injuries since they are the most catastrophic. Data are categorized as incidence rates per 100,000 workers employed (on an annual average) in a specific industry (Standard Industrial Code [SIC]).

To assess relative risk associated with this proposal, it was assumed that the industrial classifications of workers involved are the Construction Trades (SIC-15, 16, and 17). Based on DOL data and considerations of worker exposure, the probability of a fatal injury would be statistically predicted to be from 1.2 to 3.1 out of 10,000 (U.S. DOL 2000). 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” (MIL-STD-882 1993). While the potential result must be considered undesirable, risk is low. Activities involved in the proposed facility construction, modification, and demolition are not unique. Standard building and construction procedures and best management practices (BMPs) would be followed by the construction contractor(s). Strict adherence to all applicable occupational safety requirements would further minimize the relatively low risk associated with these construction activities.

In general, implementation of the Proposed Action would result in positive impacts to safety.

#### 4.5.2.2 No Action Alternative

Under the No Action alternative, the 188 FW would not build any new facilities, nor improve the installation’s infrastructure. They would continue operations and maintenance activity using existing facilities, which are in some cases inadequate and outdated. The safety enhancements that would be expected to result from the construction of the proposed new facilities would not be realized.

## 4.6 SOLID AND HAZARDOUS MATERIALS AND WASTE

This section addresses the potential impacts caused by hazardous materials and waste management practices and the impacts of existing contaminated sites on reuse options. Hazardous materials and petroleum products, hazardous and petroleum wastes, ERP sites, and solid wastes will be discussed in this section.

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## 4.6.1 METHODOLOGY

The qualitative and quantitative assessment of impacts from hazardous materials and solid waste management focuses on how and to what degree a proposed action affects 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 cannot 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 EPCRA.
- Exposure of the environment or public to any hazardous material and/or waste through release or disposal practices.

## 4.6.2 IMPACTS

### 4.6.2.1 Proposed Action

#### *Hazardous Materials and Petroleum Products*

Under the Proposed Action, the 188 FW would convert from a PAA of 15 F-16C fighter aircraft to a PAA of 18 A-10s. Because training requirements and sortie levels would remain similar to current operations, the amount of hazardous materials and petroleum products used would remain generally the same over the long term.

#### *Hazardous and Petroleum Wastes*

Under the Proposed Action, training requirements and sortie levels would remain similar to current operations; therefore, the amount of hazardous and petroleum wastes generated would remain generally the same over the long term. The Proposed Action would include

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improvements to current facilities and construction of new facilities such as the addition to the POL facility, jet engine inspection maintenance, fuel cell/corrosion control/load crew training, etc. However, these would only replace or improve similar, existing facilities and would generally be expected to be more efficient than ones being replaced. It is likely that hazardous materials and waste storage would increase temporarily as a result of construction and demolition activities; however, this would be temporary, occurring only during construction and demolition activities.

## *Environmental Restoration Program Sites*

As described in Section 3.6.2, no ERP sites are currently located at the 188 FW installation. In addition, there are no known plumes of contaminated groundwater that could affect the construction or demolition projects.

## *Solid Waste*

The demolition of 14 structures would generate approximately 4,209 tons (EPA530-R-98-010) of construction debris (91,497 cubic yards), most of which would be disposed of by landfill. It is anticipated that demolition would occur over a period of several years. Based on the existing capacity (70 million cubic yards), and an expected operational life through 2070 of the City of Fort Smith Landfill, disposal of solid waste associated with demolition under the Proposed Action would not adversely affect local landfill capacity. In addition, based on the age of the buildings (i.e., most were built from the 1950s to 1970s), asbestos and lead-based paint may be present. All friable asbestos materials would be removed from the buildings prior to demolition. All solid waste would be disposed of in accordance with applicable federal, state, and USAF regulations.

### 4.6.2.2 No Action Alternative

Under this alternative, there would be no change to the current operations of the installation. Therefore, conditions associated with solid and hazardous materials and wastes would remain as described in Section 3.6.2. Impacts as a result of the No Action alternative would be expected to be minor.

## 4.7 INFRASTRUCTURE

### 4.7.1 METHODOLOGY

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

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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.

## 4.7.2 IMPACTS

### 4.7.2.1 Proposed Action

Under the Proposed Action, the 188 FW would implement construction and demolition projects described in detail in Section 2.2 of this EA. Implementation of the Proposed Action would gradually remove and replace aging facilities, and improve utility systems.

Implementation of the Proposed Action would result in an increase in vehicle trips to and from the ARANG installation for construction workers and the delivery of materials and equipment, as well as removal of demolition debris. Increases in traffic volumes on roads surrounding the installation would be temporary, and because the elements of the Proposed Action would be phased over several years, the impacts to the local transportation system would be minor. Because the Proposed Action does not include increases in personnel or operations, no permanent increases in vehicle trips would occur.

Under the Proposed Action necessary repairs to the existing Water Tower Parking Area would occur, and the lot would be expanded to provide additional parking between Falcon Way and Building 418. This parking expansion would provide additional parking necessary for UTA weekends, and would comply with AT/FP parking guidance.

The existing water, electrical, and natural gas utility systems on the installation have several shortcomings that could considerably impact operations at the installation and present potential safety hazards. Under the Proposed Action, the 188 FW would replace and improve several facilities located on the installation. This would include some extensions of the existing utilities systems (e.g., water and electrical) and replacement of some old utilities components (e.g., new water piping). As a result, the Proposed Action would improve several deficiencies in the installation utility systems.

Construction activities associated with the Proposed Action would result in some temporary interruption of utility services and minor hindrance of transportation and circulation. These impacts would be temporary, occurring only for the duration of the construction period.

### 4.7.2.2 No Action Alternative

Under the No Action alternative, the 188 FW would maintain their existing facilities, would not build new facilities, and would not undergo aircraft conversion described under the Proposed Action. Continued use and maintenance of the existing degraded and inefficient facilities and infrastructure would require that the 188 FW continue to operate under unnecessarily inefficient conditions.

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## 4.8 EARTH RESOURCES

### 4.8.1 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. If a proposed action were to substantially affect or be substantially affected by any of these features, impacts would be considered significant. Generally, impacts associated with earth resources can be avoided or minimized to a level of insignificance 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.

### 4.8.2 IMPACTS

#### 4.8.2.1 Proposed Action

Under the Proposed Action, up to approximately 4.1 acres of land surface would be temporarily disturbed as a result of construction and 2.1 acres are scheduled for demolition of the facilities and pavements. The vast majority of the proposed construction would occur on the Wrightsville Soil complex (0-2 percent slopes) (Figure 4.8-1). These soils exhibit a high shrink-swell potential; runoff is slow; and excess water is a severe limitation. The structural design of these facilities would accommodate for these soil limitations. It is likely that grading of existing soils and placement of structural fill for proposed facilities would not substantially alter existing soil conditions at the 188 FW installation main cantonment area because much of the property has been previously disturbed as a result of prior development and no longer includes the naturally occurring surface soils, as described in Section 3.8.2. Additionally, several of the footprints for proposed facilities are located on other existing building footprints, or previously disturbed soils. There are no special qualities associated with the soils or geologic resources at the 188 FW installation. Facility design would ensure that proper site drainage is achieved. Implementation of BMPs during construction activities would minimize impacts associated with erosion. These BMPs would include silt fencing, sediment traps, application of water sprays, and revegetation of disturbed areas, as appropriate and necessary. Impacts to earth resources would be expected to be minimal under the Proposed Action.

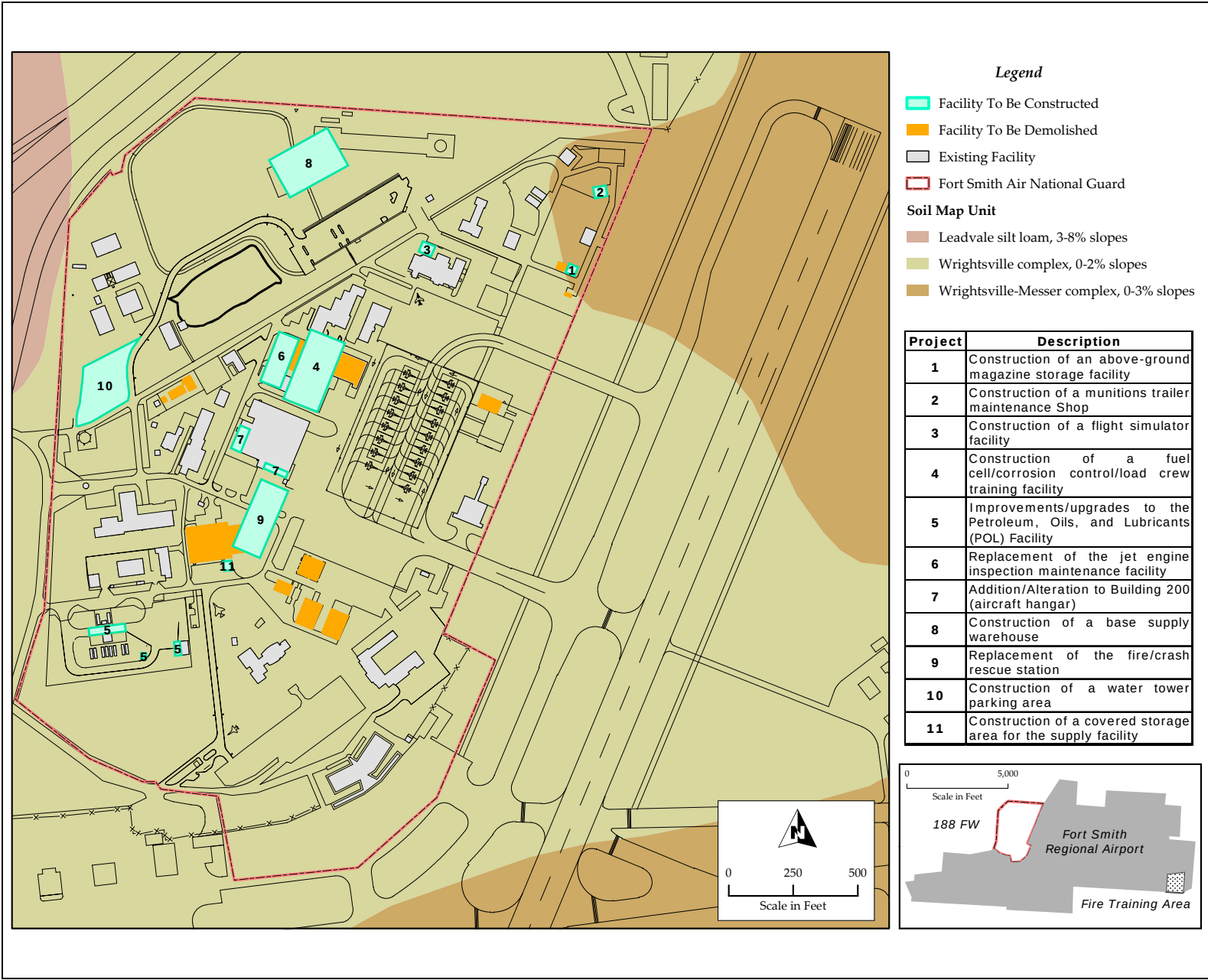


Figure 4.8-1. Soils Associated with the Proposed Action at the Arkansas Air National Guard, Fort Smith Regional Airport

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## 4.8.2.2 No Alternative Action

Under the No Action alternative, no construction would occur and no new impacts to earth resources would occur at the 188 FW installation. Conditions would remain as described in section 3.8.2.

## 4.9 WATER RESOURCES

### 4.9.1 METHODOLOGY

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 groundwater basins or exceed safe annual yield of water supply sources; 3) adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions; 4) threaten or damage unique hydrologic characteristics; or 5) violate 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.

The Water Division of the ADEQ and the USACE are the regulatory agencies that govern water resources in the state of Arkansas and specifically at Fort Smith Regional Airport, where the ARANG is a tenant. These agencies have adopted the USEPA's applicable environmental rules and regulations. The CWA of 1977 regulates pollutant discharges and development activities that could affect aquatic life forms or human health and safety.

### 4.9.2 IMPACTS

#### 4.9.2.1 Proposed Action

With regard to water resources, the primary concerns associated with the Proposed Action include effects on water quality during construction activities, changes to surface water drainage and groundwater recharge.

In general, 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

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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 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.

Under the Proposed Action, up to approximately 4.1 acres of land surface would be temporarily disturbed as a result of construction and 2.1 acres are scheduled for demolition of the proposed facilities and pavements. As described in Section 2.2, there would be approximately 2.2 acres of new impervious surface following completion of all the proposed construction. The impervious area resulting from these activities would not be one continuous hardened surface. Rather, the impervious surfaces would occupy several smaller areas, rather than one large site which would minimize localized impacts to the storm drainage system.

There is no proposed construction for areas within or near any wetlands; therefore, there would be no impacts to wetlands anticipated as a result of the Proposed Action.

The proposed construction activities would require obtaining an NPDES Storm Water Construction Permit and developing a Storm Water Pollution Prevention Plan for construction activities in accordance with the Water Division of ADEQ. Adherence to the requirements of the NPDES construction permit would include implementation of BMPs to minimize the potential for exposed soils or other contaminants from construction activities on the installation to reach nearby surface waters, stabilize runoff, and control sedimentation. Such BMPs would include the use of well maintained silt fences or straw wattles, minimizing surficial area disturbed, stabilization of cut/fill slopes, minimization of earth-moving activities during wet weather, covering of soil stockpiles, use of secondary containment for the temporary storage of hazardous liquids, and establishment of buffer areas near intermittent streams, as appropriate. Following construction, disturbed areas not covered with impervious surfaces would be reestablished with appropriate vegetation and native seed mixtures, and managed to minimize future erosion potential. The proposed facilities would not require modifications or disturbance of any streams, wetlands, or ponds located on or near the installation. Impacts to water resources as a result of the Proposed Action would be expected to be negligible.

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## 4.9.2.2 No Action Alternative

Under the No Action Alternative, no construction would occur and no impacts to water resources would occur. Conditions would remain as described in section 3.9.2.

## 4.10 BIOLOGICAL RESOURCES

### 4.10.1 METHODOLOGY

Determination of the significance of impacts to biological resources 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, 4) the proportion of the resource that would be affected relative to its occurrence in the region, and 5) 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.

### 4.10.2 IMPACTS

#### 4.10.2.1 Proposed Action

##### *Vegetation*

Under the Proposed action up to approximately 4.1 acres of land surface would be temporarily disturbed as a result of construction activities and 2.1 acres would be temporarily disturbed as a result of demolition of facilities and pavements. As described in Section 2.2, there would be approximately 2.23 acres of new impervious surface following completion of all the proposed construction.

The disturbance would occur primarily in previously developed urban grassland habitat all within the main cantonment area. Impacts from construction activities would be mitigated through BMPs to include re-vegetation of disturbed ground with native seed mixtures.

##### *Wildlife*

The Proposed Action would have negligible impacts on wildlife located in the vicinity of Fort Smith Regional Airport. Fauna found in the area are typical of wildlife in urban areas, and as such, these species typically adapt readily to urban disturbances such as construction activities by dispersing to other nearby habitat. There are no special qualities associated with existing habitat on the installation that would result in an impact to existing fauna due to proposed construction or demolition activities.

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## *Sensitive Species*

While there is potential habitat on the installation for three sensitive species (American burying beetle, the gulf crayfish snake, and the pregnant sedge) it is anticipated that the Proposed Action would not affect sensitive species at the 188 FW installation.

The American burying beetle prefers open grass/shrub habitat as well as broadleaf woodland (oak and hickory) habitat, which occurs on the Fire Training Area parcel. (approximately 3 acres in the southwest corner of the parcel) However, under the Proposed Action, no new construction would occur within this portion of the installation.

The gulf crayfish snake's habitat requirements include marsh and pond habitats. Although a pond is located within the main cantonment area and three ponds are located within the Fire Training Area, the Proposed Action would have no impacts to the ponds on the either parcel, and therefore no direct impacts to gulf crayfish snake or its habitat would be anticipated.

The pregnant sedge's requires a floodplain habitat. No portion of proposed activities would occur within the floodplain. Thus, no impacts to pregnant sedge populations are likely to occur from the Proposed Action.

## *Wetlands and Other Aquatic Habitat*

There are no jurisdictional wetlands within the ROI, therefore the Proposed Action would not impact jurisdictional wetlands (ARANG 2002). The aquatic habitat associated with the four ponds at the 188 FW installation would not be directly impacted during demolition or construction activities as none of the construction activities would occur within 50 feet of any of these ponds. Implementation of BMPs (e.g., silt fencing, sediment traps, revegetation of disturbed areas, proper secondary containment, etc.) would minimize the potential for contaminated runoff to reach these aquatic habitats. Refer to Section 4.9.2, Water Resources, for additional information on impacts to these surface water resources.

### 4.10.2.2 No Action Alternative

Under the No Action alternative, there would be no ground disturbing activities and thus no impacts to biological resources at the 188 FW installation would occur. Conditions would remain as described in Section 3.10.2 of this EA.

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## 4.11 CULTURAL RESOURCES

### 4.11.1 METHODOLOGY

Cultural resources are subject to review under both Federal and state laws and regulations. Section 106 of the NHPA of 1966 empowers the ACHP to comment on federally initiated, licensed, or permitted projects affecting cultural sites listed in, or eligible for listing in, the NRHP. Eligibility evaluation is the process by which resources are assessed relative to NRHP eligibility criteria. Historic properties, or those cultural resources determined to be eligible for the NRHP, are protected under the NHPA. Impacts to cultural resources determined to be eligible for the NRHP would be considered significant.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts 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 activities and determining the exact location of cultural resources that could be affected. Indirect impacts generally result from the effects of project-induced population increases and the need to develop new housing areas, utility services, and other support functions to accommodate population growth. These activities and the subsequent use of the facilities can impact cultural resources.

### 4.11.2 IMPACTS

#### 4.11.2.1 Proposed Action

Noise from aircraft has the potential to adversely impact cultural resources. However, in the case of the Proposed Action replacing F-16Cs with A-10s, the noise footprint will be smaller, with the result that sensitive cultural resources that may currently lie underneath the airspace will experience reduced noise.

Of the 17 buildings that will be demolished or altered through the Proposed Action, 14 date from the Cold War-era (1946-1989), and their eligibility is assessed based on Cold War contexts. Four of these are also 50 years old, and are evaluated for NRHP eligibility based also on their age. Table 4.11-1 lists all structures included in the Proposed Action, including those that date from the 1990s. A resource survey is in progress that will evaluate all 188 FW Cold War era structures for NRHP eligibility. While the 188 FW will consult with the Arkansas SHPO regarding eligibility evaluations of the buildings, preliminary findings are presented in Table 4.11-1. None of the structures meet the significance standards required for NRHP eligibility.

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**Table 4.11-1. Structures Proposed for Demolition or Alteration**

| <b><i>Building #</i></b> | <b><i>Proposed Action</i></b> | <b><i>Facility<br/>Category Name</i></b>     | <b><i>Construction<br/>Year</i></b> | <b><i>NRHP<br/>Eligibility</i></b> |
|--------------------------|-------------------------------|----------------------------------------------|-------------------------------------|------------------------------------|
| 39                       | Demolish                      | Swimming pool, consolidated                  | 1956                                | TBD                                |
| 40                       | Demolish                      | Swimming pool, consolidated                  | 1956                                | TBD                                |
| 108                      | Demolish                      | Base supply administration                   | 1980                                | TBD                                |
| 110                      | Replace/Renovate              | Vehicle maintenance shop                     | 1960                                | TBD                                |
| 113                      | Demolish                      | Shop, weapons and release systems            | 1972                                | TBD                                |
| 115                      | Demolish                      | Shop, weapons and release systems            | 1976                                | TBD                                |
| 119                      | Demolish                      | Base hazardous storage                       | 1987                                | TBD                                |
| 130                      | Expand                        | Petroleum Operations Building                | 1995                                | Not Eligible                       |
| 132                      | Demolish                      | Aircraft Corrosion Control Hangar            | 1996                                | Not Eligible                       |
| 200                      | Add-on/Renovate               | Hangar, maintenance                          | 1955                                | TBD                                |
| 201                      | Demolish                      | Fire crash/rescue station                    | 1979                                | TBD                                |
| 203                      | Demolish                      | Fuel system maintenance dock                 | 1978                                | TBD                                |
| 207                      | Demolish                      | Swimmers bath house                          | 1956                                | TBD                                |
| 214                      | Demolish                      | Shop, jet engine inspection and maintenance  | 1974                                | TBD                                |
| 221                      | Demolish                      | Munitions load crew training                 | 1982                                | TBD                                |
| 225                      | Demolish                      | Shop, conventional munitions                 | 1989                                | TBD                                |
| 230                      | Demolish                      | Storage magazine above ground type A, B, & C | 1996                                | Not Eligible                       |

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## 4.11.2.2 No Action Alternative

Impacts to cultural resources are not expected under the No Action alternative. The ARANG would maintain existing facilities and would not build new facilities or infrastructure. Cultural resources would continue to be managed in compliance with federal law and USAF regulations.

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## 5.0 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.

Fort Smith Regional Airport 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 have been analyzed for the potential to create cumulative environmental impacts. Short- and long-term planning efforts at the 188 FW and Fort Smith Regional Airport include the actions described within this environmental assessment, as well as several others that are either ongoing or planned over the short-term. The 188 FW completed an EA in 2005 that addressed proposed construction projects. These projects have either recently been completed, are on-going, or will be completed in the near future. Fort Smith Regional Airport has developed a Capital Improvement Plan (CIP) for proposed improvements at the airport over the next 5 years (personal communication, Penney 2006) (these projects are subject to separate environmental review).

On-going projects and projects planned at the Fort Smith Regional Airport and within the ROI include:

- Airfield Electrical Rehabilitation – This would be accomplished in two phases and would be completed in 2008.
- Airfield Pavement Rehabilitation – This project would be accomplished in two stages and would involve the East Hold Apron, West Corporate Taxilane, apron drainage improvements, Taxiway B, and Taxiway E.
- General Aviation (GA) Development – This would be accomplished in two phases and would include extension of Taxiway C, construction of T-hangar taxilanes, construction of a self fuel apron, and demolition of Hangars 11 and 12.
- Runway Protection Zone (RPZ) Property Acquisition – In 2008 the airport plans to acquire four parcels located within the RPZ.
- T-Hangar Development – The airport plans to construct several new T-hangars in two phases during 2007 and 2008.

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- Relocate Perimeter Road – The airport plans to relocate the roadway surrounding the airport in 2009.
- Extend Runway 07/25 – This project would be the first phase of a runway extension that would include a parallel taxiway and is scheduled to occur in 2010.
- Land Acquisition (2010) – The airport plans to acquire two parcels located within the Runway 25 approach and remove existing obstructions in 2010.
- Land Acquisition (2011) – The airport plans to acquire lands near the southeast quadrant of the airport in 2011 for future General Aviation development.
- The City of Fort Smith adopted a Comprehensive Plan in November 2002. The Comprehensive Plan is intended to provide a framework for the desired physical development of the City of Fort Smith over the next 20 years. According to the Comprehensive Plan, planned land uses surrounding the airport will include mixed-use employment/office/industrial retail parks and services, and pedestrian oriented, mixed land use neighborhoods to the north; a greenway expansion associated with Ben Geren Park to the east and south; residential development and mixed-use employment/office/industrial retail parks and services also to the south; and mixed-use employment/office/industrial retail parks and services pedestrian oriented, mixed land use neighborhoods to the west. Projects described below are also related to the City's Comprehensive Plan (City of Fort Smith 2002).
- The airport owns most of the frontage property along Phoenix Avenue, including property near the 188 FW installation, and plans to subdivide and develop much of this property. Many private land-owners also have property in this area that will likely be developed.
- The City of Fort Smith recently widened Massard Road from two to five lanes between Zero Street and Phoenix Avenue. Massard Road will also be extended south of Zero Street in the near future.
- The former Fort Chaffee site (south of the airport), comprising about 4,000-5,000 acres, will be redeveloped with industrial, commercial and residential uses under an existing master plan.
- A new airport surveillance radar is to be located on a ridgeline on Fort Chaffee.
- Subdivision and development of private property is expected to occur on a privately owned greenbelt area that is located north of the airport.

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These planned activities have the potential to generate environmental impacts that could exacerbate impacts associated with the proposal described in this EA unless projects are planned and implemented with consideration for this potential. Each of the actions listed above that are associated with airport property will be the subject of subsequent environmental review, which will evaluate the existing environment at the time of each proposal. Projects occurring on lands within the jurisdiction of the City of Fort Smith and Sebastian County will be subject to review under local planning and development policies.

Cumulative impacts anticipated in association with the actions described within this EA in addition to those actions described above are described in the following paragraphs.

**Noise.** In general, land at and surrounding Fort Smith Regional Airport are situated within areas already exposed to elevated noise from airfield operations. Much of the airport is generally located within the  $L_{dn}$  65 contour. Construction noise emanating off-site would probably be noticeable in the immediate site vicinity, but would not be expected to create significant impacts. Overall, the Proposed Action analyzed in this EA would actually reduce the land area exposed to elevated noise as compared to existing conditions as a result of the aircraft conversion from F-16s to A-10s. Cumulative impacts associated with noise would be expected to be positive, with an overall reduction in the acreage exposed to elevated noise levels.

**Land Use/Visual Resources.** In general, land uses at Fort Smith Regional Airport would not be adversely affected by the activities described above. The location and function of the proposed structures are generally compatible with the surrounding area and work to consolidate like functions and improve overall utility. The reduction in acreage exposed to elevated noise levels would be reduced under the Proposed Action, and it is likely that over time, businesses and other uses could locate in areas surrounding the airport that had previously been exposed to the higher noise levels. While this is potentially a positive impact, should the 188 FW convert to a louder aircraft at some point in the future, there could be substantial conflict if incompatible uses had located within this area. Additionally, some of the projects described above include measures to correct potential land use issues related to airport operations. Described activities would not adversely affect the viewshed at or near Fort Smith Regional Airport. While the proposed construction activities include large structures, the size and type of buildings would be similar to other buildings at the airport. As the proposed structures would not be incongruent with the surrounding buildings or land uses, cumulative impacts to land use and visual resources would be expected to be negligible.

**Air Quality.** In general, combustive and fugitive dust emissions from construction activities associated with the Proposed Action would contribute localized, short-term elevated air pollutant concentrations but would not result in any long-term impacts on the air quality of Sebastian County or AQCR 017, nor have any significant adverse impacts on Arkansas' SIP. The aircraft

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conversion under the Proposed Action would increase VOC, CO, and PM<sub>10</sub> emissions and decrease NO<sub>x</sub> and SO<sub>x</sub> from current levels. These emission increases would contribute less than significant air quality impacts along with other construction projects to Sebastian County and the AQCR.

***Socioeconomics and Environmental Justice.*** Expenditures from the activities at Fort Smith Regional Airport and other projects within the ROI described above would generally result in minor beneficial economic impacts to the region by generating construction-related employment and income in the ROI. Impacts would be temporary in nature, however, only accruing economic benefits to the region for the duration of construction activities. No permanent or long-lasting cumulative socioeconomic impacts are anticipated as a result of implementation of these activities. Disadvantaged groups within the ROI, including minority, and low-income populations, do not represent a disproportionately high segment of the ROI population. Additionally, because no significant adverse impacts are anticipated, there would be no adverse cumulative impact to these populations. There are no known cumulative environmental health or safety risks associated with these activities that may disproportionately affect children.

***Safety.*** Risk of a catastrophic event occurring during construction activities is considered to be low, and strict adherence to all applicable occupational safety requirements would further minimize the relatively low risk associated with described construction activities. Cumulative impacts to safety are expected to be negligible. In addition, proposed projects associated with the airport would improve safety conditions associated with the airfield environment.

***Solid and Hazardous Materials and Waste.*** Products containing hazardous materials and petroleum products would be procured and used during the construction activities described above. It is anticipated that the quantity of products containing hazardous materials used during the construction of these facilities would be minimal and their use would be of short duration. Contractors would be responsible for the management of hazardous materials, which would be handled in accordance with Federal and state regulations. Proposed demolition would require the disposal of construction debris at the City of Fort Smith landfill over the duration of demolition activities. However, given the existing capacity and expected operational life of this landfill disposal of this amount of debris would not substantially affect this landfill. Cumulative impacts as a result of the described activities are expected to be less than significant.

***Infrastructure.*** Implementation of the activities at Fort Smith Regional Airport described above would consolidate functions at the airport. Construction activities could result in some temporary interruption of utility services and minor hindrances of transportation and circulation during construction activities; however, these impacts would be temporary. New facilities and circulation systems would further enhance the existing installation transportation networks. New development would also result in an increase in the demand for utilities. In general, cumulative

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impacts to installation infrastructure as a result of described activities are expected to be less than significant.

**Earth Resources.** In addition to the 4.1 acres of surface disturbance that would result from implementation of the proposal described in this EA, several acres would be disturbed within the ROI over the next several years as a result of the projects described above as part of airport renovation and implementation of several other planned projects in the vicinity of the airport. It is expected that implementation of construction BMPs would be used to limit or eliminate soil movement, stabilize runoff, and control sedimentation. These BMPs would include the use of: well maintained silt fences; minimizing surficial area disturbed; stabilization of cut/fill slopes; minimization of earth-moving activities during wet weather; and use of temporary detention ponds. Following construction, disturbed areas not covered with impervious surfaces would be reestablished with appropriate vegetation and managed to minimize future erosion potential. Given the employment of engineering practices that would minimize potential erosion, cumulative impacts to earth resources are expected to be less than significant.

**Water Resources.** In addition to the 4.1 acres of surface disturbance and 2.2 acres of impervious surface that would result from implementation of the proposal described in this EA, several acres would be disturbed and/or converted to impervious surface over the next several years as a result of the projects described above. The impervious area resulting from these activities would not be one continuous hardened surface. Rather, the impervious surfaces would occupy several smaller areas, rather than one large site. It is expected that any construction activities would adhere to NPDES requirements including implementation of BMPs described above. As such, cumulative impacts to water resources are expected to be less than significant.

**Biological Resources.** In general, construction activities at Fort Smith Regional Airport and the vicinity would primarily occur on sites that are already altered by man. These impacts would include the removal of some vegetation and associated wildlife habitat. However, wildlife that uses these areas are typical of urban and suburban areas. If any impacts to sensitive species that may occur in the area are anticipated, consultation with USFWS and ANHC would occur. Cumulative impacts would be expected to be less than significant.

**Cultural Resources.** In the event of unanticipated discoveries of cultural resources during construction, work would halt at that location and the resources would be managed in compliance with federal law and USAF regulations. Cumulative impacts to cultural resources are not expected as a result of all planned activities at Fort Smith Regional Airport. Compliance with Section 106 of the NHPA, including SHPO and Native American consultation to identify any known archaeological resources has been undertaken by the 188 FW.

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## 6.0 SPECIAL OPERATING PROCEDURES AND MITIGATIONS

### 6.1 SPECIAL OPERATING PROCEDURES

Impact evaluations contained in this EA have determined that no significant environmental impacts would result from implementation of the Proposed Action. However, this determination is based on the following procedures being completed by knowledgeable, responsible personnel from the 188 FW, working through the appropriate federal, state and local agencies.

- Construction BMPs would be employed during construction activities to minimize soil movement, stabilize runoff, and generally control sedimentation. These BMPs would include, but not be limited to: the use of silt fences, covering of soil stockpiles, use of secondary containment for the temporary storage of hazardous liquids, and establishment of buffer areas near intermittent streams, as appropriate.
- The 188 FW would require their construction contractor to obtain any required permits, approvals, or certifications prior to implementing construction or demolition activities
- The 188 FW would require their construction contractor to obtain an NPDES Storm Water Construction Permit and Pollution Prevention Plan for construction activities from the Water Division of ADEQ. Adherence to the requirements of the NPDES construction permit would include implementation of BMPs to minimize the potential for exposed soils or other contaminants from construction activities on the installation to reach nearby surface waters.
- Coordination with the State Historic Preservation Office would occur prior to implementation of any construction or demolition activities that could impact historic resources.
- Personnel conducting construction and/or demolition activities would strictly adhere to all applicable occupational safety requirements during construction activities.
- Sampling for asbestos and lead-based paint would occur prior to demolition activities and materials would be handled in accordance with the ARANG Asbestos Management Plan and USAF policy.
- The ARANG will continue to coordinate construction projects with the Fort Smith Regional Airport to ensure that encroachment beyond the Building Restriction Line or into the Runway Protection Zone does not occur.

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## 6.2 MITIGATION

Special operating procedures differ from mitigation in that the former are designed to prevent negative impacts during the implementation of an action while the latter remediate impacts that occur as a result of the implementation. Since no impacts are anticipated as a result of the Proposed Action, no mitigation would be necessary.

# **DRAFT**

## **7.0 PERSONS AND AGENCIES CONTACTED**

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Arkansas Forestry Commission. 2006.

Arkansas Game and Fish Commission. 2006.

Arkansas Natural and Cultural Resources Council. 2006.

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City of Fort Smith, Planning and Zoning Department. 2006

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Harney, Margaret. 2006. Acting Field Supervisor, U.S. Fish and Wildlife Service.

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Krimmel, Major James J. 2005. 188 FW Safety Office. Personal Communication.

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Mueller, Allan. 2006. Field Supervisor, U.S. Fish and Wildlife Service.

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## 9.0 REFERENCES

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

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## INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (ICEP) DISTRIBUTION LIST FOR ARANG ENVIRONMENTAL ASSESSMENT

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September 21, 2006

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Lakewood, CO 80228

Dear Mr. Nuss:

The U.S. Fish and Wildlife Service (Service) has reviewed the information supplied in your letter dated September 7, 2006, regarding the environmental assessment of the Fort Smith Regional Airport in Sebastian County, Arkansas. Our comments are submitted in accordance with the Endangered Species Act (87 Stat. 884, as amended 16 U.S.C. 1531 et seq.).

The following endangered species are known to occur in Sebastian County: American Burying Beetle (*Nicrophorus americanus*) and Interior Least Tern (*Sterna antillarum athalassos*). The Bald Eagle (*Haliaeetus leucocephalus*) is a threatened species that also occurs in Sebastian County.

Depending on the location and extent of ground disturbances associated with this project, it may or may not adversely affect the American Bury Beetle. The Service will reserve further comments on this project until it has had the opportunity to thoroughly review the Environmental Assessment. We appreciate your interest in the preservation of endangered species. If you have any questions, please call Chris Davidson at (501) 513-4481.

Sincerely,

Margaret Harney  
Acting Field Supervisor

# DRAFT



## The Department of Arkansas Heritage

Mike Huckabee, Governor  
Cathie Matthews, Director

Arkansas Arts Council

Arkansas Historic  
Preservation Program

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars  
Cultural Center

Old State House Museum



## Arkansas Natural Heritage Commission

1500 Tower Building  
323 Center Street  
Little Rock, AR 72201  
(501) 324-9619  
fax: (501) 324-9618  
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e-mail: [info@arkansasheritage.org](mailto:info@arkansasheritage.org)  
website:  
<http://naturalheritage.com>

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Date: September 22, 2006  
Subject: Elements of Special Concern  
Fort Smith Regional Airport  
Fort Smith, Sebastian County, AR  
Purchase Order No.: 4400134185  
ANHC No.: P-CF..-06-112

Mr. Cameron Nuss  
Science Applications International Corporation  
405 Urban Street, Suite 400  
Lakewood, CO 80228

Dear Mr. Nuss:

Staff members of the Arkansas Natural Heritage Commission have reviewed our files for records indicating the occurrence of rare plants and animals, outstanding natural communities, natural or scenic rivers, or other elements of special concern within or near the Fort Smith Regional Airport in Sebastian County, Arkansas. We find no records at present time.

A Sebastian County Element list is enclosed. Represented on this list are elements for which we have records in our database. The list has been annotated to indicate those elements known to occur within a one and a five mile radius of the project site. A legend is enclosed to help you interpret the codes used on this list.

Please keep in mind that the project area may contain important natural features of which we are unaware. Staff members of the Arkansas Natural Heritage Commission have not conducted a field survey of the study site. Our review is based on data available to the program at the time of the request. It should not be regarded as a final statement on the elements or areas under consideration. Because our files are updated constantly, you may want to check with us again at a later time.

Thank you for consulting us. It has been a pleasure to work with you on this study.

Sincerely,

Cindy Osborne  
Data Manager/Environmental Review Coordinator

Enclosures: Legend  
Sebastian County Element List (annotated)  
Invoice

# DRAFT

10/18/2005

## Arkansas Natural Heritage Commission Department of Arkansas Heritage Inventory Research Program Sebastian County

| Scientific Name                                  | Common Name             | Federal Status | State Status | Global Rank | State Rank |
|--------------------------------------------------|-------------------------|----------------|--------------|-------------|------------|
| <b>Animals-Invertebrates</b>                     |                         |                |              |             |            |
| <i>Cicindela hirticollis</i>                     | Beach-dune Tiger Beetle | -              | INV          | G5          | S2S3       |
| <i>Lucanus elephus</i>                           | Giant Stag Beetle       | -              | INV          | G3G5        | S2         |
| <i>Nicrophorus americanus</i>                    | American Burying Beetle | LE             | INV          | G2G3        | S1         |
| <b>Animals-Vertebrates</b>                       |                         |                |              |             |            |
| <i>Cemophora coccinea copei</i>                  | Northern Scarlet Snake  | -              | INV          | G5T5        | S3         |
| ✓ <i>Haliaeetus leucocephalus</i>                | Bald Eagle              | LT-PD          | INV          | G4          | S2B,S4N    |
| ✓ <i>Hiodon alosoides</i>                        | Goodeye                 | -              | INV          | G5          | S2?        |
| ✓ <i>Hybognathus placitus</i>                    | Plains Minnow           | -              | INV          | G4          | SX         |
| ✓ <i>Limnithlypis swainsonii</i>                 | Swainson's Warbler      | -              | INV          | G4          | S3B        |
| <i>Percina phoxocephala</i>                      | Slenderhead Darter      | -              | INV          | G5          | S2         |
| ✓ <i>Phenacobius mirabilis</i>                   | Suckermouth Minnow      | -              | INV          | G5          | S1         |
| <i>Polyodon spathula</i>                         | Paddlefish              | -              | INV          | G4          | S2?        |
| ✓* <i>Regina rigida sinicola</i>                 | Gulf Crayfish Snake     | -              | INV          | G5T5        | S3         |
| <i>Reithrodontomys humilis</i>                   | Eastern Harvest Mouse   | -              | INV          | G5          | S1?        |
| <i>Sterna antillarum athalassos</i>              | Interior Least Tern     | LE             | INV          | G4T2Q       | S2B        |
| <i>Terrapene ornata ornata</i>                   | Ornate Box Turtle       | -              | INV          | G5T5        | S2         |
| <i>Thryomanes bewickii</i>                       | Bewick's Wren           | -              | INV          | G5          | S2B,S3N    |
| ✓ <i>Tyrannus verticalis</i>                     | Western Kingbird        | -              | INV          | G5          | S1B,S1N    |
| <b>Plants-Vascular</b>                           |                         |                |              |             |            |
| <i>Carex gravida</i>                             | a caric sedge           | -              | INV          | G5          | S2S3       |
| <i>Croptilon hookerianum</i> var. <i>validum</i> | scratch-daisy           | -              | INV          | G5?T5       | S2         |
| <i>Equisetum laevigatum</i>                      | smooth scouring rush    | -              | INV          | G5          | S1         |
| ✓ <i>Iva angustifolia</i>                        | marsh elder             | -              | INV          | G5?         | S1         |
| <i>Liatris squarrosa</i> var. <i>compacta</i>    | a blazing star          | -              | INV          | G5T3        | S3         |
| ✓ <i>Lithospermum incisum</i>                    | narrow-leaved puccoon   | -              | INV          | G5          | S2S3       |
| <i>Marsilea vestita</i>                          | prairie water-clover    | -              | INV          | G5          | S3         |
| <i>Minuartia drummondii</i>                      | a sandwort              | -              | INV          | G5          | S2S3       |
| <i>Quercus acerifolia</i>                        | maple-leaved oak        | -              | ST           | G1          | S1         |
| <i>Solidago delicatula</i>                       | a goldenrod             | -              | INV          | G5TNR       | S1         |
| <i>Valerianella nuttallii</i>                    | Nuttall cornsalad       | -              | INV          | G1G2        | S1         |
| ✓ <i>Zephyranthes chlorosolen</i>                | rain lily               | -              | INV          | G5          | S1S2       |
| <b>Special Elements-Natural Communities</b>      |                         |                |              |             |            |
| <i>Lowland oak-sweetgum forest</i>               |                         | -              | INV          | -           | S1         |
| <i>Post oak-blackjack oak forest</i>             |                         | -              | INV          | -           | S2         |
| <i>Sandstone glade/outcrop</i>                   |                         | -              | INV          | -           | S4         |
| <i>Submesic oak-hickory forest</i>               |                         | -              | INV          | -           | S1         |
| ✓* <i>Tallgrass prairie</i>                      |                         | -              | INV          | -           | S2         |
| <i>Xeric shortleaf pine-oak forest</i>           |                         | -              | INV          | -           | S3         |

\* - These elements have been recorded within one mile of the Fort Smith Regional Airport.

✓- These elements have been recorded within five miles of the Fort Smith Regional Airport.

# DRAFT

## LEGEND

### STATUS CODES

#### FEDERAL STATUS CODES

|              |   |                                                                                                                                                                                                     |
|--------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C            | = | Candidate species. The U.S. Fish and Wildlife Service has enough scientific information to warrant proposing this species for listing as endangered or threatened under the Endangered Species Act. |
| LE           | = | Listed Endangered; the U.S. Fish and Wildlife Service has listed this species as endangered under the Endangered Species Act.                                                                       |
| LT           | = | Listed Threatened; the U.S. Fish and Wildlife Service has listed this species as threatened under the Endangered Species Act.                                                                       |
| PD           | = | Proposed for Delisting; the U.S. Fish and Wildlife Service has proposed that this species be removed from the list of Endangered or Threatened Species.                                             |
| PE           | = | Proposed Endangered; the U.S. Fish and Wildlife Service has proposed this species for listing as endangered.                                                                                        |
| PT           | = | Proposed Threatened; the U.S. Fish and Wildlife Service has proposed this species for listing as threatened.                                                                                        |
| T/SA<br>E/SA | = | Threatened (or Endangered) because of similarity of appearance.                                                                                                                                     |

#### STATE STATUS CODES

|     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INV | = | Inventory Element; The Arkansas Natural Heritage Commission is currently conducting active inventory work on these elements. Available data suggests these elements are of conservation concern. These elements may include outstanding examples of Natural Communities, colonial bird nesting sites, outstanding scenic and geologic features as well as plants and animals, which, according to current information, may be rare, peripheral, or of an undetermined status in the state. The ANHC is gathering detailed location information on these elements. |
| WAT | = | Watch List Species; The Arkansas Natural Heritage Commission is not conducting active inventory work on these species, however, available information suggests they may be of conservation concern. The ANHC is gathering general information on status and trends of these elements. An "" indicates the status of the species will be changed to "INV" if the species is verified as occurring in the state (this typically means the agency has received a verified breeding record for the species).                                                          |
| MON | = | Monitored Species; The Arkansas Natural Heritage Commission is currently monitoring information on these species. These species do not have conservation concerns at present. They may be new species to the state, or species on which additional information is needed. The ANHC is gathering detailed location information on these elements.                                                                                                                                                                                                                  |
| SE  | = | State Endangered; the Arkansas Natural Heritage Commission applies this term to native plant taxa which are in danger of being extirpated from the state.                                                                                                                                                                                                                                                                                                                                                                                                         |
| ST  | = | State Threatened; The Arkansas Natural Heritage Commission applies this term to native plant taxa which are believed likely to become endangered in Arkansas in the foreseeable future, based on current inventory information.                                                                                                                                                                                                                                                                                                                                   |

### DEFINITION OF RANKS

#### Global Ranks

|    |   |                                                                                                                                                                                  |
|----|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| G1 | = | Critically imperiled globally. At a very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.                    |
| G2 | = | Imperiled globally. At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.                         |
| G3 | = | Vulnerable globally. At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. |
| G4 | = | Apparently secure globally. Uncommon but not rare; some cause for long-term concern due to declines or other factors.                                                            |
| G5 | = | Secure globally. Common, widespread and abundant.                                                                                                                                |
| GH | = | Of historical occurrence, possibly extinct globally. Missing; known from only historical occurrences, but still some hope of rediscovery.                                        |
| GU | = | Unrankable. Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.                                              |

# DRAFT



## The Department of Arkansas Heritage

Mike Huckabee, Governor  
Cathie Matthews, Director

Arkansas Arts Council

Arkansas Historic  
Preservation Program

Delta Cultural Center

Historic Arkansas Museum

Mosaic Templars  
Cultural Center

Old State House Museum



## Arkansas Natural Heritage Commission

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e-mail: [info@arkansasheritage.org](mailto:info@arkansasheritage.org)  
website:  
<http://naturalheritage.com>

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Invoice No. 06-030

To: Science Applications International Corporation  
405 Urban Street, Suite 400  
Lakewood, CO 80228

Date: September 22, 2006

ANHC No. P-CF..-06-112

RE: Data from Arkansas Natural Heritage Inventory Program.  
Elements of Special Concern, Fort Smith Regional Airport, Sebastian  
County, Arkansas

Project contact: Cameron Nuss  
Purchase Order No.: 4400134185

Staff Time (1 hr. @ \$30.00/hr.).....\$30.00

TOTAL DUE.....\$30.00

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**APPENDIX B**  
**AIRCRAFT NOISE ANALYSIS AND AIRSPACE**  
**OPERATIONS**

# DRAFT

## APPENDIX B

### AIRCRAFT NOISE ANALYSIS AND AIRSPACE OPERATIONS

Noise is generally described as unwanted sound. Unwanted sound can be based on objective effects (such as hearing loss or damage to structures) or subjective judgments (community annoyance). Noise analysis thus requires a combination of physical measurement of sound, physical and physiological effects, plus psycho- and socio-acoustic effects.

Section 1 of this appendix describes how sound is measured and summarizes noise impact in terms of community acceptability and land use compatibility. Section 2 gives detailed descriptions of the effects of noise that lead to the impact guidelines presented in section 1. Section 3 provides a description of the specific methods used to predict aircraft noise, including a detailed description of sonic booms.

#### 1.0 NOISE DESCRIPTORS AND IMPACT

Aircraft operating in the Military Operations Areas (MOAs) and Warning Areas generate two types of sound. One is “subsonic” noise, which is continuous sound generated by the aircraft’s engines and also by air flowing over the aircraft itself. The other is sonic booms (only in MOAs and Warning Areas authorized for supersonic), which are transient impulsive sounds generated during supersonic flight. These are quantified in different ways.

Section 1.1 describes the characteristics which are used to describe sound. Section 1.2 describes the specific noise metrics used for noise impact analysis. Section 1.3 describes how environmental impact and land use compatibility are judged in terms of these quantities.

#### 1.1 QUANTIFYING SOUND

Measurement and perception of sound involve two basic physical characteristics: amplitude and frequency. Amplitude is a measure of the strength of the sound and is directly measured in terms of the pressure of a sound wave. Because sound pressure varies in time, various types of pressure averages are usually used. Frequency, commonly perceived as pitch, is the number of times per second the sound causes air molecules to oscillate. Frequency is measured in units of cycles per second, or hertz (Hz).

**Amplitude.** The loudest sounds the human ear can comfortably hear have acoustic energy one trillion times the acoustic energy of sounds the ear can barely detect. Because of this vast range, attempts to represent sound amplitude by pressure are generally unwieldy. Sound is, therefore, usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as a sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Because of the logarithmic nature of the decibel scale, sounds levels do not add and subtract directly and are somewhat cumbersome to handle mathematically. However, some simple rules

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of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by approximately 3 dB, regardless of the initial sound level. Thus, for example:

$$60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB, and}$$

$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB.}$$

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB.}$$

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as “decibel addition” or “energy addition.” The latter term arises from the fact that combination of decibel values consists of first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

The difference in dB between two sounds represents the ratio of the amplitudes of those two sounds. Because human senses tend to be proportional (i.e., detect whether one sound is twice as big as another) rather than absolute (i.e., detect whether one sound is a given number of pressure units bigger than another), the decibel scale correlates well with human response.

Under laboratory conditions, differences in sound level of 1 dB can be detected by the human ear. In the community, the smallest change in average noise level that can be detected is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound intensity but only a 50 percent decrease in perceived loudness because of the nonlinear response of the human ear (similar to most human senses).

The one exception to the exclusive use of levels, rather than physical pressure units, to quantify sound is in the case of sonic booms. As described in Section 3, sonic booms are coherent waves with specific characteristics. There is a long-standing tradition of describing individual sonic booms by the amplitude of the shock waves, in pounds per square foot (psf). This is particularly relevant when assessing structural effects as opposed to loudness or cumulative community response. In this study, sonic booms are quantified by either dB or psf, as appropriate for the particular impact being assessed.

**Frequency.** The normal human ear can hear frequencies from about 20 Hz to about 20,000 Hz. It is most sensitive to sounds in the 1,000 to 4,000 Hz range. When measuring community

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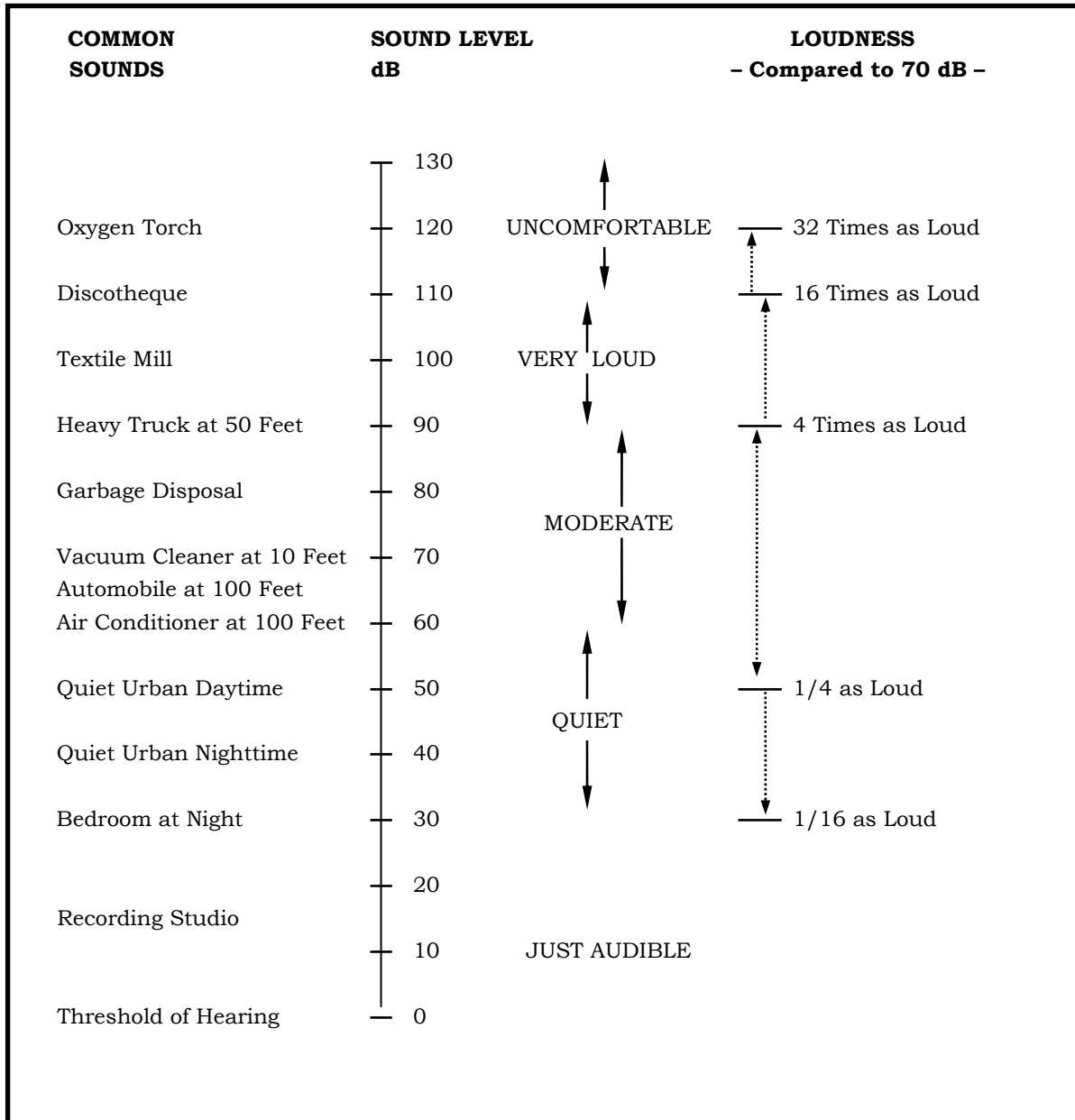
response to noise, it is common to adjust the frequency content of the measured sound to correspond to the frequency sensitivity of the human ear. This adjustment is called A-weighting (ANSI 1988). Sound levels that have been so adjusted are referred to as A-weighted sound levels. The amplitude of A-weighted sound levels is measured in dB. It is common for some noise analysts to denote the unit of A-weighted sounds by dBA. As long as the use of A-weighting is understood, there is no difference between dB or dBA: it is only important that the use of A-weighting be made clear. In this study, sound levels are reported in dB and are A-weighted unless otherwise specified.

A-weighting is appropriate for continuous sounds, which are perceived by the ear. Impulsive sounds, such as thunder or sonic booms, are perceived by more than just the ear. When experienced indoors, there can be secondary noise from rattling of the building. Vibrations may also be felt. C-weighting (ANSI 1988) is applied to such sounds. This is a frequency weighting that is flat over the range of human hearing (about 20 Hz to 20,000 Hz) and rolls off above and below that range. In this study, C-weighted sound levels are used for the assessment of sonic booms and other impulsive sounds. As with A-weighting, the unit is dB, but dBC is sometimes used for clarity. In this study, sound levels are reported in dB.

***Time Averaging.*** Sound pressure of a continuous sound varies greatly with time, so it is customary to deal with sound levels that represent averages over time. Levels presented as instantaneous (i.e., as might be read from the dial of a sound level meter) are based on averages of sound energy over either 1/8 second (fast) or 1 second (slow). The formal definitions of fast and slow levels are somewhat complex, with details that are important to the makers and users of instrumentation. They may, however, be thought of as levels corresponding to the root-mean-square sound pressure measured over the 1/8-second or 1-second periods.

The most common uses of the fast or slow sound level in environmental analysis is in the discussion of the maximum sound level that occurs from the action, and in discussions of typical sound levels. Figure B-1 is a chart of A-weighted sound levels from typical sounds. Some (air conditioner, vacuum cleaner) are continuous sounds whose levels are constant for some time. Some (automobile, heavy truck) are the maximum sound during a vehicle passby. Some (urban daytime, urban nighttime) are averages over some extended period. A variety of noise metrics have been developed to describe noise over different time periods. These are described in section 1.2.

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Source: Harris 1979 and FICON 1992.

**Figure B-1. Typical A-Weighted Sound Levels of Common Sounds**

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## 1.2 NOISE METRICS

### MAXIMUM SOUND LEVEL

The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM,  $L_{\max}$ , or  $L_{A\max}$ . The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleeping, or other common activities.

### PEAK SOUND LEVEL

For impulsive sounds, the true instantaneous sound pressure is of interest. For sonic booms, this is the peak pressure of the shock wave, as described in section 3.2 of this appendix. This pressure is usually presented in physical units of pounds per square foot. Sometimes it is represented on the decibel scale, with symbol  $L_{pk}$ . Peak sound levels do not use either A or C weighting.

### SOUND EXPOSURE LEVEL

Individual time-varying noise events have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The Sound Exposure Level (abbreviated SEL or  $L_{AE}$  for A-weighted sounds) combines both of these characteristics into a single metric.

SEL is a composite metric that represents both the intensity of a sound and its duration. Mathematically, the mean square sound pressure is computed over the duration of the event, then multiplied by the duration in seconds, and the resultant product is turned into a sound level. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level.

Because the SEL and the maximum sound level are both used to describe single events, there is sometimes confusion between the two, so the specific metric used should be clearly stated.

SEL can be computed for C-weighted levels (appropriate for impulsive sounds), and the results denoted CSEL or  $L_{CE}$ . SEL for A-weighted sound is sometimes denoted ASEL. Within this study, SEL is used for A-weighted sounds and CSEL for C-weighted.

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## EQUIVALENT SOUND LEVEL

For longer periods of time, total sound is represented by the equivalent continuous sound pressure level ( $L_{eq}$ ).  $L_{eq}$  is the average sound level over some time period (often an hour or a day, but any explicit time span can be specified), with the averaging being done on the same energy basis as used for SEL. SEL and  $L_{eq}$  are closely related, differing by (a) whether they are applied over a specific time period or over an event, and (b) whether the duration of the event is included or divided out.

Just as SEL has proven to be a good measure of the noise impact of a single event,  $L_{eq}$  has been established to be a good measure of the impact of a series of events during a given time period. Also, while  $L_{eq}$  is defined as an average, it is effectively a sum over that time period and is, thus, a measure of the cumulative impact of noise.

## DAY-NIGHT AVERAGE SOUND LEVEL

Noise tends to be more intrusive at night than during the day. This effect is accounted for by applying a 10-dB penalty to events that occur after 10 pm and before 7 am. If  $L_{eq}$  is computed over a 24-hour period with this nighttime penalty applied, the result is the day-night average sound level (DNL or  $L_{dn}$ ). DNL is the community noise metric recommended by the USEPA (USEPA 1974) and has been adopted by most federal agencies (FICON 1992). It has been well established that DNL correlates well with community response to noise (Schultz 1978; Finegold *et al.* 1994). This correlation is presented in Section 1.3 of this appendix.

While DNL carries the nomenclature “average,” it incorporates all of the noise at a given location. For this reason, DNL is often referred to as a “cumulative” metric. It accounts for the total, or cumulative, noise impact.

It was noted earlier that, for impulsive sounds, C-weighting is more appropriate than A-weighting. The day-night average sound level can be computed for C-weighted noise and is denoted CDNL or  $L_{Cdn}$ . This procedure has been standardized, and impact interpretive criteria similar to those for DNL have been developed (CHABA 1981).

## ONSET-ADJUSTED MONTHLY DAY-NIGHT AVERAGE SOUND LEVEL

Aircraft operations in military airspace, such as MOAs and Warning Areas, generate a noise environment somewhat different from other community noise environments. Overflights are sporadic, occurring at random times and varying from day to day and week to week. This situation differs from most community noise environments, in which noise tends to be continuous or patterned. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset.

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To represent these differences, the conventional DNL metric is adjusted to account for the “surprise” effect of the sudden onset of aircraft noise events on humans (Plotkin *et al.* 1987; Stusnick *et al.* 1992; Stusnick *et al.* 1993). For aircraft exhibiting a rate of increase in sound level (called onset rate) of from 15 to 150 dB per second, an adjustment or penalty ranging from 0 to 11 dB is added to the normal SEL. Onset rates above 150 dB per second require an 11 dB penalty, while onset rates below 15 dB per second require no adjustment. The DNL is then determined in the same manner as for conventional aircraft noise events and is designated as Monthly Onset-Rate Adjusted Day-Night Average Sound Level ( $L_{dnmr}$ ). Because of the irregular occurrences of aircraft operations, the number of average daily operations are determined by using the calendar month with the highest number of operations. Noise levels are calculated the same way for both DNL and  $L_{dnmr}$ .  $L_{dnmr}$  is interpreted by the same criteria as used for DNL.

## 1.3 NOISE IMPACT

### COMMUNITY REACTION

Studies of community annoyance to numerous types of environmental noise show that DNL correlates well with impact. Schultz (1978) showed a consistent relationship between DNL and annoyance. Shultz’s original curve fit (Figure B-2) shows that there is a remarkable consistency in results of attitudinal surveys which relate the percentages of groups of people who express various degrees of annoyance when exposed to different DNLs.

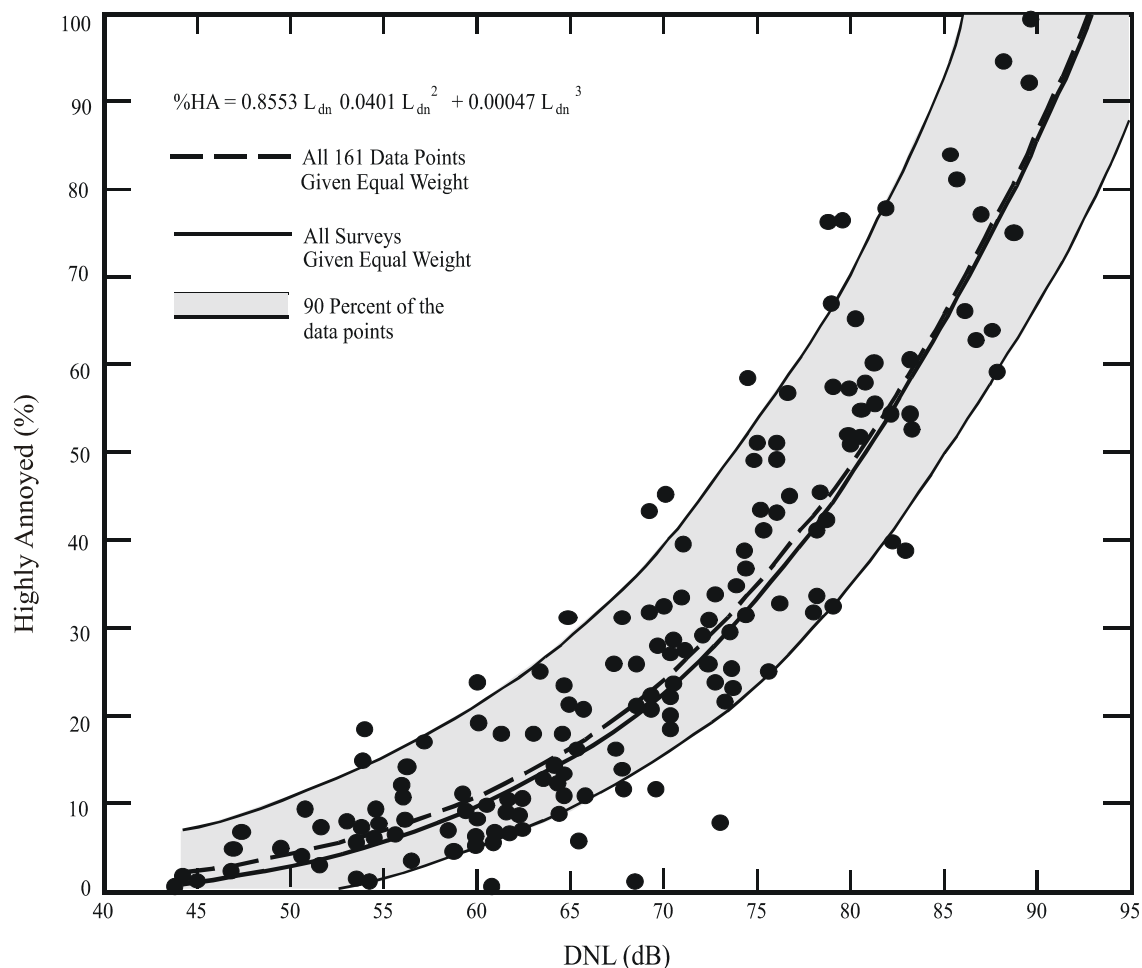


**Figure B-2. Community Surveys of Noise Annoyance**  
(Source: Schultz 1978)

A more recent study has reaffirmed this relationship (Fidell *et al.* 1991). Figure B-3 (FICON 1992) shows an updated form of the curve fit (Finegold *et al.* 1994) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.

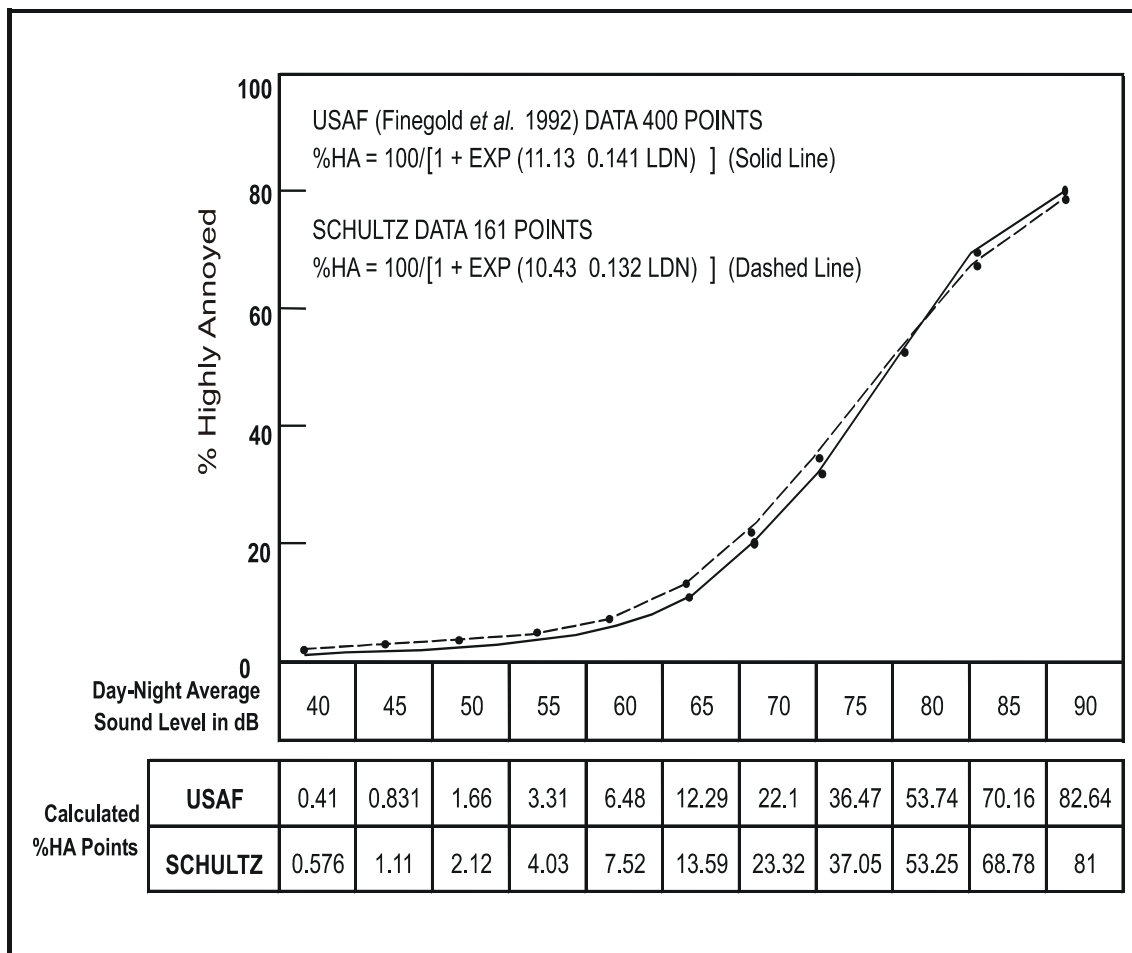


**Figure B-3. Response of Communities to Noise; Comparison of Original (Schultz 1978) and Current (Finegold et al. 1994) Curve Fits.**

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. DNL accounts for the sound level of individual noise events, the duration of those events, and the number of events. Its use is endorsed by the scientific community (ANSI 1980; ANSI 1988; USEPA 1974; FICUN 1980; FICON 1992).

While DNL is the best metric for quantitatively assessing cumulative noise impact, it does not lend itself to intuitive interpretation by non-experts. Accordingly, it is common for environmental noise analyses to include other metrics for illustrative purposes. A general indication of the noise environment can be presented by noting the maximum sound levels which can occur and the number of times per day noise events will be loud enough to be heard. Use of other metrics as supplements to DNL has been endorsed by federal agencies (FICON 1992).

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The Schultz curve is generally applied to annual average DNL. In Section 1.2,  $L_{dnmr}$  was described and presented as being appropriate for quantifying noise in military airspace. In the current study, the Schultz curve is used with  $L_{dnmr}$  as the noise metric.  $L_{dnmr}$  is always equal to or greater than DNL, so impact is generally higher than would have been predicted if the onset rate and busiest-month adjustments were not accounted for.

There are several points of interest in the noise-annoyance relation. The first is DNL of 65 dB. This is a level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like aviation which do cause noise. Areas exposed to DNL above 65 dB are generally not considered suitable for residential use. The second is DNL of 55 dB, which was identified by USEPA as a level "...requisite to protect the public health and welfare with an adequate margin of safety," (USEPA 1974) which is essentially a level below which adverse impact is not expected. The third is DNL of 75 dB. This is the lowest level at which adverse health effects could be credible (USEPA 1974). The very high annoyance levels correlated with DNL of 75 dB make such areas unsuitable for residential land use.

Sonic boom exposure is measured by C-weighting, with the corresponding cumulative metric being CDNL. Correlation between CDNL and annoyance has been established, based on community reaction to impulsive sounds (CHABA 1981). Values of the C-weighted equivalent to the Schultz curve are different than that of the Schultz curve itself. Table B-1 shows the relation between annoyance, DNL, and CDNL.

**Table B-1. Relation Between Annoyance, DNL and CDNL**

| <i>CDNL</i> | <i>% Highly Annoyed</i> | <i>DNL</i> |
|-------------|-------------------------|------------|
| 48          | 2                       | 50         |
| 52          | 4                       | 55         |
| 57          | 8                       | 60         |
| 61          | 14                      | 65         |
| 65          | 23                      | 70         |
| 69          | 35                      | 75         |

Interpretation of CDNL from impulsive noise is accomplished by using the CDNL versus annoyance values in Table B-1. CDNL can be interpreted in terms of an "equivalent annoyance" DNL. For example, CDNL of 52, 61, and 69 dB are equivalent to DNL of 55, 65, and 75 dB, respectively. If both continuous and impulsive noise occurs in the same area, impacts are assessed separately for each.

## LAND USE COMPATIBILITY

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high

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degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL or  $L_{dnmr}$  for military overflights. Impulsive noise can be assessed by relating CDNL to an “equivalent annoyance” DNL, as outlined in Section 1.3.1.

In June 1980, an ad hoc Federal Interagency Committee on Urban Noise (FICUN) published guidelines (FICUN 1980) relating DNL to compatible land uses. This committee was composed of representatives from DoD, Transportation, and Housing and Urban Development; USEPA; and the Veterans Administration. Since the issuance of these guidelines, federal agencies have generally adopted these guidelines for their noise analyses.

Following the lead of the committee, DoD and FAA adopted the concept of land-use compatibility as the accepted measure of aircraft noise effect. The FAA included the committee’s guidelines in the Federal Aviation Regulations (USDOT 1984). These guidelines are reprinted in Table B-2, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (note the footnote “\*” in the table), they provide the best means for determining noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL values above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions. In some cases, where noise change exceeds 3 dB, the 1992 FICON indicates the 60 dB DNL may be a more appropriate incompatibility level for densely populated areas.

## 2.0 NOISE EFFECTS

The discussion in Section 1.3 presents the global effect of noise on communities. The following sections describe particular noise effects.

### 2.1 HEARING LOSS

Noise-induced hearing loss is probably the best defined of the potential effects of human exposure to excessive noise. Federal workplace standards for protection from hearing loss allow a time-average level of 90 dB over an 8-hour work period, or 85 dB averaged over a 16-hour period. Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear’s most sensitive frequency, 4,000 Hz, after a 40-year exposure) suggests a time-average sound level of 70 dB over a 24-hour period (USEPA 1974). Since it is unlikely that airport neighbors will remain outside their homes 24 hours per day for extended periods of time, there is little possibility of hearing loss below a DNL of 75 dB, and this level is extremely conservative.

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**Table B-2. Land-Use Compatibility With Yearly Day-Night Average Sound Levels**

| LAND USE                                                                   | Yearly Day-Night Average Sound Level (DNL) in Decibels |       |       |       |       |         |
|----------------------------------------------------------------------------|--------------------------------------------------------|-------|-------|-------|-------|---------|
|                                                                            | Below 65                                               | 65–70 | 70–75 | 75–80 | 80–85 | Over 85 |
| <b>RESIDENTIAL</b>                                                         |                                                        |       |       |       |       |         |
| Residential, other than mobile homes and transient lodgings .....          | Y                                                      | N(1)  | N(1)  | N     | N     | N       |
| Mobile home parks .....                                                    | Y                                                      | N     | N     | N     | N     | N       |
| Transient lodgings .....                                                   | Y                                                      | N(1)  | N(1)  | N(1)  | N     | N       |
| <b>PUBLIC USE</b>                                                          |                                                        |       |       |       |       |         |
| Schools .....                                                              | Y                                                      | N(1)  | N(1)  | N     | N     | N       |
| Hospitals and nursing homes .....                                          | Y                                                      | 25    | 30    | N     | N     | N       |
| Churches, auditoria, and concert halls .....                               | Y                                                      | 25    | 30    | N     | N     | N       |
| Government services .....                                                  | Y                                                      | Y     | 25    | 30    | N     | N       |
| Transportation .....                                                       | Y                                                      | Y     | Y(2)  | Y(3)  | Y(4)  | Y(4)    |
| Parking.....                                                               | Y                                                      | Y     | Y(2)  | Y(3)  | Y(4)  | N       |
| <b>COMMERCIAL USE</b>                                                      |                                                        |       |       |       |       |         |
| Offices, business and professional .....                                   | Y                                                      | Y     | 25    | 30    | N     | N       |
| Wholesale and retail—building materials, hardware, and farm equipment..... | Y                                                      | Y     | Y(2)  | Y(3)  | Y(4)  | N       |
| Retail trade—general.....                                                  | Y                                                      | Y     | 25    | 30    | N     | N       |
| Utilities .....                                                            | Y                                                      | Y     | Y(2)  | Y(3)  | Y(4)  | N       |
| Communication .....                                                        | Y                                                      | Y     | 25    | 30    | N     | N       |
| <b>MANUFACTURING AND PRODUCTION</b>                                        |                                                        |       |       |       |       |         |
| Manufacturing, general .....                                               | Y                                                      | Y     | Y(2)  | Y(3)  | Y(4)  | N       |
| Photographic and optical.....                                              | Y                                                      | Y     | 25    | 30    | N     | N       |
| Agriculture (except livestock) and forestry .....                          | Y                                                      | Y(6)  | Y(7)  | Y(8)  | Y(8)  | Y(8)    |
| Livestock farming and breeding.....                                        | Y                                                      | Y(6)  | Y(7)  | N     | N     | N       |
| Mining and fishing, resource production and extraction .....               | Y                                                      | Y     | Y     | Y     | Y     | Y       |
| <b>RECREATIONAL</b>                                                        |                                                        |       |       |       |       |         |
| Outdoor sports arenas and spectator sports.....                            | Y                                                      | Y(5)  | Y(5)  | N     | N     | N       |
| Outdoor music shells, amphitheaters .....                                  | Y                                                      | N     | N     | N     | N     | N       |
| Nature exhibits and zoos .....                                             | Y                                                      | Y     | N     | N     | N     | N       |
| Amusements, parks, resorts, and camps .....                                | Y                                                      | Y     | Y     | N     | N     | N       |
| Golf courses, riding stables, and water recreation .....                   | Y                                                      | Y     | 25    | 30    | N     | N       |

Numbers in parentheses refer to notes.

\* The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

## KEY TO TABLE B-2

Y (YES) = Land Use and related structures compatible without restrictions.

N (No) = Land Use and related structures are not compatible and should be prohibited.

NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35 = Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.

## NOTES FOR TABLE B-2

- (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
- (2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
- (3) Measures to achieve NLR 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
- (4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
- (5) Land-use compatible provided special sound reinforcement systems are installed.
- (6) Residential buildings require an NLR of 25.
- (7) Residential buildings require an NLR of 30.
- (8) Residential buildings not permitted.

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## 2.2 NONAUDITORY HEALTH EFFECTS

Nonauditory health effects of long-term noise exposure, where noise may act as a risk factor, have not been found to occur at levels below those protective against noise-induced hearing loss, described above. Most studies attempting to clarify such health effects have found that noise exposure levels established for hearing protection will also protect against any potential nonauditory health effects, at least in workplace conditions. The best scientific summary of these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on January 22–24, 1990, in Washington, D.C., which states “The nonauditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an eight-hour day)” (von Gierke 1990; parenthetical wording added for clarification). At the International Congress (1988) on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss; and even above these criteria, results regarding such health effects were ambiguous.

Consequently, it can be concluded that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem but also any potential nonauditory health effects in the work place.

Although these findings were directed specifically at noise effects in the work place, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the nonauditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies which purport to find such health effects use time-average noise levels of 75 dB and higher for their research.

For example, in an often-quoted paper, two University of California at Los Angeles (UCLA) researchers found a relation between aircraft noise levels under the approach path to Los Angeles International Airport (LAX) and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the “noise-exposed” population (Meecham and Shaw 1979). Nevertheless, three other UCLA professors analyzed those same data and found no relation between noise exposure and mortality rates (Frerichs *et al.* 1980).

As a second example, two other UCLA researchers used this same population near LAX to show a higher rate of birth defects during the period of 1970 to 1972 when compared with a control group residing away from the airport (Jones and Tauscher 1978). Based on this report, a separate group at the United States Centers for Disease Control performed a more thorough study of

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populations near Atlanta's Hartsfield International Airport for 1970 to 1972 and found no relation in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Edmonds 1979).

A recent review of health effects, prepared by a Committee of the Health Council of The Netherlands (CHCN 1996), analyzed currently available published information on this topic. The committee concluded that the threshold for possible long-term health effects was a 16-hour (6:00 am to 10:00 pm)  $L_{eq}$  of 70 dB. Projecting this to 24 hours and applying the 10 dB nighttime penalty used with DNL, this corresponds to DNL of about 75 dB. The study also affirmed the risk threshold for hearing loss, as discussed earlier.

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB.

## 2.3 ANNOYANCE

The primary effect of aircraft noise on exposed communities is one of annoyance. Noise annoyance is defined by the USEPA as any negative subjective reaction on the part of an individual or group (USEPA 1974). As noted in the discussion of DNL above, community annoyance is best measured by that metric.

Because the USEPA Levels Document (USEPA 1974) identified DNL of 55 dB as “. . . requisite to protect public health and welfare with an adequate margin of safety,” it is commonly assumed that 55 dB should be adopted as a criterion for community noise analysis. However, financial and technical resources are generally not available to achieve that goal. Most agencies have identified DNL of 65 dB as a criterion which protects those most impacted by noise, and which can often be achieved on a practical basis (FICON 1992). This corresponds to about 13 percent of the exposed population being highly annoyed.

Although DNL of 65 dB is widely used as a benchmark for significant noise impact, and is often an acceptable compromise, it is not a statutory limit, and it is appropriate to consider other thresholds in particular cases.

In this Draft EIS, no specific threshold is used. The noise in the affected environment is evaluated on the basis of the information presented in this appendix and in the body of the Draft EIS.

## 2.4 SPEECH INTERFERENCE

Speech interference associated with aircraft noise is a primary cause of annoyance to individuals on the ground. The disruption of routine activities in the home, such as radio or television

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listening, telephone use, or family conversation, gives rise to frustration and irritation. The quality of speech communication is also important in classrooms, offices, and industrial settings and can cause fatigue and vocal strain in those who attempt to communicate over the noise. Research has shown that the use of the SEL metric will measure speech interference successfully, and that a SEL exceeding 65 dB will begin to interfere with speech communication.

## 2.5 SLEEP INTERFERENCE

Sleep interference is another source of annoyance associated with aircraft noise. This is especially true because of the intermittent nature and content of aircraft noise, which is more disturbing than continuous noise of equal energy and neutral meaning.

Sleep interference may be measured in either of two ways. “Arousal” represents actual awakening from sleep, while a change in “sleep stage” represents a shift from one of four sleep stages to another stage of lighter sleep without actual awakening. In general, arousal requires a somewhat higher noise level than does a change in sleep stage.

An analysis sponsored by the Air Force summarized 21 published studies concerning the effects of noise on sleep (Pearsons *et al.* 1989). The analysis concluded that a lack of reliable in-home studies, combined with large differences among the results from the various laboratory studies, did not permit development of an acceptably accurate assessment procedure. The noise events used in the laboratory studies and in contrived in-home studies were presented at much higher rates of occurrence than would normally be experienced. None of the laboratory studies were of sufficiently long duration to determine any effects of habituation, such as that which would occur under normal community conditions. A recent extensive study of sleep interference in people’s own homes (Ollerhead 1992) showed very little disturbance from aircraft noise.

There is some controversy associated with the recent studies, so a conservative approach should be taken in judging sleep interference. Based on older data, the USEPA identified an indoor DNL of 45 dB as necessary to protect against sleep interference (USEPA 1974). Assuming a very conservative structural noise insulation of 20 dB for typical dwelling units, this corresponds to an outdoor DNL of 65 dB as minimizing sleep interference.

A 1984 publication reviewed the probability of arousal or behavioral awakening in terms of SEL (Kryter 1984). Figure B-4, extracted from Figure 10.37 of Kryter (1984), indicates that an indoor SEL of 65 dB or lower should awaken less than 5 percent of those exposed. These results do not include any habituation over time by sleeping subjects. Nevertheless, this provides a reasonable guideline for assessing sleep interference and corresponds to similar guidance for speech interference, as noted above.

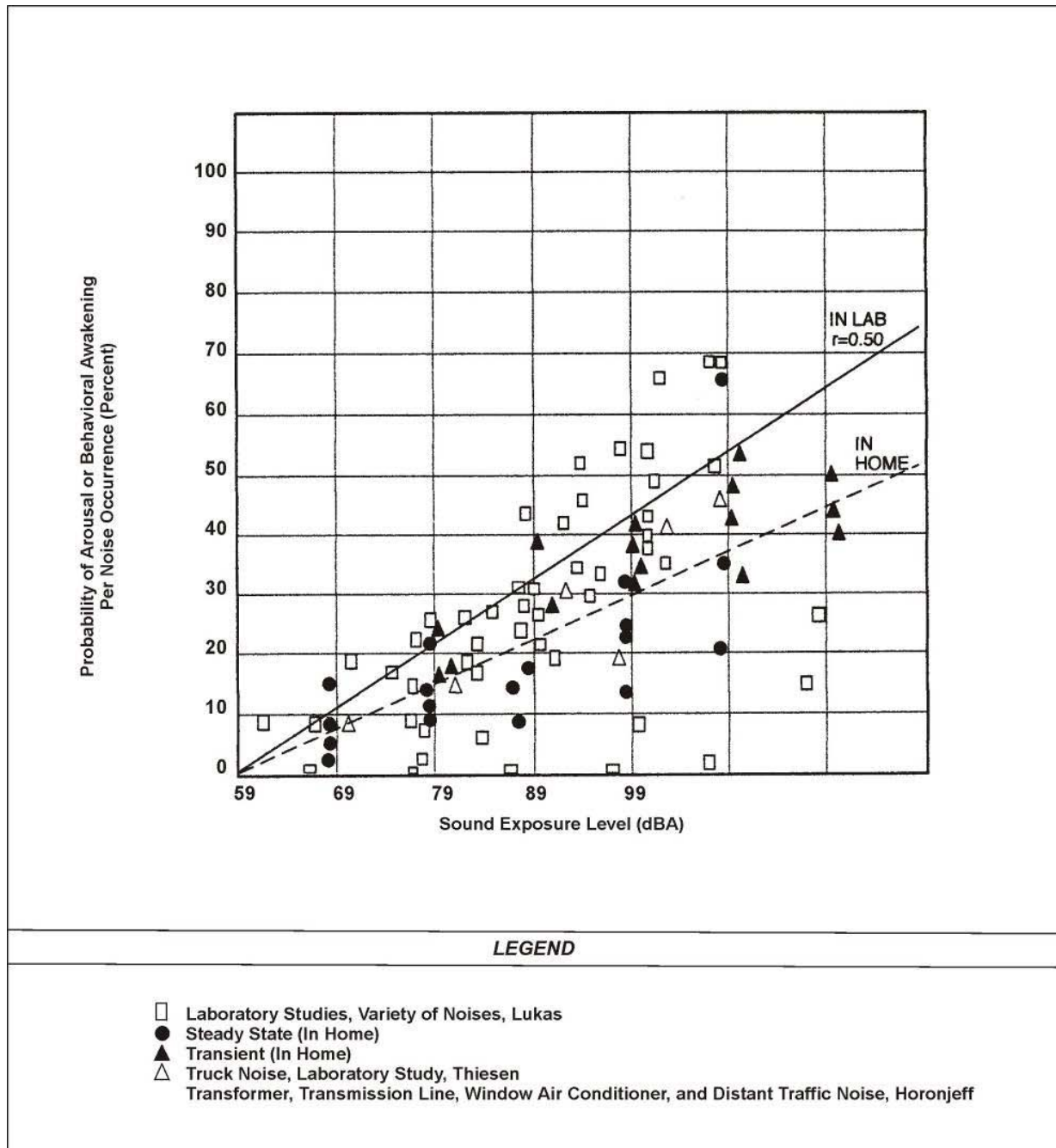


**Figure B-4. Probability of Arousal or Behavioral Awakening in Terms of Sound Exposure Level**

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## 2.6 NOISE EFFECTS ON DOMESTIC ANIMALS AND WILDLIFE

Animal species differ greatly in their responses to noise. Each species has adapted, physically and behaviorally, to fill its ecological role in nature, and its hearing ability usually reflects that role. Animals rely on their hearing to avoid predators, obtain food, and communicate with and attract other members of their species. Aircraft noise may mask or interfere with these functions. Secondary effects may include nonauditory effects similar to those exhibited by humans: stress, hypertension, and other nervous disorders. Tertiary effects may include interference with mating and resultant population declines.

## 2.7 NOISE EFFECTS ON STRUCTURES

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at sound levels above 130 dB, there is the possibility of the excitation of structural component resonance. While certain frequencies (such as 30 Hz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (National Research Council/National Academy of Sciences 1977).

A study directed specifically at low-altitude, high-speed aircraft showed that there is little probability of structural damage from such operations (Sutherland 1989). One finding in that study is that sound levels at damaging frequencies (e.g., 30 Hz for window breakage or 15 to 25 Hz for whole-house response) are rarely above 130 dB.

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations, or “rattle,” of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. In general, such noise-induced vibrations occur at sound levels above those considered normally incompatible with residential land use. Thus assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations.

## 2.8 NOISE EFFECTS ON TERRAIN

Members of the public often believe that noise from low-flying aircraft can cause avalanches or landslides by disturbing fragile soil or snow structures in mountainous areas. There are no known instances of such effects, and it is considered improbable that such effects will result from routine, subsonic aircraft operations.

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## 2.9 NOISE EFFECTS ON HISTORICAL AND ARCHAEOLOGICAL SITES

Because of the potential for increased fragility of structural components of historical buildings and other historical sites, aircraft noise may affect such sites more severely than newer, modern structures. Again, there are few scientific studies of such effects to provide guidance for their assessment.

One study involved the measurements of sound levels and structural vibration levels in a superbly restored plantation house, originally built in 1795, and now situated approximately 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport. These measurements were made in connection with the proposed scheduled operation of the supersonic Concorde airplane at Dulles (Wesler 1977). There was special concern for the building's windows, since roughly half of the 324 panes were original. No instances of structural damage were found. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning within the building itself.

As noted above for the noise effects of noise-induced vibrations on normal structures, assessments of noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites.

## 3.0 NOISE MODELING

An aircraft in subsonic flight generally emits noise from two sources: the engines and flow noise around the airframe. Noise generation mechanisms are complex and, in practical models, the noise sources must be based on measured data. The Air Force has developed a series of computer models and aircraft noise databases for this purpose. The models include NOISEMAP (Moulton 1992) for noise around airbases, ROUTEMAP (Lucas and Plotkin 1988) for noise associated with low-level training routes, and MR\_NMAP (Lucas and Calamia 1996) for use in MOAs and ranges. These models use the NOISEFILE database developed by the Air Force. NOISEFILE data includes SEL and  $L_{Amax}$  as a function of speed and power setting for aircraft in straight flight.

Noise from an individual aircraft is a time-varying continuous sound. It is first audible as the aircraft approaches, increases to a maximum when the aircraft is near its closest point, then diminishes as it departs. The noise depends on the speed and power setting of the aircraft and its trajectory. The models noted above divide the trajectory into segments whose noise can be computed from the data in NOISEFILE. The contributions from these segments are summed.

MR\_NMAP was used to compute noise levels in the airspace. The primary noise metric computed by MR\_NMAP was  $L_{dnmr}$  averaged over each airspace. Supporting routines from NOISEMAP were used to calculate SEL and  $L_{Amax}$  for various flight altitudes and lateral offsets from a ground receiver position.

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