FINAL

ENVIRONMENTAL ASSESSMENT FOR THE AEROMEDICAL EVACUATION FORMAL TRAINING UNIT WRIGHT-PATTERSON AIR FORCE BASE, OHIO

88th AIR BASE WING

May 2012

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Final
Environmental Assessment for the Aeromedical Evacuation Formal Training Unit Wright-Patterson Air Force Base

Contract No. FA8601-11-D-0002
Task Order 0008

Submitted to:

Wright-Patterson Air Force Base
88th Air Base Wing
Civil Engineering Directorate
Asset Management Division

Prepared by:

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May 2012

COVER SHEET

ENVIRONMENTAL ASSESSMENT
FOR THE AEROMEDICAL EVACUATION
FORMAL TRAINING UNIT
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Responsible Agencies: U.S. Air Force (USAF); Air Mobility Command (AMC); 88 Air Base Wing (88 ABW); Wright-Patterson Air Force Base (WPAFB), Ohio

Affected Location: Wright-Patterson AFB, Ohio

Proposed Action: Aeromedical Evacuation Formal Training Unit

Report Designation: Environmental Assessment (EA)

Written comments and inquiries regarding this document should be directed to Ms. Karen Beason, EIAP Program Manager, 88 ABW/CEAOR, 1450 Littrell Road, Building 22, Wright-Patterson AFB, Ohio, 45433-5209, (937) 257-5899.

Abstract: The USAF proposes to establish the Aeromedical Evacuation (AE) Formal Training Unit (FTU) mission to WPAFB. The AE program is coordinated by the Air Mobility Command (AMC) of the USAF headquartered at Scott Air Force Base (AFB). The AE FTU would be established to combine operational flight training and medical training. An administrative and training facility that provides a vigorous and flexible continuum of standardized training and education to flight nurses and aeromedical evacuation technicians is needed to be capable of applying safe operational and clinical patient care across the spectrum of AE flight operations in support of U.S. interests.

There is currently no existing Mobility Air Forces (MAF) AE FTU with the exception of the Air Force Reserve Command (AFRC) AE FTU at Pope Air Field (AF), North Carolina. A universal qualification training facility is needed to accommodate the AE FTU program.

This EA evaluates the Proposed Action and the No Action Alternative. Resources considered in the impact analysis are airspace management, land use, air quality, noise, geological resources, water resources, biological resources, cultural resources, socioeconomics and environmental justice, infrastructure, health and safety, and hazardous materials and wastes. Analyses in this document identify that impacts are limited to minor short-term adverse impacts on air quality and noise resulting from the proposed construction activities related to the facility modifications. The EA was made available to the public on April 13, 2012, for a 15-day review period.

FINAL
FINDING OF NO SIGIFICANT IMPACT FOR
AEROMEDICAL EVACUATION FORMAL TRAINING UNIT
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
1 May 2012

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) 1500 - 1508, Department of Defense Directive (DoD) 6050.1 and Air Force Regulation (AFR) 32 CFR Part 989, the 88th Air Base Wing (ABW) Civil Engineer Directorate, Asset Management Division prepared an Environmental Assessment (EA) for the Aeromedical Evacuation Formal Training Unit (AE FTU), Wright-Patterson Air Force Base (WPAFB), Ohio. This EA is incorporated by reference into this finding per 40 CFR 1508.13.

Purpose and Need

The US Air Force (USAF) intends to consolidate an Aeromedical Evacuation (AE) Formal Training Unit (FTU) to standardize training throughout the AE community and reduce training time. The AE FTU would be established to combine operational flight training and medical training. An administrative and training facility that provides a vigorous and flexible continuum of standardized training and education to flight nurses (FNs) and aeromedical technicians (AETs) is needed to be capable of applying safe operations and clinical patient care across the spectrum of AE flight operations in support of U.S. interests. There is currently no existing Mobility Air Forces (MAF) AE FTU with the exception of the Air Force Reserve Command (AFRC) AE FTU at Pope Air Field (AF), North Carolina. A universal qualification training facility is needed to accommodate the AE FTU program.

Description of Proposed Action

The Proposed Action consists of two parts: facility and administrative modifications to existing WPAFB buildings to accommodate the AE FTU mission and training operations for AE personnel. Two facilities are evaluated as potential locations for the AE FTU: Facility 20840 (Alternative A) and Facility 20434 (Alternative B). Modification to existing facilities at WPAFB would be limited to the interior and would be required to accommodate and support the AE FTU mission. No new facility construction or exterior facility demolition activities are planned in association with the Proposed Action.

Proposed training activities associated with the relocation of the AE FTU program to WPAFB would involve operational changes to selected building functions regarding training regime, flight mission operations specific to the AE FTU program, and AE FTU support staff. The net change in overall staff at WPAFB would increase by 31 cadre and administrative personnel at initial activation with the potential for four additional positions in the future.

The AE FTU is programmed for the training of approximately 400 transient students annually. Student enrollment in the AE FTU program would be dependent upon the number of students graduating from USAFSAM's FN and AET course who would subsequently enroll in the AMC AE FTU course. The AE FTU syllabus requirements include classroom training, hands-on training using an aircraft training device, flight training, and flight evaluations. The AE FTU program classroom structure is projected to consist of twenty classes annually. Each class would be comprised of 20 students. A total of 24 sorties for two hours each would be flown during each class, which would result in a total of 480 sorties per year.

Training operations under the Proposed Action would provide the necessary facilities and sorties that would enable AE FTU medical and flight personnel to perform readiness training operations and ensure that mission requirements are met and sustained. The Proposed Action would also require the least amount of funds for initial setup and sustainment, would be the most efficient, and would be the quickest to implement.

Alternative A

Alternative A consists of implementing the Proposed Action at Facility 20840. Facility 20840 consists of approximately 640,000 square feet (sf) and houses the 711 Human Performance Wing (HPW) units, the USAFSAM, the Human Performance Integration Directorate (HP), and the Human Effectiveness Directorate (RH), plus supporting functions. Facility 20840 contains a high-bay area that houses two C-130 training devices plus space for a future fuselage trainer (FuT). In its current condition, Building 20840 would be feasible for the AE FTU to use and share existing USAFSAM classrooms and training devices for training operations.

Alternative B

Alternative B consists of implementing the Proposed Action at Facility 20434, which would be modified and retrofitted for the AE FTU. Facility 20434 was constructed in 1955 for personnel research and science labs. Of the 6,300 gross square feet of space available in Facility 20434, approximately 4,500 net square feet would be usable. Additional training area would be obtained by sharing space with USAFSAM at Facility 20840. Extensive renovation would be required at Facility 20434; however, no scope would be developed for interior renovations and no design would occur until USAF has approved and funded the AE FTU mission at WPAFB.

No-Action Alternative

Under the No Action Alternative, there would be no change in the current AE flight training program. In addition, no centralized AE FTU facility would exist (other than at Pope AF), training would continue to be conducted within each of the 32 AE squadrons, and the continued inefficient use of training devices and resources would result. Under the No Action Alternative, AE training materials, personnel, and manpower hours would continue to be conducted at multiple squadron locations. The No Action Alternative does not meet the purpose and need because a de-centralized AE FTU program would result in continued in-unit qualification training and some units using AFRC FTU. The result would be no presence of a standardized aircrew training program that develops and maintains a high state of mission readiness for immediate and effective deployments across the range of military operations.

Alternatives Considered but Eliminated from Further Study

One alternative to the Proposed Action was considered that involved the construction of a new AE FTU facility at WPAFB as a military construction (MILCON) project. This alternative was eliminated from further evaluation at this time because no construction plans have been developed and no potential location for new construction has been identified. In addition, this alternative would require more time to secure funding and would impact the requisite timeline for standing up the AE FTU. Therefore, this alternative would not meet the purpose and need for this proposal.

Identification of Preferred Alternative

The Air Force has identified Alternative A under the Proposed Action as the preferred alternative. Alternative A involves co-locating the AE FTU with USAFSAM at Facility 20840. This selection was based on reasonable balance between mission requirements, costs associated with modifying the facility, efficient use of resources, and timeline for implementation.

Environmental Consequences

Airspace Management (EA Section 4.1): Alternatives A and B would result in short-term negligible adverse impacts. There would be minor long-term impacts on airspace management as airfield operations would slightly increase as a result of the flight training. The No Action alternative would have no impact over current conditions.

Land Use (EA Section 4.2): Alternatives A and B would result in no short or long-term impacts because no changes to land use would occur at or surrounding WPAFB. The No Action alternative would have no impact over current conditions.

Air Quality (EA Section 4.3): Under Alternative A or B, there would be minor short-term impacts from particulate matter and engine exhaust emissions generated during renovation activities; impacts from renovation would be minor because these activities involve interior modifications. In the long-term, there would be negligible impacts with slight increases in net emissions for all pollutants due to flight training. The No Action alternative would have no impact over current conditions.

Noise (EA Section 4.4): Alternative A or B would have minor short-term impacts on ambient noise generated from interior renovation activities. Minor impacts on the noise environment would be expected with anticipated slight increases in airfield operations as a result of AE FTU flight training. The No Action alternative would have no impact over current conditions.

Soil Resources (EA Section 4.5): Alternative A or B would result in short-and long-term negligible impacts to soils, topography, and physiographic features because renovation and modification activities would be limited to interior renovations of existing structures. The No Action alternative would have no impact over current conditions.

Water Resources (EA Section 4.6): Alternative A or B would result in negligible impacts to surface waters during construction as the proposed activities would be conducted inside existing facilities. Alternative A or B would not pose any new risks; however, minor adverse effects on groundwater could continue to occur as a result of aircraft operations (erosion and sedimentation controls would be implemented as a Best Management Practice). Facility modifications are limited to building interiors so there would be no increase in impervious surfaces and there would be no net loss or gain of soil in the retarding basin. The Miami Conservancy District has concurred that Alternatives A and B would have little impact on the retarding basin. The No Action alternative would have no impact over current conditions.

Natural Resources (EA Section 4.7): Alternative A or B would result in negligible short-and long-term impacts as the proposed activities would take place on previously disturbed areas with no naturally-occurring vegetation and the proposed project area does not provide suitable threatened and endangered species habitat. The Air Force requested concurrence from the U.S. Fish and Wildlife Service (USFWS). The USFWS indicated no objection to the proposed project. The No Action alternative would have no impact over current conditions.

Cultural and Historic Resources (EA Section 4.8): Alternative A would have no short- or long-term impacts to cultural and historic resources as Facility 20840 is not a structure eligible for listing in the National Register of Historic Places (NRHP). Alternative B would result in adverse impacts to Facility 20434 as this structure is a Cold War-era potential significant building and is eligible for listing in the NRHP. Proposed changes to Facility 20434 could involve interior alterations of non-original walls and fixtures and could potentially have an adverse impact to this facility. The State Historic Preservation Office (SHPO) evaluation of possible effects to Facility 20434 cannot take place at this time because information regarding proposed plans for renovation is not currently available. The Air Force has coordinated this information with the SHPO. The SHPO indicated that Alternative A would not affect historic properties. The No Action alternative would have no impact over current conditions.

Socioeconomic Resources (EA Section 4.9): Implementation of Alternative A or B would result in no short-term adverse effects on the local workforce. Long-term minor beneficial impact to the local economy in the form of revenue generated by renovation and modification activities as well as a new mission at WPAFB would result from Alternative A or B. The No Action alternative would have no impact over current conditions.

Environmental Justice (EA Section 4.10): Alternative A or B would have no impact as no change in land use would occur and there would be minimal emissions from the training aircraft. There would be no short- or long-term disproportionate impacts to minority or low-income populations. The No Action alternative would have no impact over current conditions.

Infrastructure (EA Section 4.11): Alternative A or B would have negligible short- and long-term impact from traffic interruption in the project area during construction activities. No adverse impacts are expected from Alternative A or B as there would be no substantial increase in personnel, facility operations, or transient students. The No Action alternative would have no impact over current conditions.

Health and Safety (EA Section 4.12): Alternative A or B would result in potential minor impacts to workers during construction activities associated with construction activities. Impacts would be minimized by adherence to applicable safety standards. No adverse effects associated with bird-aircraft strike hazards would occur as a result of implementation of Alternative A or B. The No Action alternative would have no impact over current conditions.

Hazardous Materials/Hazardous Waste (EA Section 4.13): Alternative A or B would have a negligible impact because hazardous materials used during construction would not be expected to increase; the use of hazardous materials, including deicing fluid, would be expected to be similar to current conditions. The potential for encountering asbestos-containing materials (ACM) and lead-based paint (LBP) in Facility 20840 and Facility 20434 would be minimized by reviewing engineering drawings, surveying the buildings prior to renovation and modification activities, and adhering to management plans. The No Action alternative would have no adverse impacts over current conditions.

Agency Consultation

In accordance with NEPA, 42 U.S.C. §4321 et seq. (1969), informal consultation was solicited with applicable agencies to seek input on the likelihood of environmental or other impacts resulting from the development of Alternative A or B. A summary of the outcome of consultation efforts with pertinent agencies is included as Appendix A of the EA.

Public Notice

A public notice was posted in the *Dayton Daily News* on April 13, 2012 and a paper copy of the EA was made available for review at the Fairborn Library. The comment period was held from April 13, 2012 until April 27, 2012. No comments were received from the public during this period.

Finding of No Significant Impact (FONSI)

The Proposed Action consists of two parts: facility and administrative modifications to existing WPAFB buildings to accommodate the AE FTU mission and training operations for AE personnel. Under the No Action Alternative, there would be no change in the current AE flight training program and AMC personnel would not be transferred from Pope AF to WPAFB; there would be no centralized AE FTU facility and training would continue to be conducted within each of the 32 AE squadrons, and the continued inefficient use of training devices and resources would result. Based upon my review of the facts and analysis contained in the EA, which is hereby incorporated by reference, I conclude that Alternative A or B and the No Action Alternative will not have a significant impact on the natural or human environment. An environmental impact statement is not required for this action. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality regulations, and 32 CFR 989.

Date: MAY 0 4 2012

TED J HECHT, P.E.
Acting Director
Civil Engineer Directorate

PUBLIC NOTICE

Notice of Availability

Draft Finding of No Significant Impact for the Environmental Assessment of the Establishment of the Aeromedical Evacuation Formal Training Unit at Wright-Patterson Air Force Base, Ohio

WRIGHT-PATTERSON AFB – Beginning April 13, 2012 through April 27, 2012, the United States Air Force will accept comments on the Environmental Assessment (EA) of the establishment of the Aeromedical Evacuation (AE) Formal Training Unit (FTU) at Wright-Patterson Air Force Base (WPAFB), Ohio. The U.S. Air Force is proposing to issue a Finding of No Significant Impact (FONSI) based on the EA. The analysis considered potential effects of the Proposed Action and the No Action Alternative on thirteen resource areas: airspace management, land use, air quality, noise, geology and soil, water resources, biological resources, cultural resources, socioeconomic resources, environmental justice, infrastructure, health and safety, and hazardous materials/hazardous wastes. The Proposed Action considered locating the AE FTU at two alternative facilities at WPAFB. The results found in the EA show that the Proposed Action, if located at either facility, would not have an adverse impact on the natural or human environment—indicating that a FONSI would be appropriate. An Environmental Impact Statement should not be necessary to implement the Proposed Action.

Copies of the Draft EA and FONSI showing the analysis are available for review at the Fairborn library, 1 East Main Street, Fairborn, OH 45324.

Written comments and inquiries on the EA and FONSI should be directed to:

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LIST OF ACRONYMS

A3TM	Aeromedical Evacuation Operations and Training Branch
ABW	Air Base Wing
ACM	Asbestos-Containing Materials
AD	Active Duty
AE	Aeromedical Evacuation
AGE	Aerospace Ground Equipment
AES	Aeromedical Evacuation Squadrons
AET	Aeromedical Evacuation Technician
AF	Air Field
AFB	Air Force Base
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AFPD	Air Force Policy Directive
AFRC	Air Force Reserve Command
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AMC	Air Mobility Command
AMC/CC	AMC Commander
APE	Area of Potential Effect
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
AR	Aerial Refueling
ARB	Air Reserve Base
ARMS	Aviation Resource Management System
ASC	Aeronautical Systems Center
AST	Aboveground Storage Tank
ATC	Air Traffic Control
AW	Airlift Wing
BAM	Bird Avoidance Model
BASH	Bird/Wildlife Aircraft Strike Hazard
BEEF	Base Engineer Emergency Force
BMP	Best Management Practice
BMP/LTM	Basewide Monitoring Program/Long Term Monitoring
BPA	Blanket Purchase Agreement
BUSTR	Bureau of Underground Storage Tank Regulation
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
CY	Calendar Year
CZ	Clear Zone
dB	Decibel
dBA	A-weighted sound level measurement
DLSME	Defense Land Systems and Miscellaneous Equipment
DNL	Day-Night Average A-Weighted Sound Level
DoD	U.S. Department of Defense

LIST OF ACRONYMS (continued)

DOT	Department of Transportation
DP&L	Dayton Power & Light
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIFS	Economic Impact Forecast System
EIS	Environmental Impact Statement
EO	Executive Order
ERO	Engines Running Unload or Offload
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
ESZ	Explosive Safety Zone
°F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FICON	Federal Interagency Committee on Noise
FLIP	Flight Information Publication
FN	Flight Nurse
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	Feet
FTU	Formal Training Unit
FuT	Fuselage Trainer
FY	Fiscal Year
GOV	Government-Owned Vehicle
gpm	gallons per minute
gpy	gallons per year
GS	Government Service
GSF	Gross Square Footage
HAF	Headquarters Air Force
HAP	High Accident Potential
HAZMART	Hazardous Material Pharmacy
HPW	Human Performance Wing
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
IRP	Installation Restoration Program
IT	International Technology Corporation
KIAS	Knots Indicated Airspeed
LBP	Lead-Based Paint
LTO	Landing Take-Off
MACT	Maximum Achievable Control Technology
MAF	Mobility Air Forces
MAJCOM	Major Command

LIST OF ACRONYMS (continued)

$\mu g/m^3$	micrograms per cubic meter
MCD	Miami Conservancy District
mg/m^3	milligrams per cubic meter
MILCON	Military Construction
MOA	Military Operation Area
MSA	Metropolitan Statistical Area
mph	miles per hour
MSL	Mean Sea Level
MSW	Mixed Solid Waste
MTR	Military Training Routes
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen Oxides
NO_2	Nitrogen Dioxide
NRHP	National Register of Historic Places
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
NSF	Net Square Footage
NSR	New Source Review
NWI	National Wetlands Inventory
O_3	Ozone
OAC	Ohio Administrative Code
ODH	Ohio Department of Health
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PAA	Primary Assigned Aircraft
Pb	Lead
PBR	Permitted-By-Rule
PCB	Polychlorinated Biphenyl
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter with an aerodynamic particle size less than 2.5 micrometers
PM_{10}	Particulate Matter with an aerodynamic particle size less than 10 micrometers
POL	Petroleum, Oils, and Lubricants
POV	Privately-Owned Vehicle
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTI	Permit to Install

LIST OF ACRONYMS (continued)

RAPCA	Regional Air Pollution Control Agency
RCRA	Resource Conservation and Recovery Act
RICE	Reciprocating Internal Combustion Engines
ROI	Region of Influence
SARA	Superfund Amendments and Reauthorization Act
SEL	Sound Exposure Level
SERE	Survival, Evasion, Resistance, and Escape
sf	Square Feet
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
SPC	Spill Prevention Coordinator
SPCC	Spill Prevention and Control and Countermeasures
SR	State Route
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
tpy	tons per year
TSCA	Toxic Substances Control Act
UEC	Unit Environmental Coordinator
UMD	Unit Manpower Document
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USAFSAM	U.S. Air Force School of Aerospace Medicine
USC	U.S. Code
USDA–WS	U.S. Department of Agriculture–Wildlife Services
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish & Wildlife Service
UST	Underground Storage Tank
UXO	unexploded ordnance
VOC	Volatile Organic Compound
WPAFB	Wright-Patterson Air Force Base

1.0 PURPOSE AND NEED FOR ACTION

This section provides a brief background description of the Proposed Action, a statement of the purpose and need for the Proposed Action, an overview of the organization of the environmental assessment (EA), and a summary of the key environmental compliance requirements.

1.1 Project Description and History

The U.S. Air Force (USAF) intends to consolidate an Aeromedical Evacuation (AE) Formal Training Unit (FTU) to standardize training throughout the AE community and reduce training time. The AE program is coordinated by the Air Mobility Command (AMC), a Major Command (MAJCOM) of the USAF headquartered at Scott Air Force Base (AFB), just east of St. Louis. There are four active-duty AE Squadrons (AES) in the USAF, but the 375th AES at Scott AFB and the 43rd AES at Pope AF in North Carolina are the only squadrons located within the continental United States.

The AMC developed the basing criteria required to initiate the Headquarters Air Force (HAF) Strategic Basing Process in January 2011. Through this process, AMC is proposing to establish the AE FTU mission to Wright-Patterson Air Force Base (WPAFB) near Dayton, Ohio. In accordance with Air Force Instruction (AFI) 10-503, *Strategic Basing* (AFI 2010a), this EA has been completed to satisfy the USAF Environmental Impact Analysis Process (EIAP) prior to executing the strategic basing decision.

Aeromedical Evacuation originated in the USAF in the late 1940's as a humane way of transporting and treating injured patients in-flight. The AE mission is accomplished using various Mobility Air Forces (MAF) aircraft including the C-5, C-21, KC-10, C-17, C-130, and KC-135. Currently, flight crews, AE Flight Nurses (FNs), and Aeromedical Evacuation Technicians (AETs) transport those injured from Operation New Dawn and Operation Enduring Freedom, as well as to respond to humanitarian missions such as Hurricane Katrina. These units provide tactical AE for U.S. troops and regional Unified Commands using C-130 Hercules, C-17 Globemaster III, KC-135 Stratotanker, and other available aircraft.

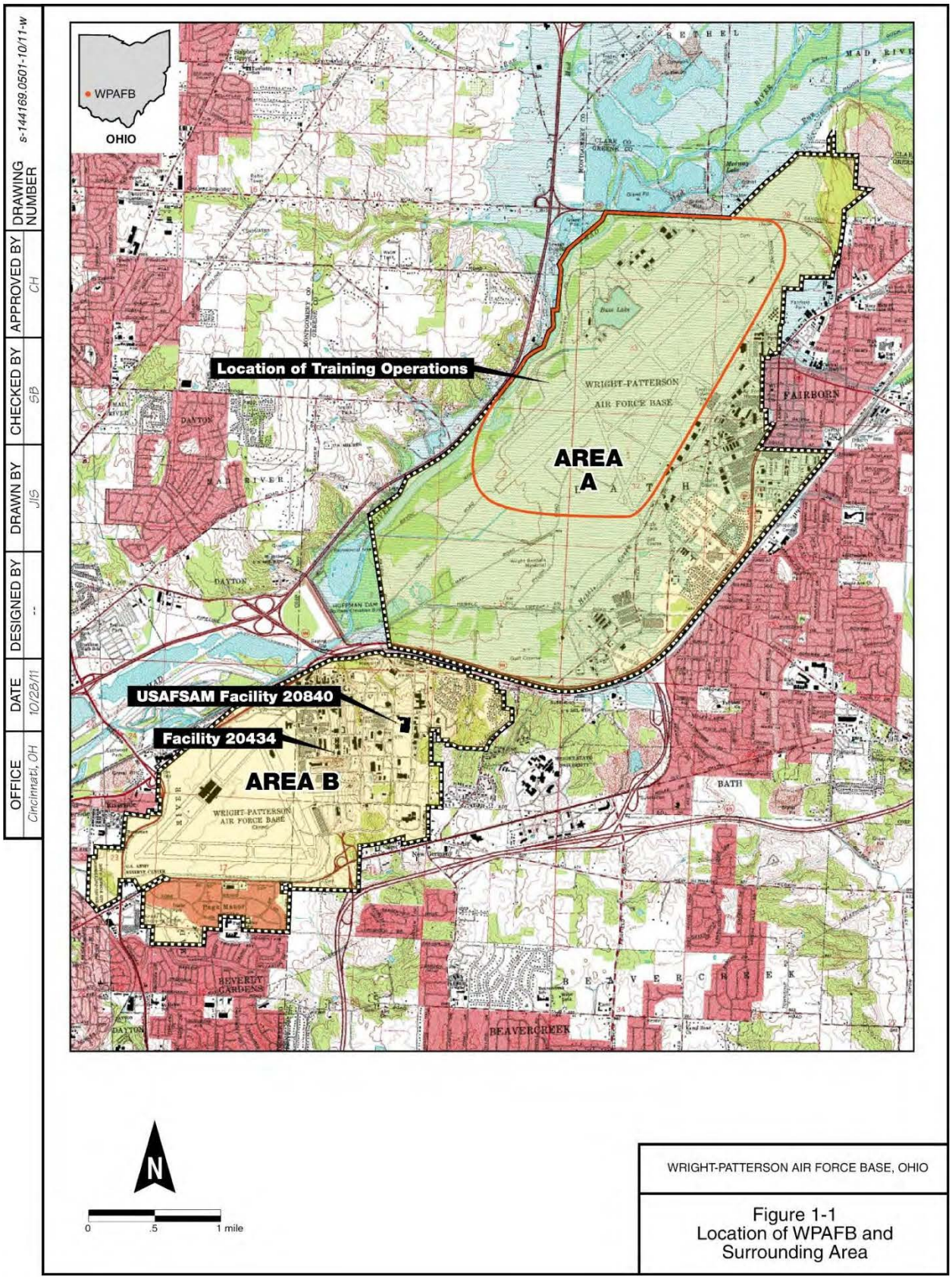
Air Mobility Command's mission is to provide rapid, global mobility and sustainment for America's armed forces. Air Mobility Command also plays a crucial role in providing humanitarian support at home and around the world. The men and women of AMC provide airlift and aerial refueling for all of America's armed forces. U.S. forces must be able to provide a rapid, tailored response with the capability to intervene against a well-equipped foe, hitting hard and terminating quickly. Rapid global mobility lies at the heart of U.S. strategy in this environment. Without the capability to project forces, there is no conventional deterrent. As U.S. forces stationed overseas continue to decline, global interests remain, making the unique capabilities only AMC can provide even more in demand.

The 711th Human Performance Wing's (711 HPW) USAF School of Aerospace Medicine (USAFSAM) is currently a tenant at WPAFB and is the premier institute for research, education, and worldwide operational consultation in Aerospace Medicine. The USAFSAM joined the Air Force Research Laboratory as part of the 711 HPW and relocated to WPAFB in March 2008. The USAFSAM's organizational mission includes education and training, research and technology development, and consultation. The USAFSAM's established organizational mission at WPAFB enables consolidation of USAFSAM and AE FTU training devices and resources. This was a key component resulting in WPAFB scoring highest on the basing criteria and being considered as the proposed location of the Air Force-wide AE FTU for this EA.

Several military missions are supported by the aircraft and personnel at WPAFB. The Aeronautical Systems Center (ASC) is the largest of four product centers in the Air Force Materiel Command (AFMC) and is the host unit at WPAFB. The mission of the ASC is to rapidly deliver war-winning capability. ASC develops, acquires, modernizes, and sustains the world's best aerospace systems. The 445th Airlift Wing (445 AW) at WPAFB is under the command of the Air Force Reserve Command (AFRC). The 445 AW is comprised of an Aerospace Medicine Squadron, Aeromedical Staging Squadron, and three attached groups including the AE Squadron. The 445 AW at WPAFB has been active in providing airlift troops and supplies around the globe and has provided operational support to almost every contingency the AF has undertaken. The 88th Air Base Wing (88 ABW) supports and maintains WPAFB, acting as the landlord to more than 100 tenant organizations.

Wright-Patterson Air Force Base is located in the southwest portion of the state of Ohio in Greene and Montgomery counties, approximately 10 miles east of the city of Dayton. The Base encompasses 8,145 acres and is classified as non-industrial with mixed development. WPAFB is subdivided into two areas: Areas A and B. Area A consists primarily of administrative offices and contains an active airfield. Area B is located across State Route (SR) 444 to the southwest of Area A and consists primarily of research and development as well as educational functions. The USAFSAM's Human Performance Wing is located in building 840 Area B (Facility 20840) of the Base. **Figure 1-1** shows the location of WPAFB and the surrounding area.

This EA presents the USAF's Proposed Action and analyzes two alternatives for implementing the Proposed Action at WPAFB. The No Action Alternative is also analyzed. If the analyses presented in the EA indicate that implementation of the Proposed Action would not result in significant environmental impacts, a Finding of No Significant Impact (FONSI) would be prepared. A FONSI briefly presents reasons why a proposed action would not have a significant effect on the human environment and why an environmental impact statement (EIS) is unnecessary. If significant environmental issues result that cannot be mitigated to insignificance, an EIS would be required, or the Proposed Action would be abandoned and no action would be taken.


WPAFB
OHIO
Location of Training Operations
AREA A
AREA B
USAFSAM Facility 20840
Facility 20434
WRIGHT-PATTERSON AIR FORCE BASE
FAIRBORN
DAYTON
BATH
BEAVERCREEK
BEVERLY GARDENS
MAD RIVER
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1 mile
OFFICE Cincinnati, OH
DATE 10/28/11
DESIGNED BY --
DRAWN BY JIS
CHECKED BY SB
APPROVED BY CH
DRAWING NUMBER s-144169.0501-10/11-w
WRIGHT-PATTERSON AIR FORCE BASE, OHIO
Figure 1-1
Location of WPAFB and
Surrounding Area

The USAF has prepared this EA in accordance with the National Environmental Policy Act (NEPA) of 1969; 40 Code of Federal Regulations (CFR), Parts 1500-1508, the Council on Environmental Quality (CEQ) regulations implementing NEPA; and the US AF EIAP [32 CFR Part 989].

1.2 Purpose and Need

The AE FTU would be established to combine flight training and medical training. An administrative and training facility that provides a vigorous and flexible continuum of standardized training and education to FNs and AETs is needed to be capable of applying safe operational and clinical patient care across the spectrum of AE flight operations in support of U.S. interests.

There is currently no existing MAF AE FTU with the exception of the AFRC AE FTU at Pope AF, North Carolina. A universal qualification training facility is needed to accommodate the AE FTU program, which currently consists of 32 AE units: 4 Active Duty (AD), 18 AFRC, and 10 National Guard Bureau (NGB). On average, AD personnel take 68 days to qualify FNs and AETs. The AFRC averages 119 days to qualify FNs and AETs. This training timeline does not include the additional Mission Ready requirements. Establishing a single training location and standardizing the AE training syllabus would reduce qualification times from 68 days for AD and 119 days for AFRC down to approximately 27 days.

As previously stated, the AMC created the basing criteria required to initiate the HAF Strategic Basing Process in January 2011. Each criterion was assigned a point value and scored each military base's ability to support the AE FTU program in regards to mission: airlift, facilities and infrastructure, environmental capacity, and cost (USAF 2011a). Specific AE FTU requirements for each criterion included:

Airlift Mission

- Fuselage/cargo compartment trainers have required equipment for AE operations (litter stanchion sets and litter straps, centerline and sidewall/Evans seats, functioning paratroop and crew entry doors and escape hatches)
- Location has AE universal qualifications mission design series (C-130, C-17, KC-135) assigned by 2013
- Base Aircrew Flight Equipment (AFE) has the facilities and personnel to support approximately 46 students
- Location hosts existing AE squadron

Facilities & Infrastructure

- Adequate on-Base facilities to support an approximate 8,500 square foot (sf) training facility
- Runway and taxiway available for KC-135 operations and runway/taxiway stressed for C-17 operations

- Building or hangar space available to house AE aircraft trainer (it is noted that this area is currently assigned to USAFSAM)
- Training location less than 60 minutes from a regional commercial airport, dedicated airport shuttle (base or commercial), adequate base vehicle support available
- Adequate contiguous ramp space available for wide body aircraft; ramp stressed for C-17
- Flight surgeon available on Base to support approximately 200 additional enrollees and approximately 60 students
- Medical equipment maintenance and supply available to support FTU medical equipment requirements
- Adequate quarters available to support approximately 60 students

Environmental Capacity

- Air Quality – base is located in an area that is in attainment for the National Ambient Air Quality Standards (NAAQS)
- Environmental Impacts – no known existing environmental issues (Federal Endangered Species, water, natural and cultural resources)
- Noise – base has no existing incompatible development above 65 decibels (dB) day-night average A-weighted sound level (DNL) contours
- Encroachment – base has no existing incompatible development in Clear Zone and/or Accident Potential Zones
- Land Use – local governments have enacted compatible land use controls to preserve the installation's flying operations

Cost

- Area construction cost factor
- Area locality cost
- 2011 Government Service (GS) locality pay

In April 2011, the criteria were coordinated and approved by AMC, AFMC, AFRC, and NGB, and the AMC Commander (AMC/CC) was briefed on the basing process and progress. The AMC Commander requested an expedited process due to the critical need to correct deficiencies in AE training. To facilitate this directive, AMC's Strategic Plans and Programs (AMC/A8) initiated an informal data call of all AMC, AFMC, AFRC, and NGB bases to score their ability to provide input pending the request from HAF/A8 (District of Washington). Basing data was received from 32 bases across AMC, AFMC, and AFRC, while NGB declined to provide input pending the formal data request from HAF/A8. WPAFB was the highest scoring installation (79 points out of a possible 100 points) with respect to AE FTU aircraft mission requirements, facilities and infrastructure requirements, environmental capacity requirements, and cost requirements. The score for WPAFB was 16 points higher than the next closest competitor.

In June 2011, the results of the informal data call were briefed to the two-digit level and all MAJCOM representatives concurred that WPAFB was the best potential solution based on the results of the informal data call. A Basing Action Request was approved by AMC/CC and sent to HAF/A8 (District of Washington) for the strategic basing decision in July 2011. The HAF/A8 determined the AE FTU initiative does not meet strategic basing triggers. According to AFI 10-503, Organization Action, and Chapter 4 of AFI 38-101, "…if an organization action/event entails activation, inactivation, designation, redesignation, or assignment of an organization, entity (unit and/or non-unit) that increases the number of Air Force positions at an installation by at least 35 positions, then this action/event must be vetted through the Strategic Basing Process" (USAF 2010a). The AE FTU training program at WPAFB would require the relocation of 31 personnel for initial activation with the potential for four positions to be added in the future. Because the proposed AE FTU involved relocation of less than 35 personnel, this action did not fall under the Strategic Basing Criteria. Therefore, HAF/A8 approved AMC to work with AFMC to host the AE FTU at WPAFB.

It was determined that WPAFB best met the AE FTU criteria requirements identified above. In addition, results of the site visit conducted at WPAFB in October 2011 indicated that WPAFB overall is well postured to accept the AE FTU mission. Base Operating Support, medical support, and facility/infrastructure are adequate to support the AE FTU mission (USAF 2012a).

1.3 Scope of Environmental Analysis

Consistent with the CEQ regulations, the EA will be organized into the following sections:

- Section 1, Purpose and Need for Action, includes a background description, purpose and need statement, EA organization and scope of environmental analysis, and regulatory framework;
- Section 2, Description of Proposed Action and Alternatives, includes a process for alternatives development, alternatives considered but eliminated, and a comparison of impacts;
- Section 3, Affected Environment, includes a description of the natural and man-made environments within and surrounding WPAFB that may be affected by the Proposed Action or the No Action Alternative;
- Section 4, Environmental Impacts, includes definitions and discussions of direct and indirect impacts, and mitigation and monitoring. The section also includes an analysis of the potential cumulative impacts on WPAFB; unavoidable adverse impacts; the relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity; and irreversible and irretrievable commitments of resources;
- Section 5, List of Preparers;
- Section 6, Consultation and Coordination, contains a list of agencies consulted in the preparation of this document;
- Section 7, References, contains references for studies, data, and other resources used in the preparation of the EA; and
- Appendices, as required.

NEPA, which is implemented through the CEQ regulations, requires federal agencies to consider alternatives to proposed actions and to analyze impacts of those alternatives. Potential impacts of the proposed alternatives described in this document will be assessed in accordance with the USAF EIAP process, which requires that impacts to resources be analyzed in terms of their context, duration, and intensity. In order to help the public and decision-makers understand the implications of impacts, they will be described in the short- and long-term, cumulatively, and within context.

Environmental issues analyzed in the EA include:

- Airspace Management;
- Land Use;
- Air Quality;
- Noise;
- Geology and Soils;
- Water Resources;
- Biological Resources, including vegetation, wetlands, wildlife, and threatened and endangered species;
- Cultural Resources;
- Socioeconomics;
- Environmental Justice;
- Infrastructure;
- Health and Safety; and
- Hazardous Materials and Waste.

Although all resources are evaluated, the EA will be "issue-driven" emphasizing the resources of most concern to the project. These issues will include airspace management, land use, air quality, and noise and will be particularly emphasized as part of the EA.

1.4 Interagency and Intergovernmental Coordination for Environmental Planning and Community Involvement

The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. The Intergovernmental Coordination Act and Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. Air Force Instruction 32-7060 requires AMC to implement a process known as Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), which is used for the purpose of agency coordination and implements scoping requirements.

Through the IICEP process, the USAF notified relevant Federal, state, and local agencies of the action proposed and provided them the opportunity to make known their environmental concerns specific to the action. The IICEP process provides the USAF the opportunity to cooperate with and consider state and local views in implementing the Federal proposal. Agency responses were provided to the USAF and incorporated into the analysis of potential environmental impacts performed as part of the EA. IICEP correspondence is included in **Appendix A**.

A Notice of Availability (NOA) for the Draft Final EA and Draft Final FONSI was published in the *Dayton Daily News* on April 13, 2012 initiating the public review period for 15 days. The Draft Final EA and FONSI were available for review in the Fairborn Public Library. No comments were received from the public during this period.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

This section describes the criteria used in selecting the Proposed Action; detailed descriptions of the Proposed Action and the No Action Alternative; identification of alternatives eliminated from further consideration; and a comparison of environmental consequences between the alternatives.

2.2 Alternatives Selection Criteria

The development of reasonable alternatives involved discussions with the members of HQ AMC, AFRC, 88 ABW, 711 HPW, and USAFSAM to identify a Proposed Action. A site survey was conducted at WPAFB from October 11 to October 14, 2011, to validate facility and infrastructure requirements and to determine the feasibility and cost to beddown the AE FTU at WPAFB (USAF 2012a). As a result of the site visit, a site survey report was prepared that summarized and concluded that WPAFB is well postured to accept the AE FTU mission. Several requirements were identified to fulfill the purpose of the Proposed Action at WPAFB. The Proposed Action and other alternatives were screened against the following criteria:

- Any alternative evaluated must meet the overall objectives of the AE FTU to standardize training throughout the AE community and reduce training time. Aeromedical Evacuation Operations and Training Branch (A3TM), in coordination with AMC/A7PR and AMC/A3TR, established the facility requirements for the AE FTU to function effectively. The AE FTU facility must incorporate administrative, classroom, training rooms, and aircrew training device.

- The facility must provide approximately 8,500 sf of administrative and training space to include three classrooms with seating for approximately 25 students/cadre, three senior leadership offices, conference room with seating for up to 35 personnel (including up to 5 personnel attached to AFRC), computer testing lab for 10 personnel, two training rooms with equipment storage capability for Emergency Procedure Exams, and medical equipment storage with additional administrative space.

- Due to manpower constraints base-wide, no alternative can have substantive impacts on mission operations.

- Any alternative evaluated must fully comply with all federal, state, and local laws and regulations, as well as Department of Defense (DoD) and Air Force policies, directives, and regulations.

- The proposed action must be economically feasible and protect the environment.

The Proposed Action as described below would provide the necessary facilities and sorties that would enable AE FTU medical and flight personnel to perform readiness training operations and ensure that mission requirements are met and sustained. The Proposed Action would also require the least amount of funds for initial setup and sustainment, would be the most efficient, and would be the quickest to implement.

2.3 Proposed Action

The Proposed Action consists of two parts: facility/administrative modifications to existing WPAFB facilities to accommodate the AE FTU mission, and training operations for AE personnel. Modification to an existing building at WPAFB would be limited to the interior and would be required to accommodate and support the AE FTU mission. No new facility construction or exterior facility demolition activities are planned in association with the Proposed Action. All projects under the Proposed Action would include required anti-terrorism/force protection measures and conform to applicable State of Ohio and WPAFB building codes and regulations.

2.3.1 Facility and Administrative Modifications

The following is a description of general facility and administrative modifications required to activate the AE FTU mission at WPAFB:

- Re-design available interior office and cubicle space to accommodate up to 35 AE FTU personnel.
- Modify interior space to accommodate AE FTU facility requirements.

The proposed general facility modifications listed above are chosen based on accepted criteria and best professional judgment to identify feasible, realistic scenarios for meeting mission objectives and facility requirements. Two facilities are evaluated as alternatives for locating the AE FTU: Facility 20840 (Alternative A) and Facility 20434 (Alternative B). Specific descriptions of these facilities and proposed modifications are provided below.

2.3.1.1 Alternative A – Locating AE FTU at Facility 20840

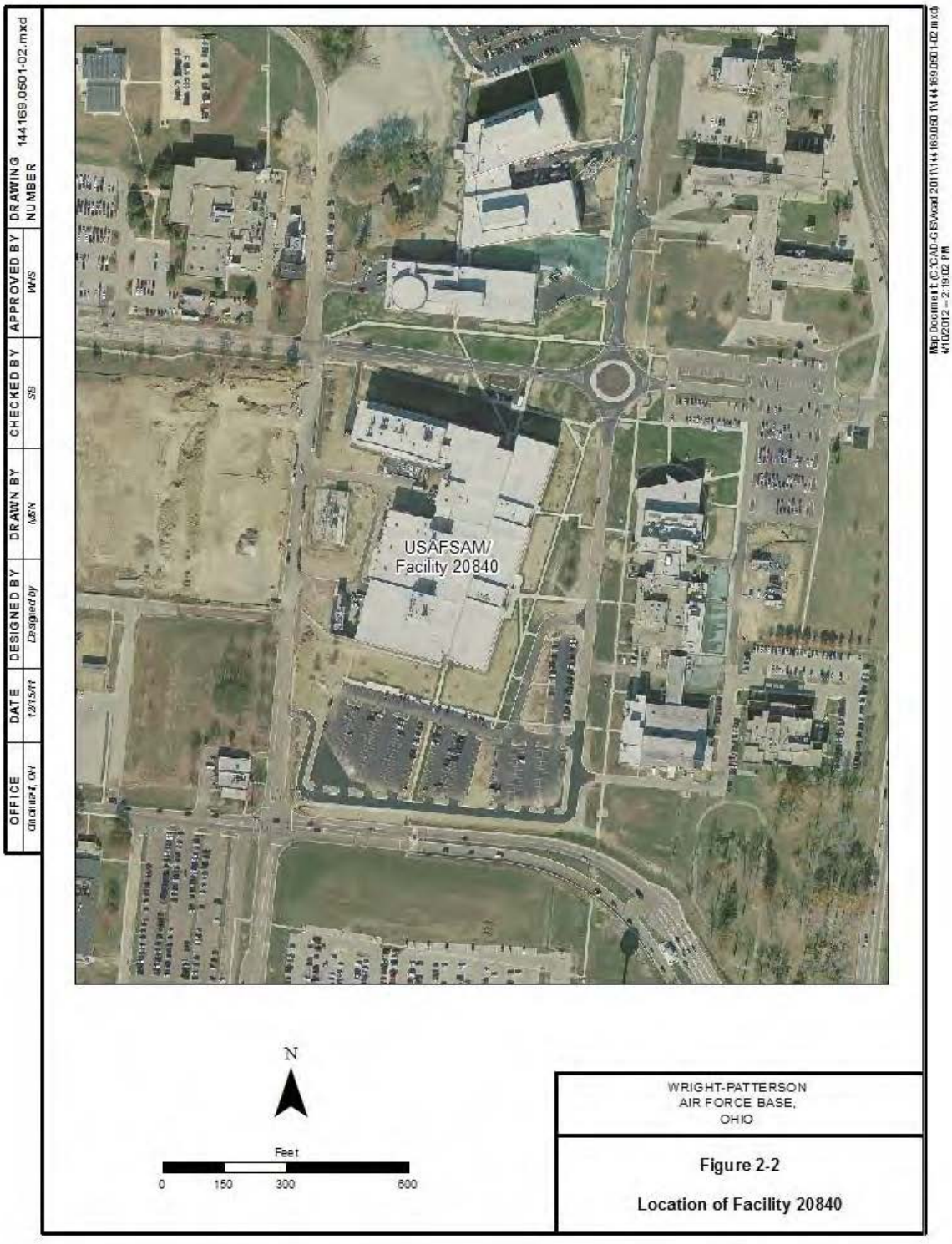
Alternative A consists of co-locating the AE FTU with USAFSAM at Facility 20840, which was recently constructed as a new facility in Area B at WPAFB (**Figure 2-1**). These modifications are discussed in the sections below.

Facility 20840 currently consists of approximately 640,000 sf and houses the 711 HPW units, the USAFSAM, the Human Performance Integration Directorate (HP), and the Human Effectiveness Directorate (RH), plus supporting functions. Facility 20840 contains a high-bay area that presently houses two C-130 training devices. Available area to house an additional AE trainer is assigned to USAFSAM. A C-17 trainer is projected to arrive in October 2013 (WPAFB 2012a). In its current condition, Facility 20840 would be feasible for the AE FTU to use and share existing USAFSAM classrooms and training devices for training operations. Facility 20840 meets the AE FTU space requirements of at least 8,500 sf for classroom space, conference room, lab stations, fuselage trainer, and three private offices (USAF 2012a, 2012h). Some of the required square footage is included in the classroom and testing space that would be shared with USAFSAM.

Figure 2-1. Facility 20840

No new facility construction or facility demolition activities are anticipated under Alternative A. The proposed modification projects as described under the Proposed Action would be implemented under Alternative A.

Alternative A would upgrade existing inadequate facilities and capabilities necessary to perform required training activities in Facility 20840. Individual projects proposed under Alternative A would involve interior renovations/retrofitting and would not include any exterior additions to existing Facility 20840. There is no requirement for additional training devices that affects activating the AE FTU at WPAFB. If needed, plans for additional training devices would be made once the AE FTU has been established and is functioning at WPAFB. These training devices could be evaluated under a Supplemental EA when details on the location, design, and funding are available. **Figure 2-2** shows the location of Facility 20840.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Facility 20840
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600
WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO
Figure 2-2
Location of Facility 20840

2.3.1.2 Alternative B – Locating AE FTU at Facility 20434

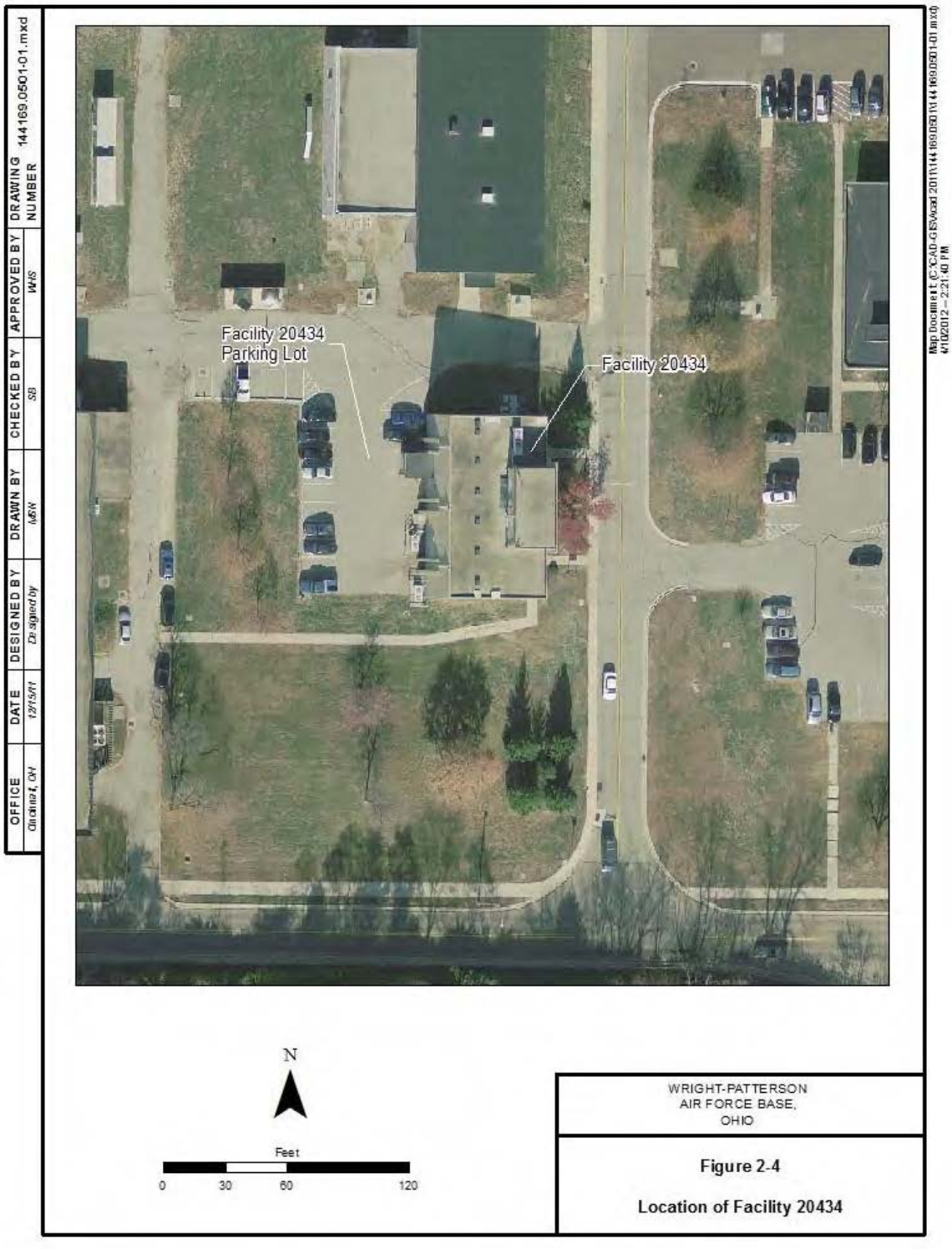
Alternative B for the Proposed Action consists of locating the AE FTU at Facility 20434 in Area B at WPAFB (**Figure 2-3**), which would be modified and retrofitted for the AE FTU. These modifications are discussed in the sections below.

Figure 2-3. Facility 20434

Facility 20434 was constructed in 1955 for personnel research and science labs and has been historically associated with the 711 HPW. This is a three-story building with the basement being committed to another user. **Figure 2-4** presents the location of Facility 20434.

Approximately 6,300 Gross Square Footage (GSF) (4,900 Net Square Footage [NSF]) is offered for use in Facility 20434. Based on calculations using available floor plans, approximately 4,500 NSF would be usable. The AE FTU would require three classrooms to conduct training. One of the classrooms, the Testing Lab, Emergency Procedures Examination Room, and the medical storage area would be located in Facility 20434. To meet the space requirement of 8,500 sf, the additional training space would be obtained by using two classrooms and two training devices at Facility 20840 (USAF 2012a).

Extensive renovation would be required at Facility 20434; however, no scope will be developed for interior renovations and no design will occur until USAF has approved and funded the AE FTU mission at WPAFB. Although there is the potential that a training device could be constructed adjacent to Facility 20434 in the future (USAF 2012a), there is no requirement for this device that would affect activating the AE FTU at WPAFB. Similar to Alternative A, plans for additional training devices would be made once


Facility 20434
Parking Lot
Facility 20434
N
Feet
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30
60
120
WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO
Figure 2-4
Location of Facility 20434
OFFICE
Cincinnati, OH
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the AE FTU has been established and functioning at WPAFB. An additional training device could be evaluated under a Supplemental EA when details on location, design, and funding are available.

Although detailed designs are not available at this time, the general scope of interior renovations typically includes the following activities (WPAFB 2012a):

- Demolish all existing non structural components within the project boundaries including systems furniture and relocatable partitions, unless specific items are serviceable and can be productively reused by the government.
- Identify and abate asbestos, polychlorinated biphenyl (PCB) light ballasts, lead paint or other environmental hazards present in the area.
- Replace all lighting, doors, and ceiling, wall, and floor finishes.
- Replace interior signage throughout the project area, using room numbers consistent with the existing building-wide numbering system.
- Design and replace all electrical distribution and heating, ventilation, and air conditioning (HVAC) systems throughout the project areas.
- Design the installation of all voice and data communication pathways, from the central communications rooms to end-user offices and workstations within the project boundaries.

2.3.2 Proposed Training Activities

Proposed training activities associated with the relocation of the AE FTU program to WPAFB would involve operational changes to selected building functions regarding training regime, flight mission operations specific to the AE FTU program, and AE FTU support staff. The net change in overall staff would be no more than 35 cadre and administrative personnel whose primary role would be AE FTU training and operating program support staff. Training requirements specific to the AE FTU program, proposed flight training operations, and aircraft that would be used for AE FTU in-flight training are described below.

2.3.2.1 Description of Training Requirements

The AMC provides evacuation of sick and injured patients, in peacetime and contingency operations, under the supervision of qualified medical crewmembers via a fixed wing aircraft. Air Force Instruction 11-2AE, Volume 1, *Aeromedical Evacuation Aircrew Training* (AFI 2010b), is the procedural document that directs the AE training program for FNs and AETs and designates AMC as the lead command for AE. The overall objective of the AE aircrew training program is to develop and maintain a high state of mission readiness for immediate and effective employment across the range of military operations in any environment. The secondary objective is to standardize Aeromedical Evacuation Crew Member training requirements into a single document to meet documentation requirements as prescribed in AFPD 11-2, *Aircraft Rules and Procedures*.

To accomplish the AE FTU mission at WPAFB, the following staffing, student enrollment, and classroom structure requirements would need to be met.

Staffing Requirements

The AE FTU training program at WPAFB would require the relocation of 31 personnel for initial activation with the potential for four positions to be added in the future (AMC 2012). Current positions would be taken from Pope Air Field (AF) Unit Manpower Document (UMD). Approximately 27 UMD positions would be relocated from the 43 AES at Pope AF to the AE FTU at WPAFB. From the UMD, four positions would be converted to administrative staff positions or utilized from the existing WPAFB USAFSAM administrative staff, if feasible. Cadre would be involved in training candidate AE students in ground and flying program requirements set forth in the AFI 11-2AE, Volume 1.

Student Enrollment

The AE FTU is programmed for the training of approximately 400 transient students annually. Student enrollment in the AE FTU program would be dependent upon the number of students graduating from USAFSAM's FN and AET course who would subsequently enroll in the AMC AE FTU course. Therefore, the actual number of students enrolling and being trained in the AE FTU course would be dependent on the graduation rate of the USAFSAM FN and AET course.

Transient students enrolled in the AE FTU program would have priority over other WPAFB students for on-base lodging located in Area A. Transportation of AE FTU students to and from training locations at Facility 20840 would be organized through WPAFB's transportation department with students being transported either by a busing system or 16-passenger van during the 27-day training course.

Classroom Structure

The AE FTU syllabus requirements include classroom training, hands-on training using an aircraft training device, flight training, and flight evaluations (AF 813; AMC 2011). The AE FTU program classroom structure is projected to consist of the following:

- Twenty classes are projected annually but would be dependent upon USAFSAM graduation rate and/or personnel issues.
- Each class would consist of 27 training days.
- Each class would be comprised of 20 training personnel: 5 training personnel per crew; 20 students (4 crews with 5 students per crew). A total of up to 400 students could be trained annually.
- Each class would require 48 flight hours. Based on 20 classes, the annual total flight hours would be 960 hours.

- Training flights would use C-130, KC-135, and/or C-17 aircraft; however, the C-130 aircraft would predominantly be utilized for training due to cost and availability for flight training.

- Each crew would fly six sorties of 2 hours in duration over a 2-week period. For each class, four crews would fly a total of 24 sorties for 2 hours each. A total of 48 flight hours per class would be conducted. A sortie is a single military aircraft flight from initial takeoff through final landing.

- Based on 24 sorties per class and 20 classes per year, the annual total number of sorties would be 480 sorties.

2.3.2.2 Proposed Flight/Aircraft Training Operations

Air Force Instruction 11-2AE, Volume 1, defines minimum criteria for flight training for aerial events associated with AE training and standardizes the Aviation Resource Management System (ARMS) training program for AE crewmembers. The ARMS training program includes events for flight training, ground training, aircrew flight equipment training, mission specific training, proficiency training, and survival training. Each of these six training programs is summarized below:

1. Flight Training – provides training in a flying environment for AE crewmembers in an assigned crew position for a comprehensive review of the various phases of flight associated with the flying mission and to continue in the ability to improve mission ready skills required for the accomplishment of the mission profile to evacuate patients.

2. Ground Training – ensures crew members understand and can demonstrate airfield driving and security procedures, aircrew intelligence training (AIT), law of armed conflict (LOAC) training, small arms training, advanced cardiac life support, aircraft training (emergency signals, systems, servicing, and configuration), cardio-pulmonary resuscitation (CPR), and National Registry Emergency Medical Technician (NREMT-B).

3. Aircrew Flight Equipment Training – includes aircrew flight equipment familiarization training, emergency egress training (non-ejection seat), aircrew chemical defense training, egress training with aircrew chemical defense ensemble (ACDE), and aircrew flight equipment.

4. Mission Specific Training – includes aircraft systems, aircraft emergencies, in-flight medical emergencies, combat/trauma casualty management, contingency engines running onload or offload (ERO) operations – hands-on ERO experience while enplaning or deplaning a configured aircraft.

5. Proficiency Training – includes aircrew chemical defense task qualification training enabling crewmembers to become aware of their limitations while wearing the chemical defense ensemble.

6. Survival Training – includes local area survival, combat survival training, conduct after capture (training for wartime, governmental, and hostage detention situations), water survival training, contingency survival, evasion, resistance, and escape (SERE) indoctrination (prepares for high risk of capture), wartime level combat survival training, and medical SERE training.

As part of the flight and aircraft training operations included in the Proposed Action, the existing runway(s) and airfield at WPAFB would be used for AE FTU sorties.

2.3.2.3 Flight Training Aircraft

Aircraft proposed for AE FTU training at WPAFB include the C-17 Globemaster III, C-130 Hercules, and KC-135 aircraft. The C-130 would be the predominant aircraft utilized in training due to cost and availability associated with operating alternate aircraft, and aircraft used in training would be primarily transient aircraft. Transient aircraft is described as AF, DoD, commercial, foreign, and some private aircraft not assigned to a particular AFB, but are en route from one location to another.

The C-130 and any other transient aircraft utilized for AE training purposes would originate from AFB units desiring to endeavor in the business efforts of the AE FTU flight training mission. There are 32 AE squadrons; 30 of these squadrons are located in the continental United States. One of these squadrons, the 445 AES, is located at WPAFB (WPAFB 2012b). Therefore, transient aircraft could potentially originate from any of the locations as shown in **Table 2-1.** A description of each aircraft is summarized and presented in **Table 2-2**.

Characteristics of C-17 Aircraft

Operational since 1995, the C-17 Globemaster III (**Figure 2-5**) is the newest, most flexible cargo aircraft to enter the airlift force (USAF 2011b). The C-17 is a high-wing military airlift aircraft capable of rapid strategic delivery of troops and all types of cargo (payloads up to 169,000 pounds) to main operating bases or directly to forward bases in the deployment area. The aircraft can perform tactical airlift and airdrop missions and can also transport litters and ambulatory patients during aeromedical evacuations when required. The inherent flexibility and performance of the C-17 force improve the ability of the total airlift system to fulfill the worldwide air mobility requirements of the U.S.

The C-17 measures 174 ft long with a wingspan of 169 ft, 10 inches. The aircraft is powered by four, fully reversible engines. The aircraft has been certified since 2008 for using a more-efficient synthetic fuel, thereby having less reliance on imported petrol. Each engine provides 40,440 pounds of thrust, enabling the aircraft to cruise at speeds of 518 miles per hour.

Table 2-1. List of United States Aeromedical Evacuation Squadrons

AE Squadron		Location
1	34th	Peterson AFB, Colorado
2	36th	Pope AF, North Carolina
3	43rd	Pope AF, North Carolina
4	45th	MacDill AFB, Florida
5	94th	Dobbins AFB, Georgia
6	109th	Minneapolis – St. Paul International Airport (IAP), Minnesota
7	118th	Nashville, Tennessee
8	137th	Oklahoma City, Oklahoma
9	139th	Stratton AFB, New York
10	142nd	New Castle, Delaware
11	146th	Channel Islands, California
12	156th	Charlotte, North Carolina
13	167th	Martinsburg, West Virginia
14	183rd	Jackson, Mississippi
15	187th	Cheyenne, Wyoming
16	315th	Charleston AFB, South Carolina
17	349th	Travis AFB, California
18	375th	Scott AFB, Illinois
19	433rd	Kelly AFB, Texas
20	439th	Westover Air Reserve Base (ARB), Massachusetts
21	445th	WPAFB, Ohio
22	446th	McChord AFB, Washington
23	452nd	March AFB, California
24	459th	Andrews AFB, Maryland
25	514th	McGuire AFB, New Jersey
26	908th	Maxwell AFB, Alabama
27	911th	Pittsburg IAP, Pennsylvania
28	914th	Niagara Falls Air Reserve Station (ARS), New York
29	932nd	Scott AFB, Illinois
30	934th	Minneapolis-Saint Paul IAP, Minnesota

Source: AF Basing Criteria for AE FTU (USAF 2011a)

Table 2-2. Characteristics of the C-17, C-130, and KC-135 Aircraft

Characteristic	C-17	C-130J	KC-135
Primary Function	Cargo and troop transport	Global airlift	Aerial refueling and airlift
Engine	Four Pratt & Whitney F117-PW-100 turbofan engines	Four Rolls-Royce AE 2100D3 turboprops	CFM International CFM-56 turbofan engines
Thrust	40,440 pounds/engine	44,500 pounds/engine	21,634 pounds/engine
Speed	518 miles per hour	417 miles per hour	530 miles per hour
Wingspan	169 feet 10 inches	132 feet 7 inches	130 feet 10 inches
Length	174 feet	97 feet 9 inches	136 feet 3 inches
Height	55 feet 1 inch	38 feet 10 inches	41 feet 8 inches
Maximum Takeoff Weight	585,000 pounds peacetime	155,000 pounds	322,500 pounds
Crew	Three (two pilots and one loadmaster); for AE a crew of five is added (two flight nurses and three medical technicians)	Five (two pilots, navigator, flight engineer, loadmaster); for AE a crew of five is added (two flight nurses and three medical technicians)	Three (pilot, co-pilot and boom operator); for AE a crew of five is added (two flight nurses and three medical technicians)
Cargo Compartment			
Length	88 feet	40 feet; Rear Ramp: 10 feet	
Width	18 feet	9 feet; Rear Ramp: 9 feet	
Height	12 feet 4 inches	9 feet	
Load	102 troops/paratroops; 36 litter and 54 ambulatory patients and attendants; 170,900 pounds of cargo (18 pallet positions)	6 pallets or 75 litters or 16 CDS bundles or 92 combat troops or 64 paratroopers, or a combination of any of these up to the cargo compartment capacity or maximum allowable weight	83,000 pounds, 37 passengers; 90 tons fuel; 6 pallet positions

Source: http://www.af.mil
Notes: NA = Not Available

The ultimate measure of airlift effectiveness is the ability to rapidly project and sustain an effective combat force close to a potential battle area. Threats to U.S. interests have changed in recent years, and the size and weight of U.S.-mechanized firepower and equipment have grown in response to improved capabilities of potential adversaries. This trend has significantly increased air mobility requirements, particularly in the area of large or heavy outsize cargo. As a result, newer and more flexible airlift aircraft are needed to meet potential armed contingencies, peacekeeping or humanitarian missions worldwide. The C-17 is capable of meeting today's demanding airlift missions.

Figure 2-5. C-17 Globemaster III Aircraft

Source: http://www.af.mil

The design of the aircraft allows it to operate on small, austere airfields. The C-17 can safely take off and land a full payload on runways as short as 3,500 ft and only 90 ft wide. Even on such narrow runways, the C-17 can turn around using a 180° three-point star turn in 80 ft and its backing capability. The C-17 is designed to airdrop 102 paratroopers and equipment.

Characteristics of C-130 Hercules Aircraft

Operational since 1956, the initial production model of the Hercules was the C-130A, with four Allison T56-A-11 pr 9-turboprops. The C-130 Hercules (**Figure 2-6**) primarily performs the tactical portion of the airlift mission and is capable of operating from rough, dirt strips and is the prime transporter for air dropping troops and equipment into hostile areas (USAF 2011b).

The C-130 measures 97 ft, 9 inches long with a wingspan of 132 ft, 7 inches. The aircraft is powered by four, turboprop engines. Each engine provides 44,500 pounds of thrust, enabling the aircraft to cruise at speeds of 417 miles per hour.

Using its aft loading ramp and door, the C-130 can accommodate a wide variety of oversized cargo, including everything from utility helicopters and six-wheeled armored vehicles to standard palletized cargo and military personnel. In an aerial delivery role, the C-130 can airdrop loads up to 42,000 pounds or use its high-flotation landing gear to land and deliver cargo on rough, dirt strips.

Figure 2-6. C-130 Hercules Aircraft

Source: http://www.af.mil

The flexible design of the Hercules enables it to be configured for many different missions, allowing for one aircraft to perform the role of many. Much of the special mission equipment added to the Hercules is removable, allowing the aircraft to revert back to its cargo delivery role if desired. The C-130 can be rapidly reconfigured for various types of cargo such as palletized equipment, floor-loaded material, airdrop platforms, container delivery system bundles, vehicles and personnel or aeromedical evacuation (USAF 2011b).

Characteristics of KC-135 Aircraft

Derived from Boeing's prototype 707 jet airliner in the early 1950's, the KC-135 has been a visible successful partner of the AF since the first aircraft was acquired in 1957. The KC-135 Stratotanker continues to enhance the USAF's capability to accomplish its primary mission of global air and space force. The KC-135 creates an air bridge to enable global mobility and global strike missions (such as B-2 missions) and local strike missions by enabling longer sorties.

The KC-135 also provides aerial refueling support to AF, Navy and Marine Corps and to allied nation aircraft. In-flight refueling was pioneered in the Cold War and streamlined with the arrival of the larger jet-powered aircraft. The result allowed military war planners and unprecedented global reach when dictating actions of forces. To this day, in-flight refueling remains a large part of the successes of the AF, especially when dealing with activities over large distances.

The Stratotanker (**Figure 2-7**) features four CFM International CFM-56 turbofan engines mounted under 35-degree swept wings, powering the KC-135 to takeoffs at gross weights up to 322,500 pounds. Internal fuel is be pumped through the KC-135's flying boom, the primary fuel transfer method. The KC-135 measures 136 ft, 3 inches long with a wingspan of 130 ft, 10 inches. Each engine provides 21,634 pounds of thrust, enabling the aircraft to cruise at speeds of 530 miles per hour.

Figure 2-7. KC-135 Stratotanker Aircraft

Source: http://www.af.mil

The KC-135 is capable of transporting litter and ambulatory patients using patient support pallets during aeromedical evacuations (USAF 2012a). A cargo deck above the refueling system can hold a mixed load of passengers and cargo; depending on fuel storage configuration, the KC-135 can carry up to 83,000 pounds of cargo (USAF 2011b).

A *sortie* is a single military aircraft flight from initial takeoff through final landing. The types of aircraft operations discussed in this document are referred to as *airfield operations*. An airfield operation represents the single movement or individual portion of a flight in the Base airfield airspace environment, such as one departure, one arrival, or one transit of the airport traffic area. Thus, a single flight would generate at least two airfield operations (takeoff and landing).

Under the Proposed Action, the AMC AE FTU is expected to conduct approximately 480 training sorties annually that would involve a straight and level, single takeoff and landing in a typical training exercise. No flight training is projected to occur at night and no extended training exercise ground operations are

projected. There would also not be any facility or staffing level changes needed in order to carry out the AE FTU flight training mission as the 31 to 35 AE FTU personnel would be responsible for scheduling ground operations.

Flying operations that would be performed by the training aircraft would be similar to current operations performed by the C-130 and other transient aircraft at WPAFB. No low-level military airspace would be used by the AE FTU in the vicinity of WPAFB or en route to/from other locations. Use of established airspace with a base altitude of 3,000 ft above ground level (AGL) does not require environmental analysis in accordance with the USAF EIAP, 32 CFR Part 989, as amended, Appendix B, A2.3.35. Low-level military airspace at less than 3,000 ft AGL would not be used by C-130 aircraft during AE FTU training activities.

2.4 No Action Alternative

Under the No Action Alternative, there would be no change in the current AE flight training program and 27 UMD positions would not be transferred from Pope AF to WPAFB. In addition, no centralized AE FTU facility would exist (other than at Pope AF), training would continue to be conducted within each of the 32 AE squadrons, and the continued inefficient use of training devices and resources would result.

To accomplish the goal of standardizing the AE FTU course, a syllabus would have to be created that each squadron could utilize. Under the No Action Alternative, AE training materials, personnel, and manpower hours would be duplicated as the AE training mission would continue to be conducted at multiple squadron locations.

Although this alternative does not satisfy the purpose and need to relocate the AE FTU mission, it is included in the environmental analysis to provide a baseline for comparison with the proposed action and is analyzed in accordance with CEQ regulations for implementing NEPA. Although this alternative would eliminate unavoidable adverse, short- and long-term impacts associated with the Proposed Action, the No Action Alternative would not satisfy selection criteria established for this project, resulting in:

- De-centralized AE FTU program that would continue to utilize the AFRC FTU and in-unit qualification.
- No presence of an aircrew training program that develops and maintains a high state of mission readiness for immediate and effective deployment across the range of military operations.

2.5 Alternatives Eliminated from Further Study

As part of the NEPA process, reasonable alternatives to the Proposed Action must be evaluated. According to 32 CFR 989.8 (b) (c), “Reasonable” alternatives meet the underlying purpose and need for the proposed action and cause a reasonable person to inquire further before choosing a particular course of action. Reasonable alternatives are not limited to those directly within the power of the Air Force to

implement and may involve another governmental agency or military service to assist in the project or even to become the lead agency. The Air Force may eliminate alternatives from detailed analysis, based on reasonable selection standards (i.e., operational, technical, or environmental standards suitable to a particular project).

For alternatives to be considered reasonable and warrant further detailed analysis they must be affordable, implementable, and meet the purpose and need for the proposal based on the project requirements stated in Section 2.3. One alternative to the Proposed Action was considered. This alternative involved the construction of a new AE FTU facility at WPAFB as a military construction (MILCON) project. Using planning MILCON construction cost factors provided by 88 ABW/CEPD, a rough order-of-magnitude estimate for a new facility would be $5.2 million. This alternative has been eliminated from further evaluation at this time because no construction plans have been developed and no potential location for new construction has been identified. This alternative would take longer to secure funding and would impact the requisite timeline. Therefore, it would not meet the purpose and need, and would result in further delay in standing up the AE FTU.

Should the Air Force consider new construction of an AE FTU facility an option in the future, the 88 ABW/CEPD would develop a more accurate cost estimate once final decisions are made and true facility requirements are gathered. *Military Construction Project Data* (DD Form 1391) would be developed and a supplemental EA could be tiered from this EA at that time.

In addition to the alternative eliminated above, other installations were also considered for the AE FTU mission during the Strategic Basing Process (AF 813). WPAFB was ranked first and scored 16 points higher than the next closest competitor. Warner Robins AFB, Grand Forks AFB, and Edwards AFB were each evaluated as a possible installation to locate the AE FTU mission. However, based on the basing criteria and scoring system, these AFB's were ranked 2 through 4. These installations were eliminated from further evaluation due to limited mission factors at each location and ability to leverage additional synergies.

2.6 Comparison of Environmental Consequences

The impacts associated with the Proposed Action and the No Action Alternative are summarized in **Table 2-3**. The information includes a concise definition of the issues addressed and the environmental impacts associated with each alternative. The analysis is based on information discussed in detail in Section 4.0, Environmental Consequences.

Table 2-3. Comparison of Environmental Consequences

Affected Environment	Proposed Action		No Action Alternative
	Alternative A (Facility 20840)	Alternative B (Facility 20434)	
Airspace Management	Short-Term: Negligible adverse impact. Long-Term: Minor impact on airspace management as airfield operations would slightly increase as a result of flight training.	Short-Term: Same as Alternative A. Long-Term: Same as Alternative A.	Short-Term: No impact Long-Term: No impact
Land Use	Short-Term: No impact because no changes to land use would occur at or surrounding WPAFB Long-Term: Same as short-term.	Short-Term: Same as Alternative A. Long-Term: Same as short-term.	Short-Term: No impact Long-Term: No impact
Air Quality	Short-Term: Minor, short-term impact from particulate matter and engine exhaust emissions generated during interior renovation activities. Long-Term: Negligible impacts with slight increase in net emissions for all pollutants due to flight training.	Short-Term: Minor, short-term impact from particulate matter and engine exhaust emissions generated during interior construction and renovation activities. Long-Term: Same as Alternative A.	Short-Term: No impact Long-Term: No impact
Noise	Short-Term: Minor impacts on ambient noise from construction activities associated with renovations. Impacts would be minor because these activities are primarily interior renovations and would be carried out during normal working hours. Long-Term: Minor impacts on the noise environment with anticipated slight increase in airfield operations as a result of flight training.	Short-Term: Same as Alternative A. Long-Term: Same as Alternative A.	Short-Term: No impact Long-Term: No impact
Geology and Soils	Short-Term: Negligible impact because construction activities are primarily limited to interior renovations. Long-Term: Negligible impact to soils, topography, or physiographic features.	Short-Term: Same as Alternative A. Long-Term: Same as Alternative A.	Short-Term: No impact Long-Term: No impact
Water Resources Groundwater	Short-Term: Negligible impact during construction as the proposed activities would be primarily conducted inside existing facilities. Long-Term: Though the Proposed Action would not pose any new risks, minor adverse effects on groundwater could continue to occur as a result of aircraft operations. Erosion and sedimentation controls would be implemented as a Best Management Practice (BMP).	Short-Term: Same as Alternative A. Long-Term: Same as Alternative A.	Short-Term: No impact Long-Term: No impact

Affected Environment	Proposed Action		No Action Alternative
	Alternative A (Facility 20840)	Alternative B (Facility 20434)	
Surface Water	Short-Term: Negligible impact during construction as the proposed activities would be primarily conducted inside existing facilities.	Short-Term: Same as Alternative A.	Short-Term: No impact
	Long-Term: Though the Proposed Action would not pose any new risks, minor adverse effects on surface water would continue to occur as a result of aircraft operations. Erosion and sedimentation controls would be implemented as a BMP.	Long-Term: Same as Alternative A.	Long-Term: No impact
Floodplains	Short-Term: Negligible impact. Modifications are limited to building interiors so there would be no increase in impervious surfaces. In addition, there would be no loss or gain of soil in the retarding basin.	Short-Term: Same as Alternative A.	Short-Term: No impact
	Long-Term: No impact	Long-Term: No impact	Long-Term: No impact
Biological Resources			
Vegetation	Short-Term: Negligible impact as the proposed activities would take place on previously disturbed areas with no naturally occurring vegetation.	Short-Term: Same as Alternative A.	Short-Term: No impact
	Long-Term: No impact	Long-Term: No impact	Long-Term: No impact
Wildlife	Short-Term: Negligible impact on wildlife as the proposed project area does not provide suitable habitat, the current land use would not change, and proposed activities are not in close enough proximity to any T&E species to generate noise-related effects.	Short-Term: Same as Alternative A.	Short-Term: No impact
	Long-Term: No impact	Long-Term: No impact	Long-Term: No impact
Threatened and Endangered Species	Short-Term: Negligible impact on threatened and endangered species as the proposed project area does not provide suitable habitat and the current land use would not change.	Short-Term: Same as Alternative A.	Short-Term: No impact
	Long-Term: No impact. The proposed project area does not provide suitable habitat and the current land use would not change.	Long-Term: Same as Alternative A.	Long-Term: No impact
Wetlands	Short-Term: No impact. No wetlands exist in the project area.	Short-Term: Same as Alternative A.	Short-Term: No impact
	Long-Term: No impact	Long-Term: No impact	Long-Term: No impact

Affected Environment	Proposed Action		No Action Alternative
	Alternative A (Facility 20840)	Alternative B (Facility 20434)	
Cultural Resources	Short-Term: No impact. Facility 20840 is not a structure eligible for listing in the NRHP. Long-Term: No impact	Short-Term: Potential adverse impact as Facility 20434 is a Cold War-era potential significant building and is eligible for listing in the NRHP. Proposed changes to this building could involve interior alterations of non-original walls and fixtures. The SHPO evaluation of possible effects to this facility cannot take place at this time since information regarding proposed plans for renovation is not currently available. Long-Term: Same as short-term.	Short-Term: No impact Long-Term: No impact
Socioeconomics	Short-Term: No adverse effect on local workforce. Beneficial impact on local economy from revenue generated by construction activities. Long-Term: Minor beneficial impact on local economy due to addition of new mission at WPAFB.	Short-Term: Same as Alternative A. Long-Term: Same as Alternative A.	Short-Term: No impact Long-Term: No impact
Environmental Justice	Short-Term: No impact Long-Term: No impact as there is no change in land use and minimal emissions from the training aircraft.	Short-Term: No impact Long-Term: Same as Alternative A.	Short-Term: No impact Long-Term: No impact
Infrastructure	Short-Term: Negligible adverse impact from construction traffic. Negligible impacts from utilities as there would be no substantial increase in personnel, facility operations, and transient students. Long-Term: Similar to short-term.	Short-Term: Same as Alternative A. Long-Term: Similar to short-term.	Short-Term: No impact Long-Term: No impact
Health and Safety	Short-Term: Potential minor impacts to workers during construction activities. Impacts would be minimized by adherence to safety standards. There would be no adverse impacts associated with bird-aircraft strike hazards. Long-Term: No impact	Short-Term: Same as Alternative A. Long-Term: No impact	Short-Term: No impact Long-Term: No impact
Hazardous Materials/Waste Hazardous Materials	Short-Term: Negligible impact. Hazardous materials used during renovation would not be expected to increase.	Short-Term: Same as Alternative A.	Short-Term: No impact

Affected Environment	Proposed Action		No Action Alternative
	Alternative A (Facility 20840)	Alternative B (Facility 20434)	
Hazardous Materials con't.	Long-Term: Negligible impact. Hazardous materials used, including deicing fluid, would not be expected to increase. Procurement of products containing hazardous materials would be comparable to those used for existing aircraft.	Long-Term: Same as Alternative A.	Long-Term: No impact
Hazardous Waste	Short-Term: Negligible impact. Hazardous wastes generated during renovation would not be expected to increase over current conditions.	Short-Term: Same as Alternative A.	Short-Term: No impact
	Long-Term: Negligible impact. The number of aircraft that would operate would be similar to the baseline condition. Therefore, it is anticipated that the volume, type, classifications, and sources of hazardous wastes would be similar in nature with the baseline condition waste streams.	Long-Term: Same as Alternative A.	Long-Term: No impact
Asbestos-Containing Material (ACM) and Lead-Based Paint (LBP)	Short-Term: Negligible adverse impact. At this time, it is anticipated that modifications in Facility 20840 would only involve rearranging furniture. A building survey would be conducted should renovation activities involve the removal or relocation of any walls, doors, or windows. If encountered, ACM and/or LBP would be removed and disposed in accordance with WPAFB policy.	Short-Term: Minor adverse impact. ACM and LBP could be encountered during construction and renovation projects. Impacts would be minimized by surveying the building prior to construction and renovation and if encountered, would follow WPAFB policy for removal and disposal of ACM and/or LBP.	Short-Term: No impact
	Long-Term: No adverse impact.	Long-Term: No adverse impact.	Long-Term: No impact
Environmental Restoration Program	Short-term: Building modifications would be limited to the interior and would have no adverse impact to ERP sites.	Short-Term: Same as Alternative A.	Short-Term: No impact
	Long-term: No impact	Long-Term: No impact	Long-term: No impact

2.7 Identification of Preferred Alternative

The preferred alternative is the alternative that the Air Force believes would fulfill its mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. As described in 40 CFR 1502.14(e), the Air Force has identified Alternative A under the Proposed Action as the preferred alternative. Alternative A involves co-locating the AE FTU with USAFSAM at Facility 20840. This selection was based on reasonable balance between mission requirements, costs associated with modifying the facility, efficient use of resources, and timeline for implementation.

3.0 AFFECTED ENVIRONMENT

This section describes the current environmental and socioeconomic conditions most likely to be affected by the Proposed Action. It 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.

In compliance with NEPA, CEQ guidelines, and 32 CFR 989, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. These resources and conditions include airspace management, land use, air quality, noise, geology and soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, infrastructure, health and safety, and hazardous materials and wastes. Analysis of potential environmental effects focuses on those resource areas that are appropriate for consideration in light of a proposed action. All resource areas are initially considered, but some may be eliminated from detailed examination because they do not directly apply to a particular proposal.

3.1 Airspace Management

3.1.1 Definition of the Resource

The USAF describes airspace management as the coordination, integration, and regulation of the use of airspace of defined dimensions. The objective of airspace management is to meet military training requirements through the safe and efficient use of available navigable airspace, in a peacetime environment, and while minimizing the impact on other aviation users and the public (AFI 13-201).

There are two categories of airspace, or airspace areas: regulatory and non-regulatory. Within these two categories, further classifications include controlled, uncontrolled, special use, and airspace for special use. The categories and types of airspace are dictated by:

- The complexity or density of aircraft movement
- The nature of the operations conducted within the airspace
- The level of safety required
- National and public interest in the airspace

Controlled Airspace

Controlled airspace encompasses the different classifications (Classes A, B, C, D, and E) of airspace and defines dimensions within which air traffic control (ATC) service is provided to flights under instrument meteorological conditions, and to flights under visual meteorological conditions. All military and civilian aircraft are subject to Federal Aviation Regulations. The controlled airspace classifications are defined, as follows:

- Class A: Includes all operating altitudes of 18,000 ft above mean sea level (MSL) and above. Class A airspace is most frequently used by commercial aircraft between altitudes of 18,000 and 45,000 ft above MSL.
- Class B: Typically comprises contiguous cylinders of airspace, stacked one upon another and extending from the surface up to 10,000 ft AGL. To operate in Class B airspace, pilots must contact appropriate controlling agencies and receive clearance to enter the airspace. Additionally, aircraft operating within Class B airspace must be equipped with specialized electronics that allow air traffic controllers to track aircraft speed, altitude, and position accurately.
- Class C: Generally described as controlled airspace that extends from the surface or a given altitude to a specified higher altitude. Class C airspace is designed and implemented to provide additional ATC into and out of primary airports where aircraft operations are periodically at high density levels. All aircraft are required to maintain two-way radio communication with local ATC facilities.
- Class D: Encompasses a 5-statute-mile radius of an operating air traffic-controlled airport. It extends from the ground to 2,500 ft AGL or higher. All aircraft must be in two-way radio communication with the ATC facility.
- Class E: May range from ground level at non-towered airfields up to 18,000 ft above MSL. The majority of Class E airspace is where more stringent airspace control has not been established.

The airways associated with Classes A through D frequently intersect approach and departure paths from both military and civilian airfields. With respect to airspace in southwestern Ohio, Class B airspace is associated with major airport complexes, such as the Cincinnati-Northern Kentucky International Airport, Kentucky. The James M. Cox Dayton International Airport, Ohio operates within Class C airspace. The airspace surrounding WPAFB is designated as Class D airspace.

Uncontrolled Airspace

Uncontrolled airspace (Class G) is not subject to restrictions that apply to controlled airspace. Limits of uncontrolled airspace typically extend from the surface to 700 ft AGL in urban areas, and from the surface to 1,200 ft AGL in rural areas. Uncontrolled airspace can extend above these altitudes to as high as 14,500 ft above MSL if no other types of controlled airspace have been assigned. ATC does not have authority to exercise control over aircraft operations within uncontrolled airspace. Primary users of uncontrolled airspace are general aviation aircraft operating under visual meteorological conditions.

Special Use Airspace

Special Use Airspace consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. With the exception of Controlled Firing Areas, special use airspace is depicted on aeronautical charts. Chart depictions include hours of operation, altitudes, and the agency controlling the airspace. All special use airspace descriptions are contained in Federal Aviation Administration (FAA) Order 7400.8, Special Use Airspace. Examples of special use airspace in the local flying area of WPAFB are restricted areas (e.g., R-3701), military

operations areas (e.g., Buckeye MOA), prohibited areas (e.g., P-56), and warning areas (e.g., W-107) (FAA 2012).

Airspace for Special Use

Airspace for Special Use is an area used by military aircraft but do not put restrictions on nonparticipating aircraft. They are designated as such for informational purposes for general aviation. Examples of airspace for special use are military training routes (MTRs), slow routes, and aerial refueling (AR) tracks.

The MTRs are flight paths that provide a corridor for low-altitude navigation and training. Low-altitude navigation training is important because aircrews might be required to fly at low altitudes for tens or hundreds of miles to avoid detection in combat conditions. To train realistically and safely, the military and the FAA have developed MTRs. This allows the military to train for low-altitude navigation at airspeeds in excess of 250 knots indicated airspeed (KIAS) (approximately 285 mph). There are two types of MTRs: instrument routes and visual routes. Typical MTRs are from 4 to 10 nautical miles wide and have altitude structures from 100 ft AGL to 5,000 ft above MSL or higher. The centerlines of MTRs are depicted on aeronautical charts.

Slow routes are similar to MTRs in structure but are used by aircraft that normally operate at low-level airspeeds of less than 250 KIAS. Slow routes are designated through military approval channels and do not require FAA coordination. The maximum altitude that can be flown in slow routes is 1,500 ft AGL.

The typical air refueling mission would use AR tracks already established in the DoD *Flight Information Publication AP/1B, Area Planning, Military Training Routes* (called "the FLIP") with generic routing to and from the tracks. These AR tracks are located throughout the country. Use of established airspace with a base altitude of 3,000 ft AGL does not require environmental analysis in accordance with the USAF *EIAP*, 32 CFR 989, as amended. The 445 AW currently flies C-17 aircraft on MTRs and uses low-level (less than 3,000 ft AGL) airspace; however, the aircraft to be used for the AE FTU would not use MTRs and low-level airspace.

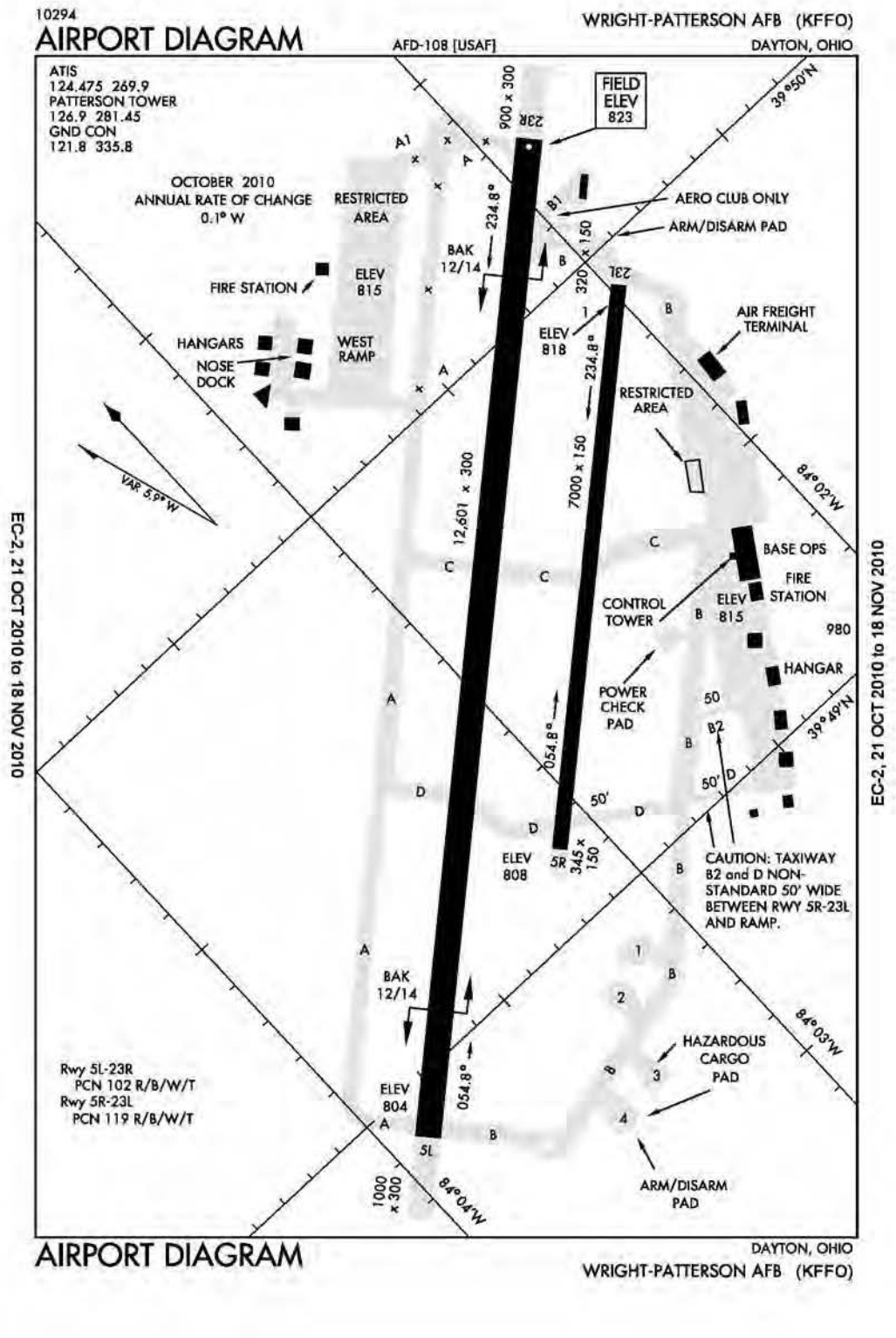
3.1.2 Existing Conditions

Wright-Patterson AFB

The WPAFB is managed and maintained by the 88 ABW. The Base is in many measures the largest, most diverse, and organizationally complex installation in the USAF. Missions range from acquisition and logistics management to research and development, education, flight operations, and many other defense-related activities.

The WPAFB has two runways oriented north-south: Runway 05L/23R is 12,601 feet long and Runway 05R/23L is 7,000 ft. **Figure 3-1** provides an airfield diagram of WPAFB. The airfield is surrounded by

Figure 3-1. WPAFB Airfield Diagram



Source: NIMA 2010

Class D airspace and lies under the Class C airspace of James M. Cox Dayton International Airport. **Figure 3-2** depicts the local controlled airspace in the vicinity of WPAFB.

Transition Training Airfields

The 445 AW conducts the majority of its aircraft operations at WPAFB. For transition training, the 445 AW uses various transitional airfields, primarily Dayton International Airport, Ohio; and Grissom ARB, Indiana (WPAFB 2011a). Other possible locations include Selfridge Air National Guard Base, Michigan; Rickenbacher International Airport, Ohio; and Campbell Army Airfield, Kentucky. These airfields are currently used to conduct instrument and visual flight rules pattern practice (landing and takeoff practice) when the local weather at WPAFB is unsuitable for training requirements and/or construction precludes safe flying operations.

The 445 AW currently maintains Letters of Agreement with civilian airfields, which establish procedures and requirements for both the 445 AW and the airfield. These Letters of Agreement also provide a tool for Operational Risk Management. Letters of Agreement are not required for use of military airfields.

AE Training

The 445 AES currently conducts training with C-130s at WPAFB as well as Youngstown Air Reserve Station (ARS) and Pittsburg International Airport (IAP) (WPAFB 2012b). There are no alternatives for inclement weather; however, ground training is not affected by weather conditions.

3.2 Land Use

3.2.1 Definition of the Resource

The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions.

Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure both orderly growth and compatible uses among adjacent property parcels or areas. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project sites and adjacent land uses.

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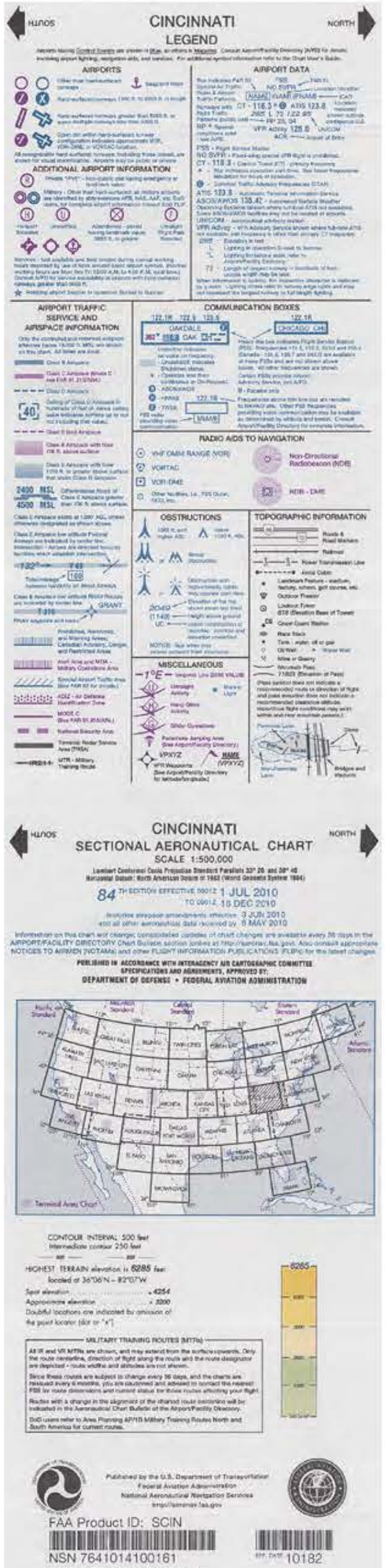

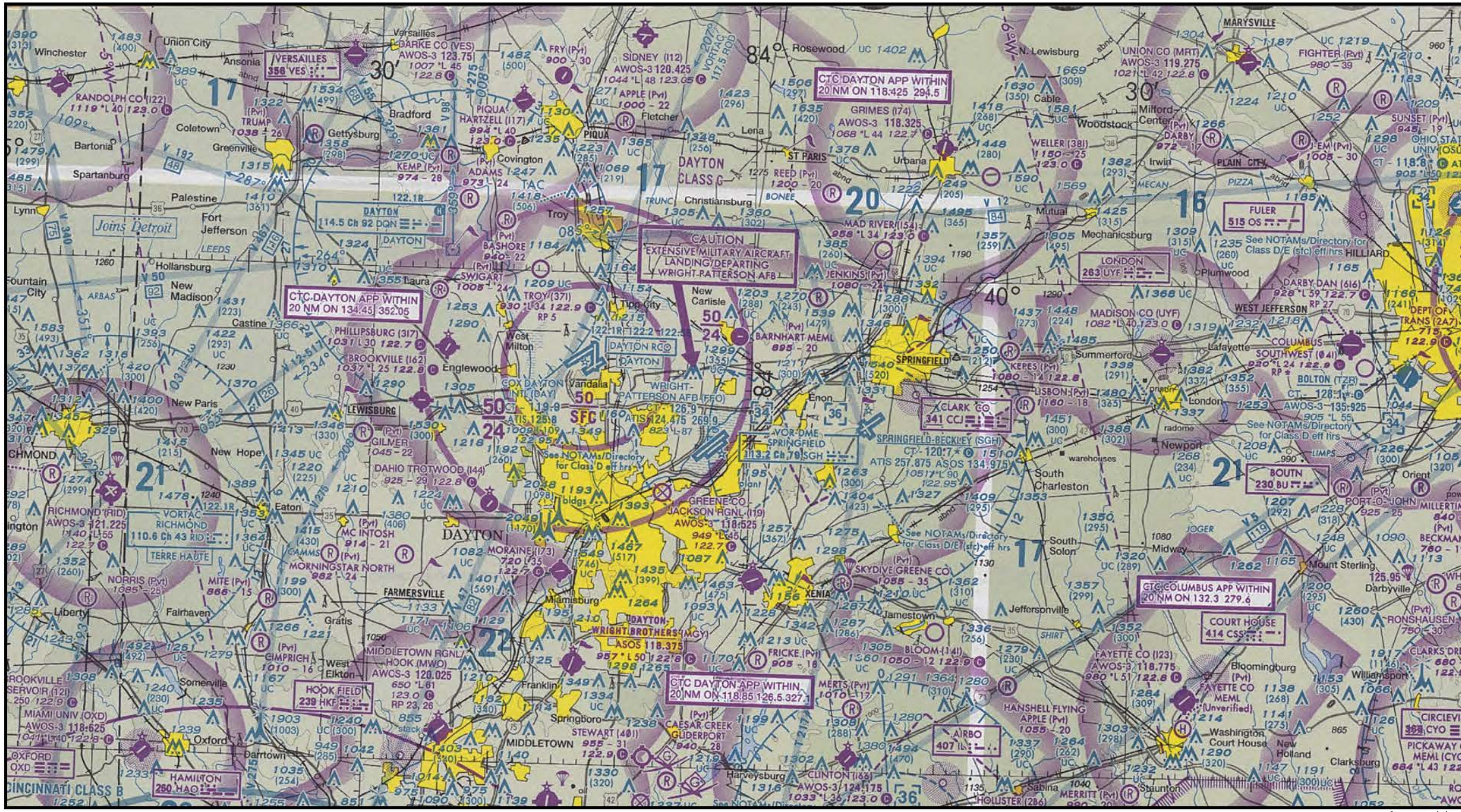

Source: FAA 2010

WRIGHT-PATTERSON
AIR FORCE BASE,
OHIO

FIGURE 3-2
Local Controlled Airspace Surrounding Wright-Patterson AFB

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The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence."

To address land use with respect to noise and safety associated with aircraft operations, DoD required military departments to establish an Air Installation Compatible Use Zone (AICUZ) program. The goal of AICUZ is to promote compatible land use around air bases by providing information concerning aircraft operations, noise exposure, and accident potential to local governments (WPAFB 1995a, 2001).

One component of the AICUZ study was the development of noise contours. These contours are produced by the computerized Day-Night Average A-Weighted Sound Level (DNL) metric and the NOISEMAP methodology. In the context of aircraft operations, land use compatibility is also described in the context of noise levels. The AICUZ study included both the conditions that existed at the time the study was prepared as well as a Maximum Mission Scenario that was based on the noise effects of various potentially feasible mission changes. The Maximum Mission (also known as Mission Capacity) Scenario was established for WPAFB to provide consistency when zoning and land use policies in the community are established. Because the noise contours were based on conservative assumptions regarding future missions, local zoning does not need to be adjusted with changes in missions. Therefore, the noise contours for the Maximum Mission Scenario remain in effect for local community planning purposes. Noise contour analysis is addressed in Section 3.4 of this EA.

The AICUZ program is also intended to reduce the potential for aircraft mishaps in populated areas. As a result of this program, WPAFB has altered basic flight patterns to avoid heavily populated areas. In addition, airfield safety zones were established under AICUZ to minimize the number of people who would be injured or killed if an aircraft crashed. Three safety zones are designated at the end of all active runways: Clear Zone (CZ), Accident Potential Zone (APZ) I, and APZ II.

The CZ represents the most hazardous area. APZs are outside of the CZs. APZ I is immediately beyond the CZ and has a high potential for accidents. APZ II is immediately beyond APZ I and has measurable potential for accidents. While aircraft accident potential in APZs I and II does not necessarily warrant acquisition by USAF, land use planning and controls are strongly encouraged for the protection of the public. Compatible land uses are specified for these zones. According to AFI 32-7063, all new construction is required to comply with the AICUZ. Neither Facility 20840 nor Facility 20434 is located in any of the APZs.

3.2.2 Existing Conditions

On-Base Land Use

WPAFB is mostly comprised of Federal lands and is zoned GOV, Government. As a Federal property, the Base is not subject to local zoning regulations. The majority of land surrounding WPAFB is within the city of Fairborn, and is zoned as R-2, R-3, R-4 (Residential) and B-1, B-2, B-3 (Business) (Fairborn 2009). WPAFB comprises 8,145 acres near Dayton, Ohio, and is divided into two areas: A and B. Area A contains administrative activities, airfield operation, maintenance, and civil engineering activities; and Area B focuses on acquisition, education, research, and development. The Base is expected to fulfill numerous roles within the USAF, incorporating both natural and man-made development constraints within the Base boundaries. Over 2,500 acres of WPAFB remain undeveloped due to various development constraints.

There is a wide variety of land use classifications on WPAFB. Open Space and Outdoor Recreation represent some of the land constrained from development. Over 2,000 acres of this undeveloped land lies within the natural constraints area, which is composed of areas such as floodplains, lakes, wetlands, or areas with unsuitable soil for building. Also located within the natural constraint area is the 109-acre Huffman Prairie Flying Field containing remnant prairie habitat, which includes several rare plant and animal species.

Human-made constraints also restrict development within the WPAFB boundaries. Included in these types of constraints are archaeological sites and historic buildings, which can be identified sites or those that remain undiscovered. Operational restrictions can also impede development. Noise contours from aircraft operations and explosive safety zones must be considered when looking at developing areas on the Base. Airfield and airspace control surfaces, such as runway approach CZs, are to remain clear of building obstructions. The presence of past waste disposal sites and fire training areas must be considered when siting facilities (WPAFB 1995a).

Surrounding Land Use

Land uses around WPAFB vary from heavily urbanized to rural agricultural (**Figure 3-3**). Most of the urbanized areas are west of the Base, with the low-density or agricultural area located east of the Base.

The closest commercial land use to WPAFB lies within the Kauffman Avenue corridor located approximately 500 ft east of Area A. The surrounding communities of Fairborn, Xenia, and Beavercreek offer ample recreation and cultural facilities for residents and visitors alike.

Development in this area caters to local residents with commercial establishments such as gas stations, grocery stores, and dry cleaners. Stores fronting the sidewalks have limited setbacks, off-street parking, and limited landscaping. The prominent educational facilities in the area include Fairborn public and private schools, Wright State University, Clark State Technical College, and Strayer University.

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Legend:

- C-17 Noise Contours (2012)
- Maxumum Mission DNL Noise Contours
- Residential
- Commercial
- Industrial
- Institutional
- Open Space
- Vacant and Agricultural
- Extractive
- Airports
- Runway
- Clear Zones
- APZ I
- APZ II

Note:
DNL Noise Levels in Decibels
65, 70, 75, 80, 85

Source: 1995 AICUZ Study Maximum Mission

Source: Land Use - Ohio Department of Natural Resources
Montgomery County Land Use data; Miami County Land Use Data;
Clark County Land Use data; Greene County Land Use data.

N

Feet
0 3,000 6,000 12,000

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Figure 3-3
Existing Land Use with C-17 and Maximum Mission Noise Contours

Cultural and entertainment resources include the Wright Brothers Memorial, various Young Men's Christian Association (YMCA) locations, the Kettering Recreation Center, the Dayton Museum, public libraries, and numerous public and private golf courses.

Most of the land surrounding WPAFB that is impacted from Base activities is compatible with Base operations. Many factors contribute to the compatibility of land uses that are within Base activity areas. Development patterns and services available encourage or restrict development in many areas outside incorporated cities, and many areas immediately surrounding the Base are development-restricted due to floodplains or well water protection restrictions. Progressive land use controls have been the most important factor concerning compatible development within noise and APZs at WPAFB (WPAFB 1995a).

3.3 Air Quality

3.3.1 Definition of the Resource

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

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

The criteria pollutant O_3 is not usually emitted directly into the air, but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "O_3 precursors." These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to

limit atmospheric O_3 concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_x.

Table 3-1. National Ambient Air Quality Standards

Pollutant	Standard Value [6]		Standard Type
CARBON MONOXIDE (CO)			
8-hour average	9 ppm	(10 mg/m^3)	Primary
1-hour average	35 ppm	(40 mg/m^3)	Primary
NITROGEN DIOXIDE (NO_2)			
Annual arithmetic mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
1-hour average[1]	0.100 ppm	(188 µg/m^3)	Primary and Secondary
OZONE (O_3)			
1-hour average[2]	0.12 ppm	(235 µg/m^3)	Primary and Secondary
8-hour average[2]	0.075 ppm	(147 µg/m^3)	Primary and Secondary
LEAD (PB)			
3-month average [3]		0.15 µg/m^3	Primary and Secondary
PARTICULATE < 10 MICROMETERS (PM_{10})			
24-hour average[4]		150 µg/m^3	Primary and Secondary
PARTICULATE < 2.5 MICROMETERS ($PM_{2.5}$)			
Annual arithmetic mean[4]		15 µg/m^3	Primary and Secondary
24-hour average[4]		35 µg/m^3	Primary and Secondary
SULFUR DIOXIDE (SO_2)			
1-hour average[5]	0.075 ppm	(196 µg/m^3)	Primary
Annual arithmetic mean[5]	0.03 ppm	(80 µg/m^3)	Primary
24-hour average[5]	0.14 ppm	(365 µg/m^3)	Primary

Notes:

1 In February 2010, USEPA established a new 1-hr standard at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the existing annual standard.

2 In March 2008, the USEPA revised the level of the 8-hour standard to 0.075 ppm. With regards to the secondary standard for O_3, USEPA revised the current 8-hour standard by making it identical to the revised primary standard.

3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m^3. USEPA revised the averaging time to a rolling 3-month average.

4 In October 2006, USEPA revised the level of the 24-hour $PM_{2.5}$ standards to 35 µg/m^3 and retaining the level of the annual $PM_{2.5}$ standard at 15 µg/m^3 and retaining the level of the annual $PM_{2.5}$. With regard to primary standards for particle generally less than or equal to 10 µm in diameter (PM_{10}), USEPA is retaining the 24-hour standard and revoking the annual PM_{10} standard.

5 In June 2010, USEPA established a new 1-hr SO_2 standard at a level of 75 parts per billion (ppb), based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The USEPA is also revoking both the existing 24-hour and annual primary SO_2 standards.

6 Parenthetical value is an approximately equivalent concentration for NO_2, O_3 and SO_2.

ppb: parts per billion
ppm: parts per million
mg/m^3: milligrams per cubic meter
µg/m^3: micrograms per cubic meter

USEPA has recognized that particulate matter emissions can have different health affects depending on particle size and, therefore, developed separate NAAQS for coarse particulate matter PM_{10} and fine particulate matter $PM_{2.5}$. The pollutant $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable $PM_{2.5}$ can include SO_2, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there and, thus, which precursors are considered significant for $PM_{2.5}$ formation and identified for ultimate control.

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

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

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour O_3, $PM_{2.5}$, and regional haze standards that were promulgated in that year. Because of the litigation and resulting delay in implementing the new O_3 and $PM_{2.5}$ ambient air quality standards, however, these new conformity requirements were not completed by USEPA until 2006 when the $PM_{2.5}$ de minimis levels were added. The last revision of the General Conformity rules occurred in April 2010 (40 CFR 93.153). The USEPA rule in this latest revision sought to clear up identified issues, reduce specific regulatory burdens, and modify the rules to be helpful to states revising their SIP for implementing the revised NAAQS while assuring Federal agency actions continue to conform. Regulatory burden reduction measure changes made to the General Conformity applicability rule in April 2010 include:

1. Deleting the provision that requires Federal agencies to conduct a conformity determination for regionally significant actions where the direct and indirect emission of any pollutant represent 10 percent or more of a nonattainment or maintenance area's emission inventory even though the total direct and indirect emissions are below de minimis levels.
2. Adding new types of actions that Federal agencies can include in their "presumed to conform" lists and permitting States to establish in their General Conformity SIPs "presumed to conform" lists for actions within their State.
3. Finalizing an exemption for the emissions from stationary sources permitted under the minor source New Source Review (NSR) programs similar to the EPA's existing General Conformity regulation which already provides for exemptions for emissions from major NSR sources.

4. Establishing procedures to follow in extending the 6-month conformity exemption for actions taken in response to an emergency.

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

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if a proposed project's net emission increase meets or exceeds the rate of emissions listed in 40 CFR 52.21(b)(23)(i); or (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)].

3.3.2 Existing Conditions

Regional Climate

The climate of this region of Ohio is humid and temperate with warm summers and cold winters. Average minimum and maximum temperatures are between 21 and 36 degrees Fahrenheit (°F) in January and 45 and 85 °F in July. The average annual precipitation is 38.43 inches, with June typically being the wettest month and October the driest month. The prevailing winds are from the southwest, with average monthly wind speeds between 3 and 7 knots.

Regional Air Quality

Under the authority of the CAA and subsequent regulations, USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the NAAQS. Through the CAA, Congress has stated that the prevention and control of air pollution belongs at the state and local level, thus USEPA has delegated enforcement of the PSD and Title V programs to the Ohio Environmental Protection Agency (OEPA). The OEPA has adopted the NAAQS by reference, thereby requiring the use of the standards within the state of Ohio.

Wright-Patterson AFB

Wright-Patterson Air Force Base is located in Greene and Montgomery counties, which are located in the Metropolitan Dayton Intrastate AQCR (40 CFR 81.34). Each AQCR is classified as an attainment area or nonattainment area for each of the criteria pollutants depending on whether it meets or fails to meet the NAAQS for the pollutant. Ambient air quality for the Metropolitan Dayton Intrastate AQCR, which was formerly classified as a maintenance area for the 1-hour and 8-hour O_3, is not yet designated for the new 8-hour O_3 NAAQS established in 2008.

Ambient air quality, which was classified as attainment for the NO_2 annual standard, was designated as unclassifiable/attainment effective on February 29, 2012 for the new 1-hour standard established in 2010 (USEPA 2012). Ambient air quality for SO_2 is not yet designated for the new 1-hour standard established in 2010. Ambient air quality for lead, which was in attainment for the previous quarterly standard, is not yet designated for the new rolling 3-month standard established in 2008. The ambient air quality for $PM_{2.5}$ is classified as attainment for the 24-hour standard and nonattainment for the annual standard. The region is designated as an unclassifiable/attainment area for all other criteria pollutants. Unclassifiable areas are those areas that have not had ambient air monitoring and are assumed to be in attainment with NAAQS. Any of the pending attainment designations have no regulatory effect on the current analysis.

Air quality is typically good in the vicinity of WPAFB, and is generally affected only locally by military and civilian vehicle emissions, particulate pollution from vehicle traffic, emissions from wastewater treatment plants, industrial sources, and construction activities. Mobile sources, such as vehicle and aircraft emissions, are generally not regulated and are not covered under existing stationary source permitting requirements. Stationary emissions sources at WPAFB include natural gas and coal-fired boilers; research and development sources, such as laboratory fume hoods and test cells; paint spray booths; refueling operations; and emergency power generators.

Wright-Patterson Air Force Base is under the jurisdiction of USEPA Region 5 and the OEPA. The Regional Air Pollution Control Agency (RAPCA), under the jurisdiction of the OEPA, conducts annual compliance inspections at WPAFB. The base has long had an aggressive program of internal audits and inspections to ensure continual compliance with all applicable air permit terms and conditions. Detailed records are maintained to demonstrate compliance with emission limits, and reports are submitted in a timely manner to the local regulatory agency.

The WPAFB air emissions inventory includes over 1,400 emissions sources. Of these, approximately 1,050 are included in the Base's Title V permit application, which was originally submitted to the OEPA in February 1996 in accordance with CAA requirements. Many of the Title V sources are insignificant, including emergency generators and laboratory fume hoods. There were 29 permitted non-insignificant emissions units identified in the original application, most of which were boilers and paint spray booths. The OEPA finalized the Title V Operating Permit for WPAFB in January 2004 with an effective date of

February 17, 2004 (OEPA 2004). A Title V renewal permit application was submitted to the OEPA in May 2008 and is currently under review. The Title V renewal application notified OEPA that the number of permitted non-insignificant emission units was reduced from 29 to 26.

Area B, Facilities 20840 and 20434

Area B at WPAFB is primarily dedicated to research and development facilities. Facility 20840 houses USAFSAM, and Facility 20434 is currently unoccupied and is under control of the 711 HPW. A number of insignificant emissions units located within Area B research and development facilities are listed in the WPAFB Title V permit, identified on the Title V renewal application, or listed in the OEPA Air Services profile. Facility 20434 currently does not contain any insignificant activities while Facility 20840 includes the following:

- 3 Emergency Backup Generators
- 36 Laboratory Fume Hoods

Insignificant sources listed in the Title V permit may or may not have permit conditions or reporting requirements depending on the regulatory qualifications that categorizes a source as insignificant. Insignificant sources that were specifically issued a Permit-to-Install (PTI) must be evaluated individually prior to commencing work to assure that the terms and conditions of the issued PTI are maintained. Insignificant sources that were permitted-by-rule (PBR) may be modified or relocated without notification provided the terms and conditions of the PBR are maintained. Insignificant sources that are de minimis or to which only generally applicable requirements apply may undergo additions, removals, and relocations and do not require a modification of the Title V permit provided the changes do not exceed insignificant emission levels.

Insignificant emission levels are defined in Ohio Administrative Code (OAC) rule 3745-77-01(V)(3) to be less than or equal to 5 tpy of any regulated air pollutant other than a Hazardous Air Pollutant and not more than 20 percent of an applicable major source threshold. Changes to insignificant sources are handled as routine administrational changes through air profile updates submitted through Air Services to the OEPA, Division of Air Pollution Control.

An Air Conformity Applicability Analysis was prepared for the Proposed Action, Alternative A, and Alternative B. This analysis is discussed in Section 4 and provided in **Appendix B**.

3.4 Noise

3.4.1 Definition of the Resource

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies according to the source type, characteristics of the noise source, distance between source and receptor, receptor sensitivity,

and time of day. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). Decibels are used to characterize sound levels that can be sensed by the human ear. "A-weighted" decibels (dBA) incorporate an adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise event. All sound levels analyzed in this EA are A-weighted.

Single-event noise, such as an overflight, is described by the sound exposure level (SEL). Cumulative noise levels, resulting from multiple single-events, are used to characterize community noise effects from aircraft or airfield environment, and are measured in the DNL metric, as described in Section 3.2.1. A general discussion of these metrics is provided below and a detailed explanation is provided in **Appendix C**.

Sound Exposure Level

The SEL measurement describes a noise event, such as an aircraft overflight, comprising a period of time when an aircraft is approaching a receptor and noise levels are increasing, the instant when the aircraft is closest to the receptor and the maximum noise level is experienced, and the period of time when the aircraft moves away from the receptor resulting in decreased noise levels. SEL is a measure that accounts for both loudness and duration of a noise event.

The SEL metric relates to a single event, which is useful when calculating the noise effects of aircraft flyovers. Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft and engines at different power settings at various phases of flight. These values form the basis for the individual-event noise descriptors at any location, and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, and variations from standard aircraft operating profiles and power settings.

Day-Night Average A-Weighted Sound Level

The DNL noise metric incorporates a "penalty" for nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. The DNL values are obtained by averaging aircraft single event SEL values for a given 24-hour period. DNL is the preferred noise metric of U.S. Department of Housing and Urban Development (HUD), FAA, USEPA, and DoD for modeling aircraft noise in airport environs.

Most people are exposed to sound levels of DNL 50 to 55 dBA or higher on a daily basis. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below DNL of 65 dBA (USDOT 1980).

Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments and that there is a consistent relationship between DNL and the level of annoyance. The "Schultz Curve" (discussed in **Appendix C)** shows the relationship between DNL noise levels and the percentage of the population predicted to be highly annoyed.

Noise Criteria and Regulations

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Guidelines and regulations that are relevant to the project are described below.

According to USAF, FAA, and HUD criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds DNL of 75 dBA, "normally unacceptable" in regions exposed to noise between the DNL of 65 to 75 dBA, and "normally acceptable" in areas exposed to noise where the DNL is 65 dBA or less. The Federal Interagency Committee on Noise (FICON) developed land-use compatibility guidelines for noise in terms of DNL (USDOT 1980). DNL is the metric used by the USAF in determining noise impacts of military airfield operations for land use planning.

USAF land use compatibility guidelines (relative to DNL values) are documented in the *AICUZ Program Handbook* (USAF 1999). Four noise zones are used in AICUZ studies to identify noise impacts from aircraft operations. These noise zones range from DNL of 65 to 80 dBA and above. For example, it is recommended that no residential uses, such as homes, multifamily dwellings, dormitories, hotels, and mobile home parks, be located where the noise is expected to exceed a DNL of 65 dBA.

If sensitive structures are located in areas within a DNL of 65 to 75 dBA, noise-sensitive structures should be designed to achieve a DNL of 25 to 30 dBA interior noise reduction. Noise-sensitive structures might include schools, concert halls, hospitals, and nursing homes. Elevated noise levels in these structures can interfere with speech, causing annoyance or communication difficulties. Some commercial and industrial uses are considered acceptable where the noise level exceeds DNL of 65 dBA. For outdoor activities, USEPA recommends DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population will be at risk from any of the effects of noise (USEPA 1974).

Response to Noise Events

Noise can cause a person to be irritated or annoyed. Noise annoyance is defined by USEPA as any negative subjective reaction to noise by an individual or group. DNL is an accepted unit for quantifying annoyance to humans by general environmental noise, including aircraft noise. **Table 3-2** describes the percentage of people who were "highly annoyed" when exposed to various levels of noise measured in DNL. The data shown provides a perspective on the level of annoyance that might be anticipated. For

example, 15 to 25 percent of persons exposed on a long-term basis to DNL of 65 to 69 dBA are expected to be highly annoyed by noise events.

Table 3-2. Percentage of Population Highly Annoyed by Noise Zones

DNL	Percentage of Persons Highly Annoyed	
	Low	High
65–69 dBA	15	25
70–74 dBA	25	37
75–79 dBA	37	52
80 + dBA	61	61

Source: USAF 2000
Notes: dBA = A-weighted decibel; DNL = Day-Night Average A-Weighted Sound Level

The effects of noise on sleep are of concern, primarily in ensuring suitable residential environments. DNL incorporates consideration of sleep disturbance by assigning a 10 dBA penalty to nighttime noise events (10:00 p.m. to 7:00 a.m.). More typically, single noise events, not average sound levels, correlate with sleep disturbance. A discussion of the relationships between the occurrence of awakening and SEL is presented in **Appendix C**. Most of these relationships do not reflect habituation and, as such, do not address long-term sleep disturbance effects. Nevertheless, the studies can be used to demonstrate relative differences in interference among different noise-event exposure scenarios.

3.4.2 Existing Conditions

Construction Program

Building construction, modification, and demolition work can cause considerable noise emissions. A variety of sounds come from cranes, cement mixers, welding, hammering, boring, and other work processes. Construction equipment and building operations are often poorly silenced, but quickly become a part of the ambient noise levels heard every day. The proposed renovation/modification projects detailed in Section 2.3 would potentially generate the types of sounds listed above.

Aircraft Operations

The noise contour analysis for WPAFB is presented in the *1995 AICUZ Study for Wright-Patterson AFB, Ohio* (WPAFB 1995a). This analysis was generated by the NOISEMAP model, which has a specific database for military helicopters and fixed-wing type aircraft, including C-130, KC-135, and C-17 aircraft. Based on reasonable assumptions at the time of the 1995 AICUZ Study, a Maximum Mission/Maximum Capacity Scenario was analyzed and incorporated a potential increase in F-16, F-15, C-141, and C-5 aircraft operations.

Although it is not anticipated that all aircraft operations projected in the Maximum Mission Model would be stationed at WPAFB at any one time, the Maximum Mission Model was intended to capture the maximum feasible operational capacity of the airfield and support activities. In addition, transient aircraft

from other installations and flying club aircraft operations are included in this study. Within the limits of accuracy of the model itself, it was meant to provide a good-faith "worst-case" baseline for the surrounding communities' zoning and land-use decisions, thus limiting encroachment and preserving the capacity of the Base to host additional flying missions. **Figures 3-3** and **3-4** depict the baseline noise contours presented in the 1995 AICUZ Study (WPAFB 1995a).

The most recent noise study for WPAFB was conducted in 2008 to confirm that C-5 aircraft noise levels were within the Maximum Mission/Maximum Capacity Scenario. This analysis confirmed that noise levels were within the Maximum Mission/Maximum Capacity contours established in 1995 (WPAFB 2011a). Since then, the 445 AW has replaced the C-5 aircraft with the C-17. The conversion of the C-5 to the C-17 occurred throughout FY11 and is now complete. The C-17 is a newer and more flexible airlift aircraft. Due to a quieter engine, the noise levels in the vicinity of WPAFB have been reduced. For comparison, the projected noise contours for the C-17 are also shown on **Figure 3-4** (WPAFB 2011a)**.** Because the Maximum Mission Scenario noise contours have been, and are currently, used for noise compatibility planning around the Base, these contours are considered to be the baseline for the noise evaluation in this EA. As shown in **Figure 3-4**, Facility 20434 is located within the 70-dBA contour for the Maximum Mission Scenario; Facility 20840 is just outside the 70-dBA contour and within the 65-dBA contour. Both facilities are located outside the 65-dBA noise contour based on the projected C-17 mission for 2012.

No noise sensitive receptors were identified in the AICUZ. There have been no recent complaints regarding aircraft noise (WPAFB 2011a). Aircrews limit their routes to the south and east as much as possible. Although a hospital was recently constructed in the vicinity of I-675 and Fairfield Road, this facility is located outside of the 65-dBA noise contour. In addition, construction of new housing occurs outside of 70-dBA contours.

3.5 Geology and Soils

3.5.1 Definition of the Resource

Geological resources consist of the earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography, geology, hydrogeology, soils, minerals, and, where applicable, paleontology.

Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features. Geology is the study of the earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition. Hydrogeology extends the study of the subsurface to water-bearing structures. Hydrogeological information helps in the assessment of groundwater quality and quantity and its movement.

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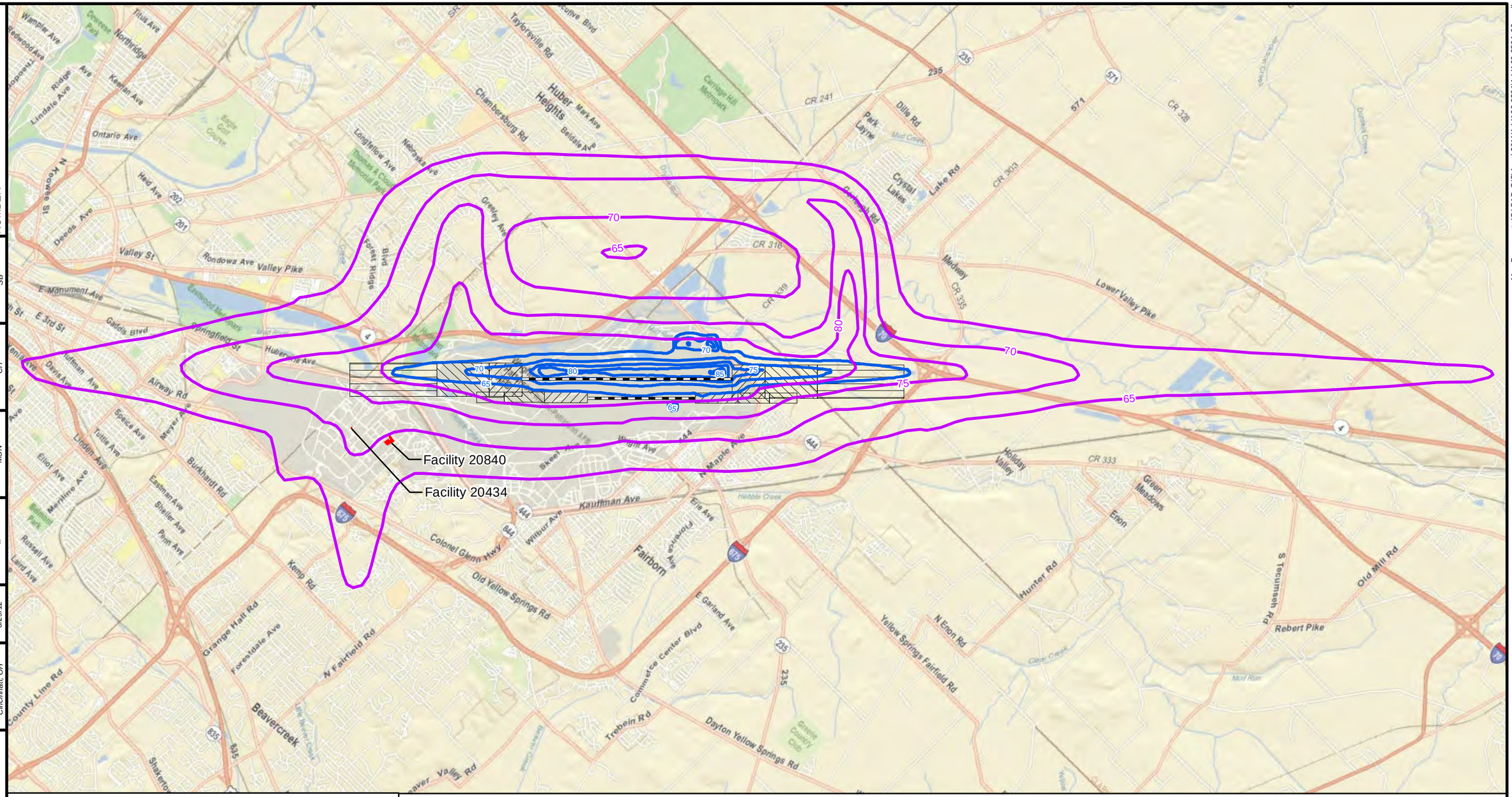

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Figure 3-4
1995 Maximum Mission Contour vs. the C-17 2012 Contour

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soils properties must be examined for their compatibility with particular construction activities or types of land use. Minerals are naturally-occurring, homogeneous inorganic solid substances that have a definite chemical composition and characteristic crystalline structure, color, and hardness. Minerals are not extracted for economic purposes at WPAFB. Another component of the soil at WPAFB is arsenic. Arsenic is a highly poisonous metallic element having three allotropic forms; yellow, black, and gray, of which the brittle, crystalline gray is the most common. Arsenic and its compounds are used in insecticides, weed killers, solid-state doping agents, and various alloys. Naturally-occurring arsenic has impacted groundwater in portions of WPAFB.

3.5.2 Existing Conditions

Topography and Geology

The topography of Area A is flat with some portions included in the 100-year flood- plain of the Mad River. The highest elevations on the Base are in Area B and occur along a bedrock ridge that extends from the southeast corner of Area B to the Wright Memorial. The majority of the base is on the broad alluvial plain of the Mad River Valley, which overlies Ordovician-age Richmond shale and limestone bedrock (WPAFB 2001). The elevation on Base ranges from approximately 760 to 980 ft above MSL (WPAFB 2001). Wright-Patterson AFB is within the glaciated till plain region of southwestern Ohio, an area within the Central Lowlands Physiographic Province. The Central Lowlands province is characterized by low rolling hills, level plains, and flat alluvial valleys (WPAFB 2007a).

Natural Hazards

The state of Ohio is characterized by a low level of seismic activity (USGS 2008). The Dayton, Ohio, area does not typically experience earthquakes because of its location in relation to fault zones (Hansen 2002). Northwest Ohio had a series of historic earthquakes in the late 1800s to mid 1900s. The majority of these earthquakes were located in Auglaize and Shelby counties, which are approximately 45 miles from Greene County, Ohio (Hansen 2002), with the greatest instrumented magnitude recorded between 5.0 and 5.4 (USGS 2012). On July 23, 2010, a 5.0 magnitude earthquake originating along the Quebec-Ontario border was felt in Dayton and surrounding areas.

Soils

Surface soil at WPAFB formed on unconsolidated deposits, primarily alluvium, glacial outwash, glacial till, and loess (WPAFB 2007a). Development and substantial earthmoving activities have altered the natural soil characteristics at WPAFB, making precise classifications difficult. The U.S. Department of Agriculture-Natural Resource Conservation Service (NRCS) mapped most of WPAFB as urban land complexes.

According to the NRCS, the soil survey for Greene County, Ohio indicated that the soils in the Facility 20840 and Facility 20434 project areas (0 to 5 ft below the ground surface) are of the Miamian-Urban land complex (USDA-SCS 1978). The Miamian-Urban complex is made up of gently sloping soils on uplands underlain by glacial till. Much of the original soil material of the Miamian-Urban complex has been disturbed or buried by earthmoving and filling operations. Runoff is generally rapid in Miamian-Urban soils and during construction there is a hazard of erosion in areas devoid of vegetation.

3.6 Water Resources

3.6.1 Definition of the Resource

Water resources include groundwater, surface water, and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes.

Groundwater

Groundwater consists of the subsurface hydrologic resources. It is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

Surface Water

Surface water resources consist of lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. Storm water is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade lakes, rivers, and streams. Storm water flows, which may be exacerbated by high proportions of impervious surfaces associated with buildings, roads, parking lots, and airfields are important to the management of surface water. Storm water systems convey precipitation away from developed sites to appropriate receiving surface waters. Higher densities of development, such as those found in Area B, require greater degrees of storm water management because of the higher proportions of impervious surfaces that occur in urban centers. Surface water in the Mad River is a source of groundwater recharge for the Miami Valley Buried Aquifer system (Section 3.6.2) and the groundwater production wells in the City of Dayton wellfields.

Floodplains

Floodplains are areas adjacent to rivers, stream channels, or coastal waters where the ground surface elevation is low enough to allow for periodic or infrequent inundation from flooding due to excessive rain or snow melt. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year.

Executive Order 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of appropriate FEMA Flood Insurance Rate Maps, which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a specific step-by-step process must be followed to comply with EO 11988 outlined in the FEMA document *Further Advice on EO 11988 Floodplain Management*. As a planning tool, the NEPA process incorporates floodplain management through analysis and public coordination of the EA.

In addition, all floodplain related construction activities must be coordinated with the Miami Conservancy District (MCD) for approval. The MCD is a political subdivision of the State of Ohio formed under Section 6101 of the Ohio Revised Code for specific regional water-related purposes with a core mission of flood control. The MCD through the *Land Use Agreement* (dated January 7, 2000) and the MCD *Policy and Procedure for Permits in Retarding Basins* regulates all construction on land within the Huffman Dam Retardation Basin and more than 5 ft below the spillway elevation of 835 ft, above MSL.

3.6.2 Existing Conditions

Groundwater

Wright-Patterson Air Force Base is regionally located in the Great Miami River Valley, which is filled with glacial deposits of sand and gravel. The glacial outwash deposits are very permeable and exhibit high transmissivity and hydraulic conductivity. The resulting aquifer system, collectively called the Miami Valley Buried Aquifer, is a highly productive source of water for the millions of people in southwest Ohio. The USEPA designated the Miami Valley Buried Aquifer system as a sole-source aquifer in 1988, meaning that all new projects must be approved by USEPA Region 5 to ensure its continued use as a drinking water supply (53 Federal Register 15876). The buried aquifer system provides drinking water for more than 1.6 million people in southwest Ohio (Debrewer et al. 2000).

Groundwater can also be found in large volumes in the Silurian-age (415 to 465 million years ago) limestone and dolomite bedrock underneath the buried valley aquifer system. Private wells and smaller public systems typically use this bedrock aquifer because, though not as productive as the buried aquifer, it is adequate for such uses (MCD 2002). Underneath the limestone and dolomite bedrock is Ordovician-age (465 to 510 million year ago) bedrock shales and limestones of the Richmond Group. The lower bedrock aquifer system generally produces less than 5 gallons per minute (gpm) and is only productive enough for livestock use.

The buried valley aquifers coincide with the present Great Miami River and its tributaries. Water underground generally follows the same flows as surface waters with upland areas serving as recharge areas and groundwater divides (MCD 2002). At WPAFB, the Mad River follows the course of the Mad

River Buried Aquifer, part of the Miami Valley Buried Aquifer system. South of Huffman Dam (a flood control dam that is managed by the MCD), a till zone divides the Mad River Buried Aquifer into an upper water table unit and a lower confined unit.

However, north of the dam and in other parts of the buried valley aquifer, till zones occur less frequently as discontinuous, less-permeable zones within the more permeable outwash deposits (WPAFB 1995b). The glacial deposits have been reported to be up to 250 ft thick in the buried rock valley underlying Area A of WPAFB. The depth to the water table occurs approximately 10 to 20 ft below ground surface across most of Area A (WPAFB 1995b). Vertical hydraulic gradients vary throughout the area, and both upward and downward gradients have been recorded in nested monitoring wells at WPAFB. Most of the wells in the outwash deposits yield between 750 and 1,500 gpm, but can vary from less than 200 to more than 4,000 gpm (WPAFB 1995b). The City of Dayton groundwater production wells at Huffman Dam are screened at depths of over 100 ft below ground surface. Because of the limestone and dolomite bedrock, groundwater is typically hard (Debrewer et al. 2000).

Surface Water

Wright-Patterson Air Force Base is in the Mad River Valley. The Mad River originates approximately 40 miles north of Springfield, Ohio, and flows south and southwest past WPAFB to its confluence with the Great Miami River in Dayton, Ohio. The Great Miami River flows into the Ohio River, which flows into the Mississippi River. Sustained flow of the Mad River originates from groundwater discharge of glacial deposits upstream of Huffman Dam. The Mad River approaches WPAFB from the north and flows along the western border of Area A (**Figure 3-5**). The OEPA has divided the Mad River watershed into five areas: the headwaters; Mad River between Kings and Chapman Creeks; Buck Creek; Mad River from Chapman to Mud Creeks; and the lower Mad River (Mud Creek to the Great Miami River). Mud Creek enters the Mad River 2,000 ft due north of the SR 235 bridge, near the northwest corner of Area A. WPAFB lies adjacent to the northernmost portion of the lower Mad River segment.

The OEPA has determined that segments of the Mad River watershed do not support designated aquatic life uses for Warmwater Habitat, Modified Warmwater Habitat, Coldwater Habitat, or the Primary Contact Recreational use (OEPA 2009). Specifically, OEPA has identified the lower segment of the Mad River, which flows through WPAFB, as an impaired water under Section 303(d) of the Clean Water Act (CWA) for not meeting aquatic life and recreation use standards (OEPA 2010).

The USEPA has established the total maximum daily load of effluent (TMDL) for the Mad River in the *Mad River Total Maximum Daily Loads for Sediment and Turbidity* (USEPA 2007). A TMDL specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates pollutant loadings among point and nonpoint pollutant sources. The TMDL for the Mad River watershed has been set at 120 percent of natural sediment loading. According to the report, the natural sediment loading in the basin is approximately 894 tons/mi^2/yr based on an annual average.

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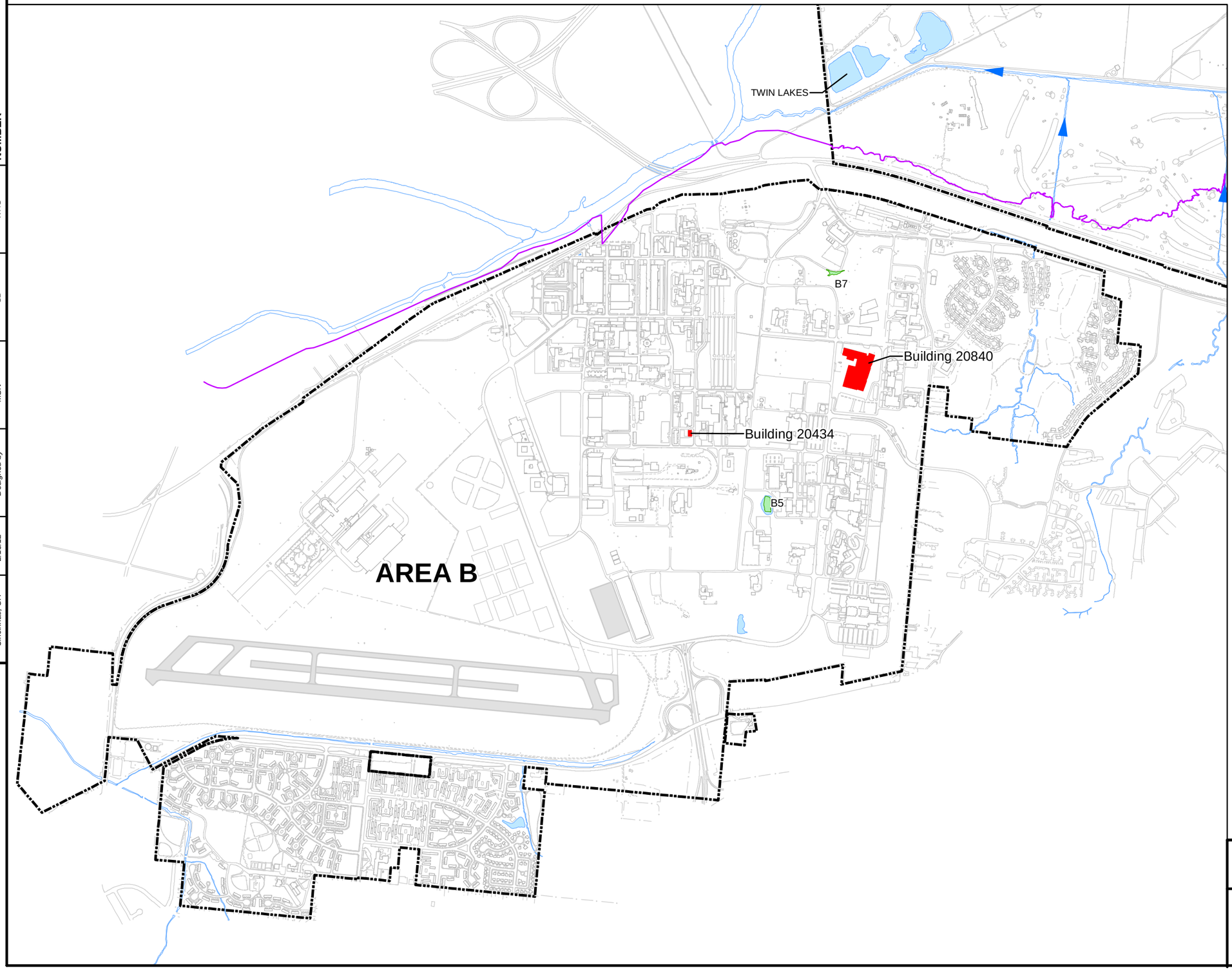

Legend

- 100-Year Flood Plain
- Stream Flow Direction
- Installation Area
- Lakes and Ponds
- Creeks and Rivers
- Wetlands

N

Feet

0 750 1,500 3,000

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Figure 3-5

Surface Water, NPDES Monitoring Points, and Wetlands in Area B

There are several recreational lakes in Area A of WPAFB. The largest is Bass Lake in the northwestern corner of Area A (**Figure 3-5**). The Twin Lakes Recreational Area, comprised of East Twin Lake, West Twin Lake, and Gravel Lake, is located in the southwest corner of Area A (WPAFB 1999).

Trout and Hebble creeks are minor surface water features located in Area A. They flow in a general westward direction into the Mad River. Mud Run is another small surface water feature joining the Mad River along the Base's northern border. Of these, Bass Lake is located north of the airfield (**Figure 3-5**).

The WPAFB Storm Water Management Plan (SWMP) and the Storm Water Pollution Prevention Plan (SWPPP) (prepared to comply with the CWA and the Ohio Water Pollution Control Act) provides detailed descriptions of storm drainage areas and their associated outfalls, potential storm water pollution sources, and material management approaches to reduce potential storm water contamination (WPAFB 2007b). The SWPPP was last updated in September 2011 while the SWMP was last updated in April 2011. An OEPA industrial permit (NPDES 1IO00001) and a municipal National Pollution Discharge Elimination System (NPDES) General permit (OHQ000002) cover the WPAFB storm water program (WPAFB 2011b).

The SWPPP and SWMP provide best management practices (BMPs) to prevent surface water contamination from activities such as construction, storing and transferring of fuels, storage of coal, use of deicing fluids, storage and use of lubrication oils and maintenance fluids, solid and hazardous waste management, and use of deicing chemicals. Some storm water also enters the Base form surrounding communities and area (WPAFB 2001).

The WPAFB's NPDES permit was last modified in January 2011 and expires in September 2014. There are 23 defined drainage or "Outfall Areas" on Base (WPAFB 2011b). Outfalls in Area B drain west and north toward the Mad River, just north of Springfield Pike (WPAFB 2007b). Much of the Base research laboratories are situated within the Area B outfall limits. **Table 3-3** provides specific information about the Area B outfall monitoring points which are sampled either monthly or bi-monthly under the NPDES permit. These outfalls are monitored for general activities and aircraft component testing of oil and grease, benzene, toluene, ethylbenzene, xylene, and 1,2,4-trimethylbenzene. The outfalls currently monitored that drain Area B are shown in **Figure 3-5**.

Floodplains

Area B is not located within any floodplains. The elevation of the project area is approximately 850 ft above MSL. The 10-year floodplain is at 804.7 ft above MSL, and the 100-year floodplain is at 814.3 ft above MSL. Based on a review of the FEMA Flood Insurance Rate Map (Community Panel # 39057C0015D), the project area is not located within a floodplain (FEMA 2012).

Table 3-3. Drainage Areas in Area B Monitored under NPDES Permit

Drainage Basin Number [1]	Description
3	Storm sewer utility located over 1-mile northwest of Facility 20840 (approximately 4,500 ft northwest of Facility 20434). Drains street networks in Area B directly into the Mad River.
4	Storm sewer utility located approximately 4,500 ft northwest of Facility 20840 (approximately 3,750 ft northwest of Facility 20434). Drains street networks in Area B directly into the Mad River.
5	Storm sewer utility located in drainage ditch along Old SR 4 at Longstreet Lane and approximately 3,000 ft northeast of Facility 20840 (over 1-mile northeast of Facility 20434). Drains street networks and drainage ditch west and north toward the Mad River.
22	Industrial outfall that provides monitoring of storm water runoff from 20770 and 31240 Heating Plant Complexes and the Aerospace Vehicle Survivability Testing Facility. Basin 22 is located approximately 3,750 ft southwest of Facility (1,500 ft southwest of Facility 20434) in the vicinity of D Street.
23	Industrial outfall located in the vicinity of Eleventh Street and G Street. Miscellaneous discharges (groundwater infiltration, building sump pumps, condensate from cooling equipment, and discharges from oil/water separators) to the storm sewer drainage system. Basin 23 is located approximately 4,500 ft southwest of Facility 20840 (approximately 750 ft southwest of Facility 20434) and discharges toward the west and north toward the Mad River.

Source: WPAFB 2007b
Notes: 1 = Drainage basin number corresponds to NPDES monitoring points indicated on Figure 3-5; ft = feet.

3.7 Biological Resources

3.7.1 Definition of the Resource

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

Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat detention, and erosion protection. Wetlands are protected as a subset of the "the waters of the United States" under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and besides navigable waters, incorporates deepwater aquatic habitats and wetlands.

The U.S. Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR Part 328).

Under the Endangered Species Act (ESA) (16 U.S.C. 1536), an "endangered species" is defined as any species in danger of extinction throughout all or a large portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The USFWS

also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant protection under the Act.

The Ohio Department of Natural Resources (ODNR), Division of Wildlife may restrict the taking or possession of native wildlife threatened with statewide extirpation and maintains a list of endangered species (Ohio Revised Code 1531.25). Additionally, ODNR maintains a list of plant species native to the state and in danger of extirpation or are threatened with becoming endangered. These plants are protected pursuant to Ohio Revised Code Chapter 1518.

3.7.2 Existing Conditions

A literature review was conducted to provide baseline information on the project area's natural resources. This review provided current information on vegetation, wildlife, threatened and endangered species, wetlands, streams, lakes, and floodplains. This information was gathered from WPAFB's current Integrated Natural Resources Management Plan (INRMP) (WPAFB 2007a) and Wetland Management Plan Update (BHE 2009). Data was also gathered from the USFWS, ODNR, and MCD.

Vegetation

Wright-Patterson Air Force Base contains four general types of natural vegetative communities including forest, old fields, prairie, and wetlands. Areas that may be impacted by the Proposed Action are disturbed areas. These include maintained areas that are frequently mowed such as right-of-ways, lawns, and recreational areas, and have been designated by the Base as turf and landscaped areas.

Wright-Patterson Air Force Base has been awarded the Arbor Day Foundation's Tree City USA designation for fourteen years. The Tree City USA award originates from the National Arbor Day Foundation, an organization founded in 1976 dedicated to tree plantings, conservation, and promotion of community forestry (WPAFB 2009). Benefits of being a Tree City designee include creating a framework for action, education, a positive public image, and citizen pride (Arbor Day 2012).

Wildlife

Wright-Patterson Air Force Base is home to a variety of wildlife. Previously conducted surveys documented the presence of 23 mammals, 118 birds, 8 reptiles, and 6 amphibians on the Base (3D 1998, BHE 1999, BHE 2005). The project area is located within disturbed areas on the Base and those species occurring in such areas are common species to the Base and surrounding area.

Because birds as well as mammals pose a hazard to airfield and aircraft operations, the Air Force has established bird air strike hazard and wildlife management plans. WPAFB implements a comprehensive

Bird/Wildlife Aircraft Strike Hazard (BASH) plan that involves prevention, monitoring, and reduction of bird/wildlife hazards (WPAFB 2007a).

Threatened and Endangered Species

Endangered and threatened species on the Base are protected under the ESA. In addition, AFI 32-7064 states that the Air Force will protect state species when practicable and provided that in doing so, is not in direct conflict with the military mission. The Endangered Species Management Plan (BHE 2001), which has been incorporated into the INRMP (WPAFB 2007a), provides species-specific protection and conservation measures to protect known special status species occurring on the Base. Protected wildlife species known to occur or known to have occurred on WPAFB include (**Figure 3-6** shows the known locations of threatened and endangered species at WPAFB):

Federally-Listed

- Indiana bat (*Myotis sodalis*), endangered
- Eastern massasauga rattlesnake (*Sistrurus catenatus*), candidate species
- Clubshell (*Pleurobema clava*), endangered
- Rayed bean (*Villosa fabalis*), endangered
- Snuffbox (*Epioblasma triquetra*), endangered

State-Listed

- King rail (*Rallus elegans*), endangered
- Common tern (*Sterna hirundo*), endangered
- Bald eagle (*Haliaeetus leucocephalus*), threatened
- Osprey (*Pandion haliaetus*), endangered
- Sharp-shinned hawk (*Accipiter striatus*), special interest
- Peregrine falcon (*Falco peregrines anatum*), endangered
- Upland Sandpiper (*Bartramia longicauda*), threatened
- Sedge Wren (*Cistothorus platensis*), species of concern
- Henslow's sparrow (*Ammodramus henslowii*), special interest
- Blazing star stem borer or Beer's Noctuid (*Papaipema beeriana*), endangered
- Sunflower moth (*Tarachidia binocular*)
- Butternut *Juglans cinerea*), potentially threatened
- Whorled water-milfoil (*Myriophyllum verticillatum*), endangered
- Great plains ladies' tresses (*Spiranthes magnicamporum*), potentially threatened
- Pigeon grape (*Vitis cinerea*), potentially threatened

Additionally, the midland sedge (*Carex mesochorea*) is known to exist from just outside the Base boundary in Greene County and is listed as threatened in Ohio. This species is quite similar to more common species like oval-leaf sedge (*C. cephalophora*), both of which can occur in lawns, right-of-ways, and other open, disturbed areas. While some potential habitat does exist within the area of influence, mowing schedules for these disturbed areas lessen the likelihood of fruiting and identifiable plants.

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OFFICE Cincinnati, OH

Area A
Area B
Facility 20434
Facility 20840
B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17
C1 C2 C4 C5 C6 C11A C11B C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C30 C31

Legend

- Pigeon Grape
- Radiate Sedge
- Home Range of Juvenile Female Indiana Bat
- Home Range of Adult Female Indiana Bat
- Habitat Potentially Suitable for Roosting Indiana Bats
- Potentially Suitable Habitat for the Blazing Star Stem Borer Habitat
- Primary Habitat for the Eastern Massasauga Rattlesnake
- Wetlands
- WPAFB Boundary

N

Feet
0 1,500 3,000 6,000

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Figure 3-6

Threatened and Endangered Species and Wetlands Locations in Area A and B

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The federal candidate species, eastern massasauga rattlesnake is usually found in wet areas including wet prairies, marshes, and low lying areas adjacent to higher ground for foraging. Neither the historic nor current population size nor status of massasauga snakes at WPAFB has been determined. Reports of massasauga sightings have been limited to the Prime Base Engineer Emergency Force Training Area and Twin Base Golf Course in Area A. There is no requirement to survey the proposed project areas for potential habitat because the eastern massasauga is a Federal candidate species. However, a preliminary survey of the proposed project area did not encounter evidence of burrows (crayfish or small mammals) occurring within open wetlands for winter hibernation with adjacent upland forests for foraging during the summer.

As part of this EA, consultation with the ODNR was conducted to request National Heritage Program information for state- and federally-listed threatened and endangered plants and animals in the vicinity of the project area. According to the ODNR Biodiversity Database, no unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, park or forests, national wildlife refuges, or other protected natural areas exist within a 1-mile radius of the project area. In addition, a 5-mile radius search of each project area was conducted for the Indiana bat. The ODNR reported a capture record within 5-miles of the project area but ODNR does not provide specific location data on this sensitive species. As such, the ODNR indicated that if suitable habitat occurs within the project area, these trees must be conserved and if suitable tree habitat must be cut that it be done between September 30 and April 1 (**Appendix A**).

The USFWS was also contacted as part of this EA to request known presence or absence of Federal- and state-listed species that may be located within the project vicinity (**Appendix A**). The USFWS indicated there are no Federal wilderness areas, wildlife refuges or designated critical habitats located within the vicinity of the project area. Due to the project type, size, and location, the USFWS indicated they do not anticipate any impact on federally-listed endangered, threatened, or candidate species, or their habitats.

Wetlands/Jurisdictional Waters

Executive Order 11990, *Protection of Wetlands*, May 24, 1977, directs Federal agencies to consider alternatives to avoid adverse effects on and incompatible development in wetlands. Federal agencies are directed to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland.

The CWA sets the basic structure for regulating discharges of pollutants to U.S. waters. Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States, including wetlands. The National Wetlands Inventory (NWI) (a department within USFWS), USEPA, and the NRCS help in identifying wetlands.

Forty-four wetlands, totaling approximately 20 acres, are located on WPAFB, including one small wetland within the boundaries of the Area A airfield (WPAFB 2007a). No wetlands are located in the vicinity of the project area. The nearest wetland to Facility 20840 is wetland B7 and the nearest wetland to Facility 20434 is B5 (**Figure 3-5**).

3.8 Cultural Resources

3.8.1 Definition of the Resource

As defined by 36 CFR 800.16, historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria. Several Federal laws and regulations govern protection of cultural resources, including the National Historic Preservation Act (NHPA) (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990).

Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing) or architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance). Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., arrowheads and bottles). Archaeological evidence generally is considered to be at least 50 to 100 years in age. Specified or effective thresholds vary across federal, state, and local laws, regulations, and guidance, but NHPA Section 106 process generally is implemented with a 50-year age cut-off.

Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered for the NRHP. More recent structures might warrant protection if they have potential as Cold War-era resources. Structures less than 50 years in age, and particularly DoD structures in the category of Cold War-era, are evaluated under explicit guidance of the National Park Service Bulletin 22.

The regulations implementing the NHPA (36 CFR Part 800) direct Federal agencies to consider their responsibilities under Section 106 of the NHPA and make an assessment of the potential impact of an undertaking on historic properties that are within the proposed project's Area of Potential Effect (APE), which is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." In accordance with Section 106 of the NHPA, determinations regarding the potential effects of an undertaking on historic properties are presented to the State Historic Preservation Office (SHPO).

Facility 20434 is considered a historic structure located within the APE. This structure is identified in the *Integrated Cultural Resources Management Plan* (ICRMP) for WPAFB (WPAFB 2011c) and the *Updated Building Evaluations for Historic Significance, 1953-1956, at WPAFB*. The ICRMP was established in concurrence with the SHPO on January 25, 1999, and updated in May 2006 and September 2011. As part of the ICRMP, the surveys have been conducted encompassing the entire Base to locate historic and prehistoric archaeological sites.

3.8.2 Existing Conditions

The APE for the Proposed Action includes Facilities 20840 and 20434 (**Figures 1-1, 2-2,** and **2-4**). The surveys indicate that Facility 20434 (presently referred to as the Human Effectiveness Directorate) was historically named the Universal Dynamic Sight and Computer Test Building. Facility 20434 is listed on the Ohio Historic Inventory as being a 1955 period, Cold-War significant structure that is eligible for listing on the National Register.

Information from the *Updated Building Evaluations for Historic Significance, 1953-1956, at WPAFB* report indicates Facility 20434 was designed by the U.S. Army Corps of Engineers and was constructed in 1955. The Facility was originally a flexible gunnery simulation facility that was likely used as a computer-related weapons sight research facility. Information suggests that Facility 20434 was no longer in use for its original purpose and was subsequently transferred to the Flight Control Laboratory in the late 1950s and was used as a flight control simulator lab. Plans dating to 1962 indicate the interior modifications associated with this change in use.

Facility 20434 is currently used as office space. Most of the public spaces in the building such as stairwells and corridors retain many ca. 1959 interior finishes. A former test cell in the basement has been converted to a conference room but still retains 1970s-era two-way mirrors and 1950's-era wood-paneled doors. Despite the replacement of windows and doors and the filling in of some rear-elevation cargo doors, the building still retains its original exterior proportions and massing, and the original bare concrete exterior surface survives unaltered.

Based on the National Register evaluation, Facility 20434 is listed as eligible under Criterion A and Consideration G, as follows:

Criterion A – Facility 20434 has a very good level of integrity, with the massive concrete exterior envelope intact except for new windows, some new doors, and closing in of two rear cargo door openings. The interior largely reflects the floor plan as altered in 1959 for the Flight Control Lab use of the building. Overall, this building was part of the important aeronautical research facilities located at WPAFB in the early 1950s and early 1960s and has a good level of interior and exterior material integrity for that period. Therefore, Facility 20434 was recommended as eligible for the National Register under Criterion A for associations with 1950s and early 1960s simulator and aircraft controls research that benefited military

aircraft development, the Apollo Program, and the continuing mission of WPAFB as a vital aeronautics research laboratory.

Consideration G – Facility 20434 was used in the development of cockpit control technology for military aircraft and spacecraft. Research completed here contributed to the development of the lighted controls for the lunar landing craft that allowed the United States to complete a manned moon landing before the Soviet Union was able to develop the necessary technology to achieve this goal. The building has fairly good integrity for the circa 1959-1970 period. For its contribution to the U.S. victory over the Soviet Union in the 1960s space race, this building meets the "exceptional significance" requirements of Consideration G. This building is therefore recommended as eligible under Consideration G for its associations with Apollo Program related research, and because the building has a high level of integrity for the Cold War era.

3.9 Socioeconomics

3.9.1 Definition of the Resource

Socioeconomics are defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Regional birth and death rates and immigration and emigration affect population levels. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Changes in these two fundamental socioeconomic indicators might be accompanied by changes in other components, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permit characterization of baseline conditions in the context of regional, state, and national trends.

Data in three areas provide key insights into socioeconomic conditions that might be affected by a proposed action. Data on employment could identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region could be used to compare the "before" and "after" effects of any jobs created or lost as a result of a proposed action. Data on industrial or commercial growth or growth in other sectors provides baseline and trend line information about the economic health of a region. Because data projecting future social and economic conditions are not always available, it is also appropriate to use planning documents to identify expected conditions that could experience impacts due to a given action.

In appropriate cases, data on an installation's expenditures in the regional economy help to identify the relative importance of an installation in terms of its purchasing power and jobs base. Demographics identify the population levels and changes to population levels of a region. Demographics data might also be obtained to identify, as appropriate to evaluation of a proposed action, its characteristics in terms of race, ethnicity, poverty status, educational attainment level, and other broad indicators.

Socioeconomic data are presented at county, state, and U.S. levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends. Data have been collected from previously published documents issued by Federal, state, and local agencies and from state and national databases (e.g., U.S. Bureau of Economic Analysis' Regional Economic Information System).

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires Federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. The EO further requires Federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks. The order defines environmental health and safety risks as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on, and the products we use or are exposed to)." Such information aids in evaluating whether a proposed action would render vulnerable children targeted for protection in the EO.

3.9.2 Existing Conditions

Social and Economic Conditions

Population – WPAFB is located 10 miles outside of Dayton, Ohio and is the largest base in the Air Force with over 27,000 personnel serving in 116 different units. Military personnel at WPAFB serving in the Air Force, ANG/Reserves, Navy, Army, and Coast Guard account for approximately 9,500 persons. Civilian personnel at WPAFB serving in roles such as contract civilians and private businesses account for approximately 18,000 persons (WPAFB 2010a). The city of Dayton has a population of 155,781 and the Dayton-Springfield, Ohio Metropolitan Statistical Area (MSA) has a population of 839,359 (Bureau of Census American Community Survey 2005-2009). An MSA is defined by the U.S. Census Bureau as a core area with a large population nucleus (at least 50,000) and the adjoining communities that have a high degree of economic and social integration within that core (Bureau of Census 2000b).

Employment – WPAFB provides a major source of employment in the five-county area. In addition, WPAFB awards numerous contracts every year to local businesses. For fiscal year (FY) 10, the total number of jobs provided by WPAFB was 27,378 (WPAFB 2010a). This number includes military active duty, trainees and reservists, DoD civilians, and other civilians, such as contractors. This number of indirect jobs supported by the Base, such as restaurants, dry cleaners, and others is estimated at 31,972. The total economic impact to the local Dayton community was $4.5 billion.

Some of the key industries in the Dayton, Ohio economy include services, trade (wholesale and retail), government, and manufacturing. In FY 06, the finance and insurance industries employed 14,595 employees and jobs provided by the government totaled 37,298 (Bureau of Census 2000a).

Table 3-4 lists the industry of employment for residents around WPAFB, the Dayton-Springfield MSA, and the state of Ohio in 2000. A large portion of residents in the Dayton-Springfield MSA are employed in education, health and social services, and public education or manufacturing; a lower percentage are employed in agriculture, forestry, fishing and hunting, and mining.

Table 3-4. Employment of Residents in Dayton-Springfield MSA, Greene County, and the State of Ohio (2000)

Employment by Industry	Dayton–Springfield MSA	Greene County	State of Ohio
Percent of Employed Persons in Armed Forces	0.7%	2.2%	0.1%
Industry of Civilian Labor Force			
Agriculture, forestry, fishing and hunting, and mining	0.5%	0.7%	1.1%
Construction	5.4%	5.4%	6.0%
Manufacturing	19.1%	13.8%	20.0%
Wholesale trade	3.2%	2.6%	3.6%
Retail trade	12.0%	12.3%	11.9%
Transportation and warehousing, and utilities	4.8%	3.9%	4.9%
Information	2.3%	2.3%	2.4%
Finance, insurance, real estate, and rental and leasing	5.0%	4.5%	6.3%
Professional, scientific, management, administrative, and waste management services	9.0%	9.6%	8.0%
Education, health and social services	20.8%	23.8%	19.7%
Arts, entertainment, recreation, accommodation, and food services	7.5%	7.9%	7.5%
Other services (except public administration)	4.4%	4.2%	4.5%
Public administration	5.9%	8.9%	4.1%

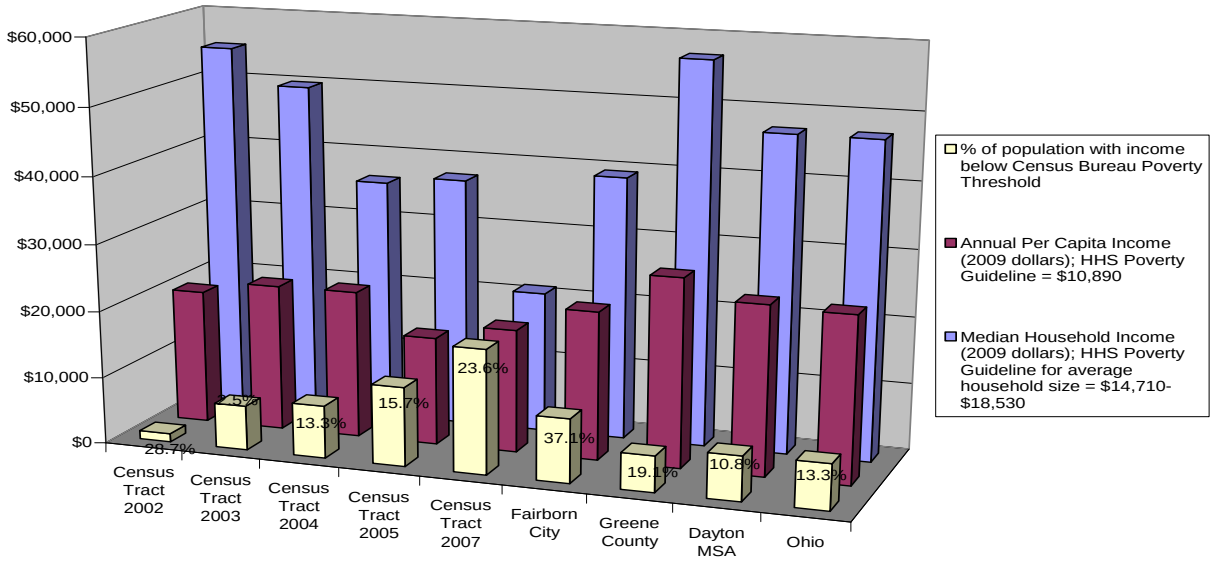
Source: Bureau of Census 2000a
MSA = Metropolitan Statistical Area

The unemployment rate for the Dayton-Springfield MSA in December 2011 was 8.2 percent, slightly higher than the statewide average of 7.6 percent (DACC 2012). The December 2010 unemployment rate in the MSA around WPAFB and within Greene County was 9.8 percent, slightly higher than the state average of 9.2 percent.

Residents living in Fairborn have a lower per capita income and median household income in comparison to the MSA and the state of Ohio (Bureau of Census 2000a). Fairborn also has a higher percent of persons living below the poverty level (**Figure 3-7**). By contrast, Greene County has a higher per capita income and median household income, and a lower percent of persons living below the poverty level, than either the Dayton MSA of the state of Ohio.

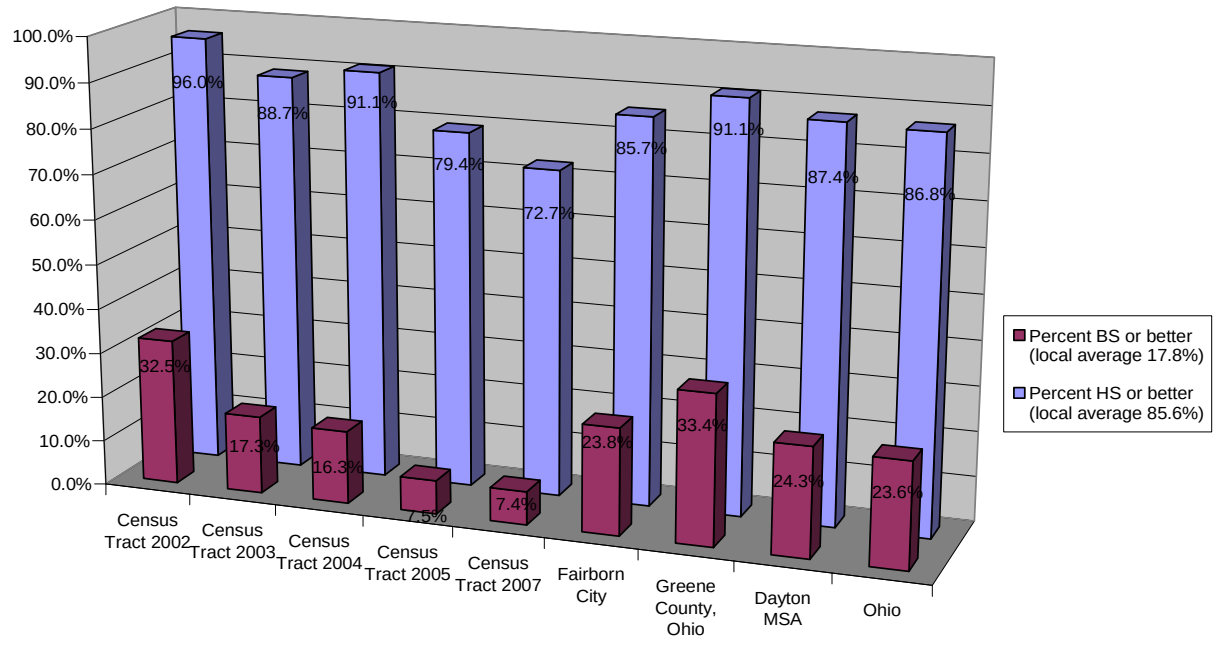
Education – The percentage of residents who have obtained a high school diploma is substantially the same in the area around WPAFB, as an average of figures for local census tracts, as in Greene County, the Dayton MSA, or Ohio, while the percentage of residents holding a bachelor's degree or higher is slightly lower on average in the project area than in the wider geographical region (**Figure 3-8**).

Figure 3-7. Income and Poverty Level of Residents in the Project Area and Surrounding Geographic Region



Notes: HHS = Health and Human Services

Figure 3-8. Educational Attainment of the Residents in the Project Area and Surrounding Geographic Region



Notes: HS = High School; BS = Bachelor's of Science degree.

Community Resources and Services – WPAFB offers numerous community resources such as a bank, bakery-deli, flowers, ice cream, barber/beauty shop, laundry/dry cleaning facility, all of which are located within the commissary at the Kittyhawk Center. The USAF Medical Center at WPAFB services primary deployment platforms and contains a teaching hospital. In addition to these resources, recreational facilities such as the Aero Club, a bowling alley, an arts/crafts center, golf courses, recreational lakes, and sports/fitness complexes exist at WPAFB (WPAFB 2010a).

Wright-Patterson Air Force Base provides a major source of employment in the five-county area. In addition, WPAFB awards numerous contracts every year to local businesses. For FY10, the total number of jobs provided by WPAFB was 27,378 (WPAFB 2010a). This number includes military active duty, trainees and reservists, DoD civilians, and other civilians, such as contractors. The number of indirect jobs supported by the base, such as restaurants, dry cleaners, and others is estimated at 31,972. The total economic impact to the local Dayton community was $4.5 billion.

The Dayton region is rich in community resources providing recreational and cultural opportunities for its residents. In the Dayton region, cities generally provide their own emergency response and safety services, as does Fairborn. Fairborn's proximity to the Base has led to a mutual aid agreement between the WPAFB and Fairborn emergency response units. Fairborn emergency medical technician squads routinely transport patients to the Wright-Patterson Medical Center for treatment.

3.10 Environmental Justice

3.10.1 Definition of the Resource

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that all federal agencies address the effects of policies on minorities and low-income populations and communities, and to ensure that there would be no disproportionately high and adverse human health or environmental effects to minority or low-income populations or communities in the area. A "minority" is defined as a person who is Black, Hispanic (regardless of race), Asian American, American Indian, and/or Alaskan Native. "Low-income" is defined as a median household income at or below the Department of Health and Human Services (HHS) poverty guidelines (U.S. Department of Transportation [USDOT] 1999).

A minority population is defined as any readily identifiable group of minority persons who live in geographic proximity, or are geographically dispersed or transient persons (such as migrant workers) who will be similarly affected by a proposed program, policy, or action (FHWA 1998). Minority populations residing in the study area were compared to the population characteristics of the city and state. The CEQ guidance states that "minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis."

Low-income status was based upon comparing the income of the proposed project site and larger study area residential population to the U.S. Census Bureau Poverty Threshold (U.S. Census Bureau, Housing and Household Economic Statistics Division 2000a). The CEQ guidelines do not specifically state the percentage considered meaningful in the case of low-income populations. The definition of "low income populations" is defined by Housing and Urban Development (HUD) as populations where "50 percent or greater are low-income individuals".

3.10.2 Existing Conditions

A screening analysis using U.S. Census Bureau 2010 racial information and American Community Survey (ACS) 2005-2009 economic information catalogued by census tract was used to identify low-income and minority populations living within the affected area around WPAFB. For purposes of this evaluation, Census Tract 2002 (ACS) was considered equivalent to Census Tract 2803 (Bureau of Census 2010). WPAFB and surrounding areas were included in Census Tracts 2001.02 (commercial and residential), 2001.4 (commercial only), 2803, 2004, 2005, and 2007. Since Tract 2001.4 includes areas of commercial development, this tract is omitted from further discussion.

Census Tract 2803 represents the on-Base population. Tract 2803 has a higher percentage of females of child-bearing age (15 to 44 years) and lower percentage of individuals 65 and older and 75 and older than the larger comparison geographies surrounding the Base. Tract 2803 also has a lower percentage of older adults (0.6 percent), a higher percentage of minorities (25.2 percent), and a higher percentage of Hispanic residents (7.5 percent) (**Figure 3-9**) than the average for the surrounding area. Tract 2803 also has a higher percentage of children under 5 years of age as compared to the larger comparison geographies selected for this study.

Surrounding off-Base areas were included in Census Tracts 2001.02, 2005, and 2007 and were noted as having low-income or minority populations. Census Tract 2001.02, which includes the area west of Area A and a majority of the Wright State University area, was found to have a somewhat higher portion of black or African-American residents (18.6 percent) and a higher percentage of the population with income below the Census Bureau Poverty Thresholds (28.7 percent) than the average for the on-Base area (**Figure 3-10**).

Figure 3-9. Percentage of Population Identifying as Hispanic or Latino (2010)

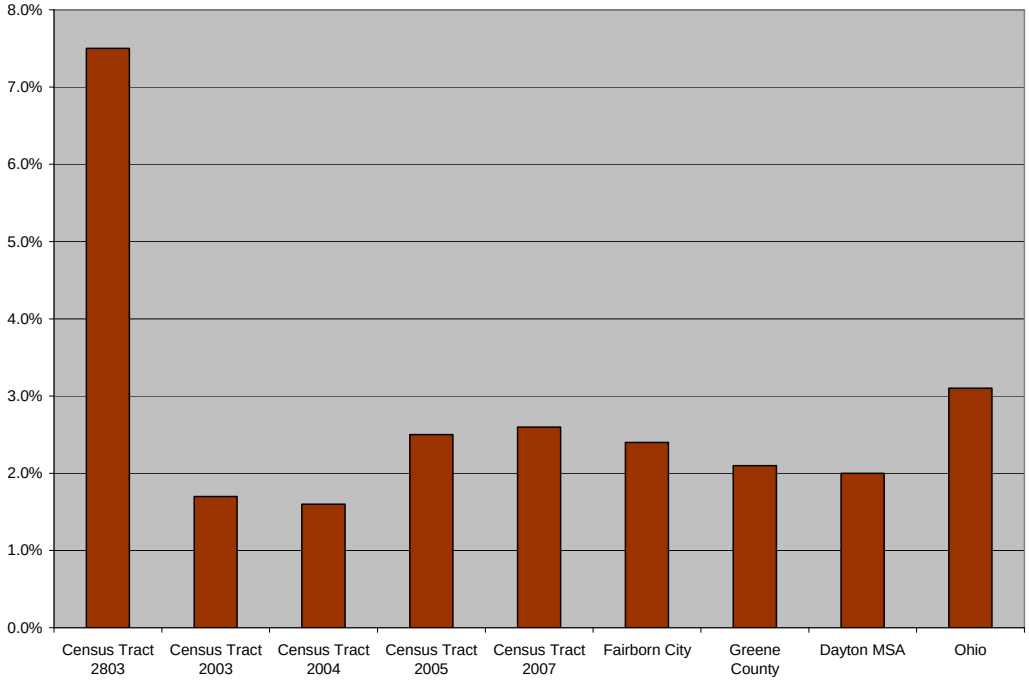
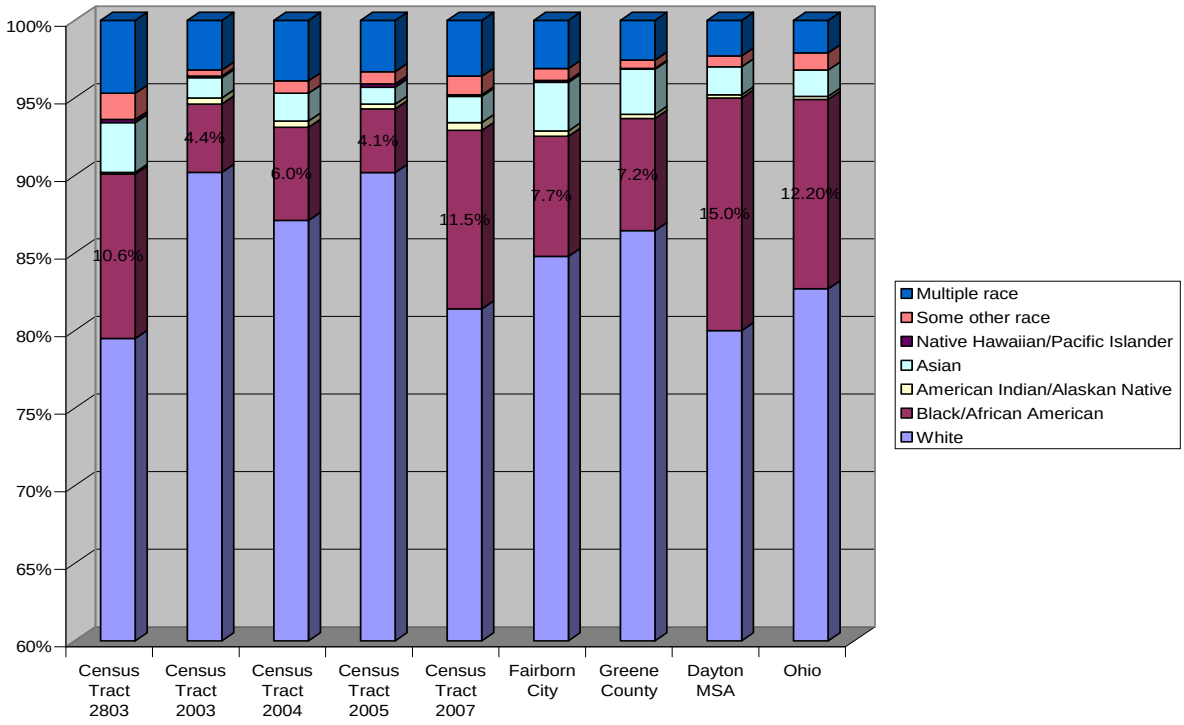


Figure 3-10. Race of Residents in the Surrounding Area Compared to Dayton MSA, Greene County, and the State of Ohio (2010)



Source: U.S. Census Bureau 2010 data.

Census Tract 2005, which is located east of Areas A and B, has a somewhat higher percentage of the population with income below the Census Bureau Poverty Thresholds (23.6 percent) than the average for the on-Base area). Census Tract 2007, which is located southeast of WPAFB, has a median household income just above the range for average household size for the Base and a considerably higher percentage of the population with income below the Census Bureau Poverty Thresholds (37.1 percent) than the average for the on-Base area.

3.11 Infrastructure

3.11.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to economic growth of an area. The infrastructure components to be discussed in this section include transportation systems, utilities (electrical power, natural gas, liquid fuel, water supply, communications, and heating and cooling), pollution prevention, solid waste, sanitary and wastewater systems.

3.11.2 Existing Conditions

The infrastructure information contained in this section was obtained from the WPAFB General Plan (WPAFB 2001) and provides a brief overview of each infrastructure component and comments on its existing general condition.

Transportation System

State highways provide direct access to WPAFB. SR 444 bisects the Base creating a barrier between Wright Field and Patterson Field (WPAFB 2001). SR 844 provides a route from Gate 15A to I-675, which is located east of the Base. Interstate 675 (I-675) provides direct access to I-70, which is approximately 9 miles to the north; U.S. 35, which is approximately 5 miles to the south; and I-75, which is approximately 15 miles to the southwest (WPAFB 2001). SR 235 provides access from Gate 26A to SR 4 and I-70 (WPAFB 2001).

Traffic enters Area B through Gates 1B from Springfield Street, 19B from National Road, and 22B off of I-675. The primary arterial road passes the west side of Facility 20840 via Hobson Way (P Street). Facility 20840 is accessible by the following roads: Fifth Street, Tenth Street, Hobson Way, and Q Street. Facility 20434 is accessible by Tenth Street and K Street.

Electrical Power

Dayton Power & Light provides WPAFB with electrical power (WPAFB 2001). The Base receives power via two substations, which is delivered by over 500 miles of primary electrical lines on Base. These aboveground and underground transmission lines are owned by WPAFB (WPAFB 2001).

The electrical distribution system on Base is designed to meet the needs of a much larger base population so the demands of service are within the system's capacity (WPAFB 2001). The overall condition of the system is adequate in providing the power to the current Base population.

Natural Gas

The natural gas at WPAFB is supplied by Vectren. The on-Base natural gas system, which is owned by WPAFB, contains over 130,000 linear feet of underground piping and 11 distribution subsystems (WPAFB 2001). Vectren owns a distribution line that goes past the Wright Memorial area. The natural gas system is the principal heating option for housing areas and outlying areas of the Base. It feeds some individual buildings and the three satellite heating plants: Facilities 20581, 10849, and 4019 (WPAFB 2001).

Liquid Fuel

The liquid fuel system at WPAFB is delivered primarily by tank trucks with an alternate capability for pipeline delivery. Defense Logistics Agency-Energy is responsible for determining mode of delivery. WPAFB operates approximately 85 underground storage tanks (USTs) and 175 aboveground storage tanks (ASTs).

Eighty percent of the storage capacity on Base is for Jet Fuel-8 (JP-8), which is supplied directly to the Base via tank truck from Defense Fuel Support Point – Lebanon. The Bulk Fuels Storage tank farm is comprised of ten 420,000-gallon JP-8 ASTs and one 840,000-gallon JP-8 AST, one 15,000-gallon motor gas AST, and one 220,000-gallon diesel AST.

Water Supply

Wright-Patterson Air Force Base provides its own potable water from on-Base wells to all Base locations except Page Manor Housing, which obtains its water from Montgomery County Water Department. The water supply and distribution system at WPAFB consists of three Base-owned and operated water collection, treatment, storage, and distribution systems (WPAFB 2001). One system services Wright Field (Area B) and The Woods (formerly referred to as Woodland Hills), a second system services Area A and Patterson Field, and the third system provides water for the Marksmanship Facility (formerly referred to as the Combat Arms Training and Maintenance (CATM) Facility, which was installed in April 2005).

A Drinking Water Source Protection Plan (WPAFB 2007c) exists for three well fields at WPAFB: Area A, Area B, and the east Area Well Field. Drinking water source protection areas exist for these three well fields. The drinking water source protection area for these areas was adopted from the 5 year time of travel area at immediate pumping rates as delineated in 1994 by the U.S. Geological Survey (USGS). The Area A well field is located in the southern portion of Area A, along the north and east portions of SR 444. The Area B well field is located across SR 444 near the entry gate to WPAFB Area B. The east

Well Field (inactive) is located in the southwestern portion of Area A and north of Hebble Creek Road (WPAFB 2007d).

Communications

The communications system at WPAFB provides support to the 445 AW and its associate units. The communications system consists of telephone, local computer systems, long-haul communications, and land mobile radio systems (WPAFB 2001). There are over 100 miles of communication cable ducts on Base (WPAFB 2001). WPAFB's communications and information utility infrastructure is in good condition (WPAFB 2001). There are improvements planned for the Base that would enable it to meet any known future communication requirements (WPAFB 2001).

Heating and Cooling

WPAFB is heated with six coal- and gas-fired central heating plants. These plants are located throughout the Base and provide approximately 80 percent of the annual heating requirements for WPAFB (WPAFB 2001). The two largest central heating plants are in Facility 31240, which serves Patterson Field and Kittyhawk Community Center (Area A); and Facility 20770, which serves Wright Field (Area B) (WPAFB 2001). There are also four satellite heating plants that serve smaller areas on the Base. These plants operate on natural gas and provide 4 percent of the Base's overall heating needs. The remaining 16 percent of the Base's overall heating is met by natural gas furnaces in individual buildings (WPAFB 2001).

Pollution Prevention

AFI 32-7080, *Pollution Prevention Program*, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*; EO 12873, *Federal Acquisition, Recycling, and Waste Prevention*; and EO 12902, *Energy Efficiency and Water Conservation at Federal Facilities*. AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans. The 88 ABW fulfills this requirement with the following plans (WPAFB 2001):

- Integrated Solid Waste Management Plan
- Storm Water Pollution Prevention Plan
- Hazardous Waste Management Plan
- Hazardous Material Emergency Planning and Response Plan
- The Spill Prevention Control and Countermeasure Plan

These plans ensure that WPAFB maintains a waste reduction program and meets the requirements of the CWA; NPDES permit program; and Federal, state, and local requirements for spill prevention control and countermeasures.

Solid Waste

Municipal solid waste at WPAFB is managed in accordance with the guidelines specified in AFI 32-7042, *Waste Management*. This AFI incorporates by reference the requirements of Subtitle D, 40 CFR 240 through 244, 257, and 258, and other applicable Federal regulations, AFIs, and DoD Directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program that incorporates the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record-keeping and reporting; and pollution prevention.

WPAFB operates a Qualified Recycling Program that is run by 88 ABW/Asset Management Division, Environmental Branch (CEAN). The recycling center is located in Facility 10293 on Patterson Field. The recycling program includes aluminum, glass, paper, plastics, oil, and ferrous and nonferrous materials (WPAFB 2001).

WPAFB has a contract for solid waste pick-up and disposal of all refuse on the base (WPAFB 2001). The contractor removes refuse from military family housing and industrial areas on the Base.

Sanitary Sewer and Wastewater Systems

The sanitary sewer collection system at WPAFB is owned by the Base and consists of 43 miles of pipelines. The wastewater produced on the north side of Patterson Field is discharged to the Fairborn treatment plant, northwest of the Base. The wastewater produced on the remainder of Patterson Field, Wright Field, and Page Manor is served by the Dayton treatment system.

WPAFB produces an average of 3.5 mgd of sewage. The overall condition of the system is adequate in the collection of wastewater. The current system is designed to accommodate a Base population that is approximately 50 percent larger (WPAFB 2001).

3.12 Health and Safety

3.12.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. The public has little access to the construction activities associated with the Proposed Action, so the primary safety concern is the potential for aircraft crashes and loss of life and property damage. Aircraft safety focuses on matters such as the potential for aircraft mishaps, airspace congestion, BASH, munitions handling and use, flight obstructions, weather, and fire risks.

Aircraft mishaps might involve midair collisions with other aircraft; collisions with objects such as towers, or buildings; weather-related accidents; and bird/wildlife-aircraft collisions. The environment for air safety is based on the physical risks associated with aircraft flight and current military operational procedures concerning air safety. Safe flying procedures, adherence to flight rules, and knowledge of

emergency procedures form consistent and repeated aspects of training for all aircrews, including those at WPAFB. Since the inception of the USAF in 1947, aircraft accidents have steadily declined each year.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of highly noisy environs. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation processes creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

The following provides additional information on specific safety hazards associated with training flights.

Aircraft Operations

The existing environment for air safety is based on the physical risks associated with aircraft flight and current military operation procedures concerning air safety. Obstructions to flights, which include things such as towers and power transmission lines, represent safety concerns for aircrews, especially those engaged in low-altitude flight training. Aircrews are briefed and familiarized with potential obstructions along their routes before undertaking a mission. Furthermore, DoD FLIP and aeronautical charts identify the location of such hazards and indicate the required horizontal and/or vertical separation distances to ensure safety.

Hazardous weather conditions can pose safety hazards and influence a pilot to alter flight. Pilots consult the National Weather Service or weather services at local airports to obtain preflight weather information. Adverse weather conditions of concern include tornadoes, thunderstorms, hail, severe turbulence, dust storms, and wind shear. The evaluation of potential hazards of weather conditions rests in a pilot's sound discretion based on knowledge of available information, experience, and the operational limits of the aircraft.

The U.S. Air Force Safety Center (AFSC) has defined four classifications of mishaps: Classes A, B, and C; and High Accident Potentials (HAPs). Class A mishaps result in a total cost in excess of $2 million for injury, occupational illness, and property damage; a fatality or permanent total disability; or destruction or damage beyond economical repair to USAF aircraft. Class B mishaps result in a total cost in excess of $500,000 (up to $1.99 million) in property damage, permanent partial disability, or hospitalization of five or more personnel. Class C mishaps result in total damage that costs in excess of $50,000 (up to $49,900), or an injury or occupational illness that results in a loss of workers productivity greater than 8

hours. Mishaps not meeting the definitions of Class A, B, or C, but, because of damage or injury necessitate USAF reporting, are classified as HAPs.

The BASH is a safety concern due to the potential damage that a strike might have on the aircraft or potential injury to aircrews. Birds might be encountered at altitudes of 30,000 ft and higher; however, most birds fly close to ground level. Approximately 95 percent of all reported incidents in which a USAF aircraft has struck a bird have been below 3,000 ft AGL. Approximately half of these bird strikes occur in the airport environment, and approximately one-third occur during low-altitude training. Strike rates rise substantially as altitude decreases.

The USAF devotes considerable attention to avoiding the possibility of bird/wildlife-aircraft strikes. It has conducted a worldwide program for decades to study bird migrations, bird flight patterns, and past strikes to develop predictions of where and when bird/wildlife-aircraft strikes might occur. This program, which consistently updates the data, also defines avoidance procedures through a Bird Avoidance Model (BAM). Each time an aircrew plans a training sortie along an established training route or other training airspace, they use the BAM to define altitudes and locations to avoid. Use of this model has minimized BASH. Each base or flying unit also develops and maintains a bird/wildlife-aircraft avoidance plan that dictates the location and timing of avoidance measures within the airspace used by the base or unit.

Munitions and Explosive Safety

Explosive safety zones (ESZs) are required for areas where ordinance are stored or handled. ESZs are typically determined based upon the net explosive weight of the ordinance to be stored or handled and the blast resistance properties of the magazine. Explosive Safety Quantity Distance (ESQD) arcs that delineate the extents of each ESZ are constructed. ESZ and ESQD requirements are specified in Air Force Manual 91-201, *Explosive Safety Standards*.

Construction and Demolition Safety

Construction site safety is largely adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by DoD and USAF regulations designed to comply with standards issued by Occupational Safety and Health Administration (OSHA) and USEPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

3.12.2 Existing Conditions

Fire Hazards and Public Safety

The Fire Department at WPAFB provides fire, crash, rescue, and structural fire protection at the Base. The 445 AW abides by a general safety policy relating to the performance of all activities at the Base.

Individuals, supervisors, managers, and commanders are expected to give full support to safety efforts and safety awareness and strict compliance with established safety standards are expected.

Aircraft Safety

Risks associated with takeoffs and landings at WPAFB are presented in the 1995 AICUZ Study for the base, which was developed to address safety issues and to identify hazard potential due to aircraft accidents, obstructions to navigation, and incompatible land uses based on exposure levels to aircraft noise in the surrounding area. The WPAFB AICUZ Study also defines obstruction-free areas and APZs relative to runways and taxiways, which in turn results in constraints in the siting and location of facilities on Base (WPAFB 1995a).

Bird/Wildlife-Aircraft Strike Hazard

The office of primary responsibility for the BASH Plan at WPAFB is the 88 ABW Flight Safety Office. The 445 AW at WPAFB actively supports the BASH Plan (WPAFB 2011c) per the Host Tenant Support Agreement. The plan is intended to reduce the potential for a bird/wildlife strike to occur at the Base by providing procedures for:

- Establishing the Base's Bird Hazard Working Group
- Disseminating long-term information to aircrews and Base personnel on specific bird hazards
- Eliminating or managing environmental factors on Base that attract or support bird and wildlife activity, especially in the vicinity of the airfield
- Identifying and reporting bird and wildlife activities that pose a hazard to flying operations
- Dispersing and depredating birds and wildlife on Base that pose a hazard to flying operations
- Altering flying operations to avoid hazards from bird strikes
- Disseminating information to all assigned and transient aircrews for specific bird hazards and procedures for avoidance

The BASH Plan includes maintenance specifications for grass mowing on the airfield to range from 7 to 14 inches, seasonal inspection requirements for grain-type grasses that attract high-threat avian species, and periodic inspection requirements for ponding and proper drainage on the airfield whenever possible to reduce insect breeding. The BASH Plan also established a Bird Hazard Warning System to provide a means for immediate exchange of information between the ground operations and aircrews concerning the existence of birds that pose a hazard. The BASH reduction techniques currently listed in the WPAFB BASH Plan include abating nuisance avian species using pyrotechnics and depredation, when necessary.

At the Base, there are several common bird types that might be present and pose a hazard: waterfowl (ducks and geese), raptors (hawks and birds of prey), pigeons, doves, meadowlarks, blackbirds, starlings, and killdeer. Migratory waterfowl (ducks, geese, and swans) pose a threat to low-flying aircraft. Waterfowl vary considerably in size, from 1 to 2 pounds for ducks, 5 to 8 pounds for geese, and up to

20 pounds for most swans. Waterfowl are usually only a hazard during the migratory season. Waterfowl typically migrate at night, and generally fly between 1,500 and 3,000 ft AGL during the fall migration and 1,000 to 3,000 ft AGL during spring migration. In addition, other large migratory avian species, such as turkey vultures and gulls, pose a threat to military aircraft.

Strike rates rise dramatically as altitude decreases, which is partly due to the greater number of low-altitude missions, but mostly because birds are commonly active close to the ground. Any gain in altitude above 1,000 ft represents a substantially reduced threat of a bird strike (AMC 2002).

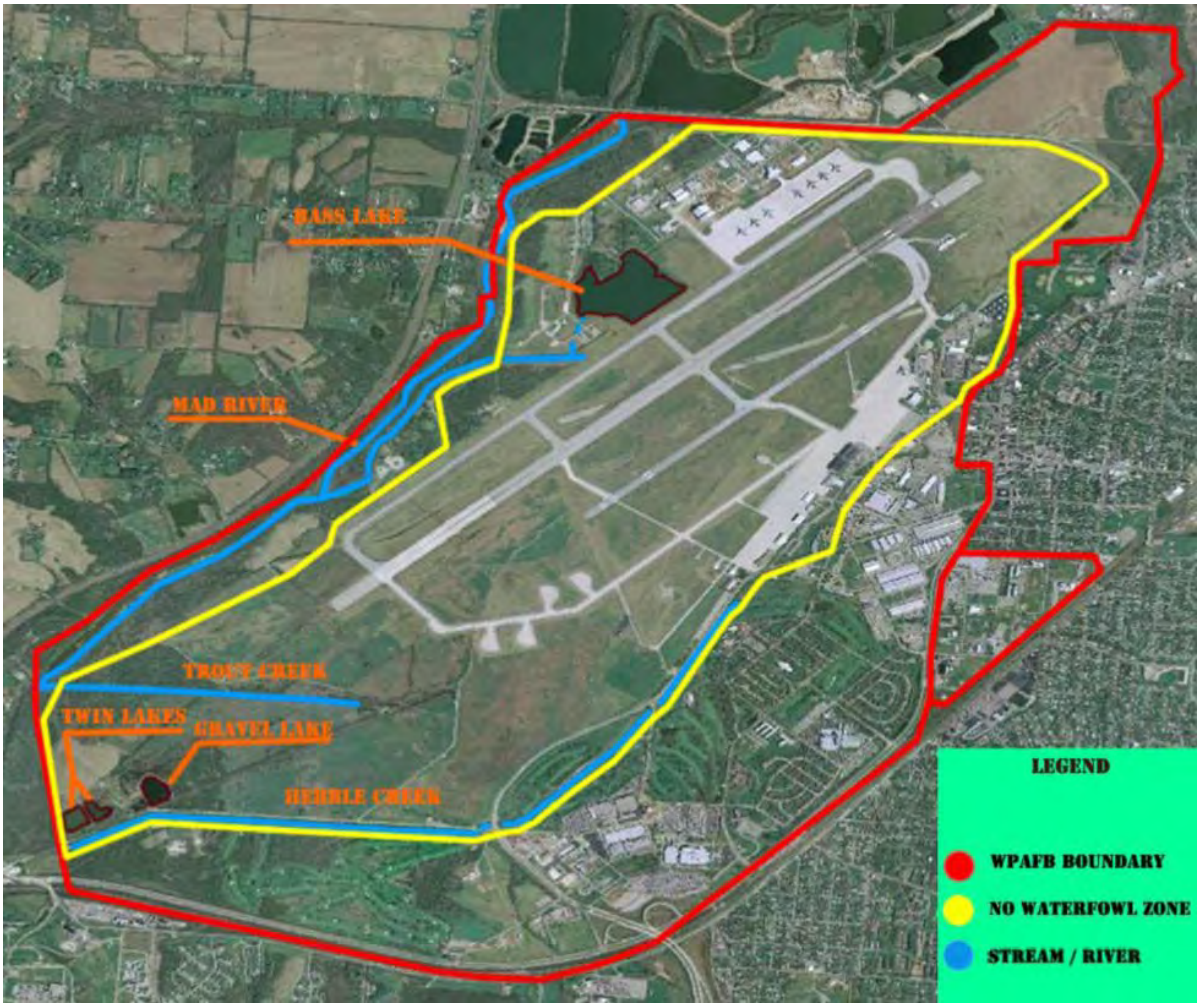
The BAMs are used to analyze BASH visually during flight planning. The majority of costs incurred by the USAF occur during the fall migration of waterfowl and raptors. On average in the month of September, approximately 14.3 percent of all bird/wildlife-aircraft strikes occur. In addition, most bird/wildlife-aircraft strikes occur after 10:00 a.m. (AFSC 2012a). Using online BAM software to calculate avian densities during the highest risk months and at high-risk day times for WPAFB, avian density over the Region of Influence (ROI) is shown as low to moderate (USAF 2012b). No severe avian densities are shown for these high-risk seasons or day times.

Figure 3-11 presents the no waterfowl zone (yellow line) in relation to the WPAFB property boundary. Features such as lakes, streams, and rivers are shown in blue line.

Several incidences of bird-aircraft strikes have been reported at WPAFB. The Flight Safety Officer prepares bird strike reports that include the date and time of each strike, conditions, aircraft model, number of birds, bird species, and altitude and location at the time of the strike (WPAFB 2011c). The potential exists for future bird strikes although current BASH Plan and U.S. Department of Agriculture-Wildlife Services (USDA–WS) management strategies and protocols continue to be implemented. The USAF BASH Team maintains historic records of bird/wildlife-aircraft strikes.

WPAFB maintains a USFWS depredation permit that specifies numbers of birds that may be killed by species as part of an overall management program (WPAFB 2007a). However, depredation permits are not required for killing English house sparrows *(Passer domesticus)*, European starlings *(Sturnus vulgaris)*, common pigeons or rock doves *(Columba livia)*, and mute swans *(Cygnus olor)*. In addition, 50CFR21.43 excludes the need for a depredation permit for red-winged blackbirds *(Agelaius phoeniceus)*, rusty blackbirds *(Euphagus carolinus)*, brown-headed cowbirds *(Molothrus ater)*, common grackle *(Quiscalus quiscula)*, and American crows *(Corvus brachyrhynchos)* when concentrated in such numbers and manner as to constitute a health hazard or other nuisance.

Figure 3-11. No Waterfowl Zone at WPAFB



Source: WPAFB 2011d

In addition, a Wildlife Survey and Airfield Management Plan was developed to provide information regarding bird and mammal activities on the airfield and detail short- and long-term ways of reducing BASH potential (WPAFB 2007a). A Cooperative Services Agreement between WPAFB and USDA–WS was finalized in September 2001 to obtain USDA–WS assistance in reducing BASH potential (WPAFB 2007a).

Munitions and Explosives Safety

There are two areas that are constrained by ESQD CZs in Area B. Clear zones exist at Wright Field and at Facility 20100 (Aerospace Survivability Facility). Explosives are classified based on their reactions to specific influences. The explosives hazard class is further subdivided into "division", based on the character and predominance of the associated hazards and their potential for causing personnel casualties or property damage.

Construction and Demolition Safety

All contractors performing construction activities are responsible for following ground safety regulations and worker compensation programs, and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and availability of Material Safety Data Sheets. Industrial hygiene is the responsibility of contractors, as applicable.

Contractor responsibilities are to review potentially hazardous workplace operations; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous materials), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures.

3.13 Hazardous Materials/Waste, Stored Fuels, and ERP

3.13.1 Definition of the Resource

Air Force Policy Directive 32-70, *Environmental Quality*, establishes the policy that the USAF is committed to:

- Cleaning up environmental damage resulting from its past activities
- Meeting all environmental standards applicable to its present operations
- Planning its future activities to minimize environmental impacts
- Managing responsibly the irreplaceable natural and cultural resources it holds in public trust
- Eliminating pollution from its activities wherever possible

Hazardous material is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. Hazardous waste is defined as any solid, liquid, contained gaseous, or semisolid waste; or any combination of wastes that pose a substantial present or potential hazard to human health or the environment.

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

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

Toxic substances might pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are ACM, radon, LBP, PCBs, pesticides/herbicides, and UXO. The presence of special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and the Toxic Substances Control Act (TSCA), defines hazardous materials. The Occupational Safety and Health Administration (OSHA) is responsible for enforcement and implementation of Federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of hazardous materials in the workplace and ensures appropriate training in their handling.

The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both hazardous materials and wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health or welfare or the environment when released or otherwise improperly managed.

Through its Environmental Restoration Program (ERP), the DoD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, to control the migration of contaminants, to minimize potential hazards to human health and the environment, and to clean up contamination. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

3.13.2 Existing Conditions

Hazardous Materials

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or

track any of those activities. A privately contracted hazardous material pharmacy (HAZMART) is located in Facility 30089. The HAZMART ensures that only the smallest quantities of hazardous materials necessary to accomplish the mission are purchased and used (WPAFB 2001).

Hazardous and toxic material procurements at WPAFB are approved and tracked by the Bioenvironmental Engineering Office. The Civil Engineering Asset Management Division (CEA) supports and monitors environmental permits, hazardous material and hazardous waste storage, spill prevention and response, and participation on the Base Environmental Protection Committee. The Hazardous Substance Steering Committee is a network safety, environmental and logistics experts who work with hazardous material Issue Point Managers, Unit Environmental Coordinators (UECs), and other hazardous material users to ensure safe and compliant hazardous material management throughout the Base (WPAFB 2008a).

The 445 AW uses a propylene glycol-based deicing fluid for aircraft deicing operations. Propylene glycol is a colorless, odorless, water-soluble liquid considered safe for use in commercial formulations of foods, drugs, and cosmetics (HHS 2010). Propylene glycol is used widespread because of its low toxicity; only very high doses result in adverse health effects (HHS 2010). However, propylene glycol requires oxygen for breakdown, which can deplete surface waters of dissolved oxygen, resulting in oxygen impairments.

According to the 2010 Annual Comprehensive Site Compliance Evaluation (Shaw 2011, WPAFB 2012c), the 445 AW purchases approximately 5,100 gallons per year (gpy) of pure deicing fluid (before dilution) prior to the deicing season. Of that, approximately 40 to 70 percent of the concentrated fluid is used on the West Ramp for C-17 aircraft.

The propylene glycol is diluted to 60 percent propylene glycol, 40 percent hot water. The amount of deicing fluid used at the West Ramp varies depending upon the weather conditions. The 445 AW currently captures about 75 percent of the deicing fluid using a mobile vacuum unit). Approximately 3,000 gallons were collected last winter (WPAFB 2010b). The recovered deicing fluid is stored in four 1,500-gallon ASTs behind Facility 34044. The recovered deicing fluid is a non hazardous waste and is recycled through an offsite recycler arranged by the 445 AW. Deicing fluid not recovered is discharged to the Base's storm water system, which flows into Bass Lake and the Mad River. The outfalls associated with the airfield are monitored for glycol as required by the WPAFB NPDES storm water permit.

The East Ramp, run by contractor TECOM, follows the same procedure as the 445 AW for deicing transient aircraft. According to the 2010 Annual Comprehensive Site Compliance Evaluation, the East Ramp sprayed approximately 3,500 gallons of pure deicing fluid after dilution to the 60 percent propylene glycol, 40 percent hot water mix. The East Ramp currently captures approximately 60 to 75percent of the deicing fluid sprayed using a mobile vacuum unit. The recovered deicing fluid is then stored in two 1,500 ASTs inside building 206. The recovered deicing fluid from the East Ramp is a non hazardous waste and

can be recycled offsite through a contractor arranged by the 88 ABW. Deicing fluid not recovered is discharged to the Base's storm water system, which flows into Hebble Creek and the Mad River. The outfalls associated with the airfield are monitored for glycol as required by the WPAFB NPDES storm water permit.

Hazardous Waste

The 88 ABW maintains a Hazardous Waste Management Plan (WPAFB 2008b) as directed by AFI 32-7042, *Waste Management*. This plan prescribes the roles and responsibilities of all members of WPAFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for solid waste and hazardous waste management.

Wastes generated at WPAFB include waste flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, mixed-solid waste (MSW), and other miscellaneous wastes. Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called "Universal Wastes," and their associated regulatory requirements are specified in 40 CFR 273. Types of waste currently covered under the universal waste regulations include hazardous waste batteries, hazardous waste thermostats, and hazardous waste lamps.

Management of hazardous waste is the responsibility of each waste-generating organization and 88 ABW/CEAN. WPAFB produces more than 1,000 kilograms of hazardous waste per month and is considered a large quantity hazardous waste generator.

There are no hazardous waste collection sites in Facility 20434. Facility 20840 contains 10 permitted hazardous waste storage locations, which are associated with USAFSAM's research and development laboratories. Waste storage locations include ignitable, corrosive, universal, P-listed, and F-listed waste streams. In addition to these waste storage locations, Facility 20840 is listed on the WPAFB blanket purchase agreement (BPA) and any additional infectious waste streams generated from the AE FTU (i.e., sharps needle sticks on mannequins and/or students acting as patients) would be accumulated on the cargo compartment trainers and on actual training flights and then picked up from Facility 20840 under the BPA.

Stored Fuels

Stored fuels present a potential threat to the environment, which is mitigated at WPAFB through spill prevention and control and countermeasures (SPCC). The WPAFB SPCC Plan (WPAFB 2008c) describes practices used to minimize the potential for stored fuel spills, prevent spilled materials from migrating off the base, and ensure that the cause of any spill is corrected. The WPAFB Oil and Hazardous Substance Integrated Contingency Plan (WPAFB 2005) describes emergency planning,

notification and spill response practices. Collectively, the SPCC Plan with a focus on spill prevention and the Integrated Contingency Plan (ICP) with a focus on spill response provide a comprehensive strategy for preventing stored fuel releases to the environment.

The Spill Prevention Coordinator (SPC) is the primary point of contact for the SPCC Program. The SPC works closely with Tank Managers, UECs, and WPAFB emergency response personnel to implement the SPCC Plan. Required SPCC training, standard operating procedures (SOPs), inspections, and record keeping are coordinated by the SPC.

Petroleum-based products such as fuel, oils and lubricant are stored on the Base in ASTs and USTs. The measures designed to prevent and handle a release from these ASTs are addressed in the WPAFB SPCC Plan.

Underground storage tanks are subject to Federal regulations implementing the RCRA contained in 40 CFR Part 280. The State of Ohio regulates USTs under the OAC 1301:7-9 and the Bureau of Underground Storage Tank Regulations (BUSTR). Aboveground storage tanks are regulated under the Federal Oil Petroleum Pollution Prevention and Response Regulation and the WPAFB SPCC Plan. According to the WPAFB General Plan, there are no UST or ASTs located within the immediate area of the project area.

Asbestos-Containing Materials

Air Force Instruction 32-1052, *Facilities Asbestos Management,* provides the direction for asbestos management at USAF installations. This instruction incorporates by reference applicable requirements of 29 CFR 669 et seq., 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.3.80, Section 112 of the CAA, and other applicable AFIs and DoD Directives.

Air Force Instruction 32-1052 requires bases to develop an Asbestos Management Plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos-management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by USEPA with the authority promulgated under OSHA, 29 U.S.C. 669, et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

The 88 ABW/CEAN has developed standard contract specifications for the removal and disposal of ACM. These specifications incorporate all applicable USEPA, OSHA, and USDOT requirements. The Ohio Department of Health (ODH) must license contractors, and all asbestos-abatement work must be done under the onsite supervision of an ODH-designated "competent person." Work area monitoring for airborne asbestos fibers is accomplished by an industrial hygienist certified by the American Board of

Industrial Hygiene. Industrial hygienists must also be certified by the ODH. Laboratory analyses of air samples and of bulk samples must be accomplished in a certified and accredited laboratory.

Non-friable ACM can be disposed of in a sanitary landfill as long as there is proof (manifest provided by 88 ABW/CEAN or landfill ticket) that the landfill is aware they are receiving ACM. Friable asbestos must be disposed of in a USEPA-approved landfill. ACM-abatement contractors are responsible for obtaining all required permits from regulatory agencies and for OEPA and ODH notification requirements (WPAFB 2001). WPAFB has implemented an Asbestos Management Plan to minimize risk from friable ACM in buildings where the material remains. Additional sampling is usually required in buildings scheduled for renovation or demolition (WPAFB 2001).

The 88 ABW/CEAN provided historical ACM sampling data conducted in Facility 20434 which indicated that approximately 10 of 22 building materials sampled and analyzed (i.e., mastic floor tile, ceiling tiles, carpet adhesive, caulk) resulted in a positive trace of asbestos. Historical ACM sampling was provided for informational purposes only and is not sufficient for compliance with any National Emissions Standards for Hazardous Air Pollutants (NESHAP) or RAPCA requirements. As such, an additional ACM survey of Facility 20434 may be required. In addition, an ACM survey would be required prior to any renovations in Facility 20840 that involve the removal or relocation of walls, doors, or windows.

Lead-Based Paint

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

The USAF policy and guidance establishes LBP management at USAF facilities. The policy incorporates, by reference, the requirements of 29 CFR 1910.120, 29 CFR 1926, 40 CFR 50.12, 40 CFR 240 through 280, the CAA, and other applicable Federal regulations. Additionally, the policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating LBP hazards.

More than 95 percent of WPAFB facilities were constructed prior to 1980 and contain LBP. Lead concentrations are generally low with the exception of paints used on outdoor structures such as water towers. The HUD action level is 5,000 ppm. However, even when concentrations are below this, OSHA Lead Construction Standard (29 CFR 1926.62) must be followed. All workers performing lead abatement or removal or any other lead disturbance are required to have a lead workers license issued by the ODH. Licensing is not required if the contract involves mechanical demolition. Contractors containerize LBP

wastes which are turned in to the 88 ABW/CEAN for disposal. Bioenvironmental Engineering samples and monitors all in-house projects involving LBP (WPAFB 2001).
No LBP surveys have been conducted for Facility 20840 or 20434. Due to the recent construction of Facility 20840, LBP would not be a concern. It is assumed that LBP exists in Facility 20434 until surveyed.

Pesticides
Use of insecticides, fungicides, herbicides, and rodenticides is regulated by the Ohio Department of Agriculture, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). A range of pesticides are used at WPAFB for rodent control and grounds maintenance. They are applied by licensed contractors and occasionally by grounds maintenance workers (ant bait stations), both of which are overseen by certified advisors and applicators. WPAFB reduces potential environmental impacts of pesticides in use by controlled applications, inventory inspection, and monitoring. All insecticides, fungicides, herbicides, and rodenticides are handled, applied, and disposed of consistent with the state requirements and FIFRA.

In addition, 40 CFR 261.2(1)(B)(ii) specifically states that commercial chemical products listed in Section 261.33 are not solid wastes (and, thus, not hazardous waste) if they are applied to the land and that is their ordinary manner of use. Therefore, the contaminated soil would be treated as a hazardous waste (if it is dug up) only if it exhibits one or more of the four RCRA hazardous waste characteristics defined in 40 CFR 261.21 through 261.24.

Environmental Restoration Program
The ERP is a subcomponent of the Defense Environmental Restoration Program that became law under SARA (formerly the Installation Restoration Program [IRP]). The ERP requires each DoD installation to identify, investigate, and clean up hazardous waste disposal or release sites. WPAFB began its IRP in 1981 with the investigation of possible locations of hazardous waste contamination. In 1988, WPAFB entered into an Ohio Consent Order with the OEPA. In October 1989, WPAFB was placed on the USEPA's National Priorities List (NPL), a list of sites that are considered to be of special interest and require immediate attention (WPAFB 2001).

Wright-Patterson Air Force Base currently has identified 67 IRP sites, two regional groundwater sites, and several areas of concern per the Air Force Restoration Information Management System. Wright-Patterson Air Force Base has grouped the majority of confirmed or suspected sites requiring investigation and characterization in 11 geographically-based operable units (OUs), designated as OUs 1 through 11 (IT 1999). In addition to the 11 OUs, WPAFB addressed base-wide issues of groundwater and surface water contamination under the Basewide Monitoring Program (BMP) and Long-Term Groundwater Monitoring (LTM) Program. Principal groundwater contaminants beneath WPAFB include benzene, toluene, ethylbenzene, xylene, trichloroethene, and tetrachloroethene (WPAFB 2007d). **Figure 3-12** indicates the locations of ERP and related sites within the vicinity of Facilities 20840 and 20434.

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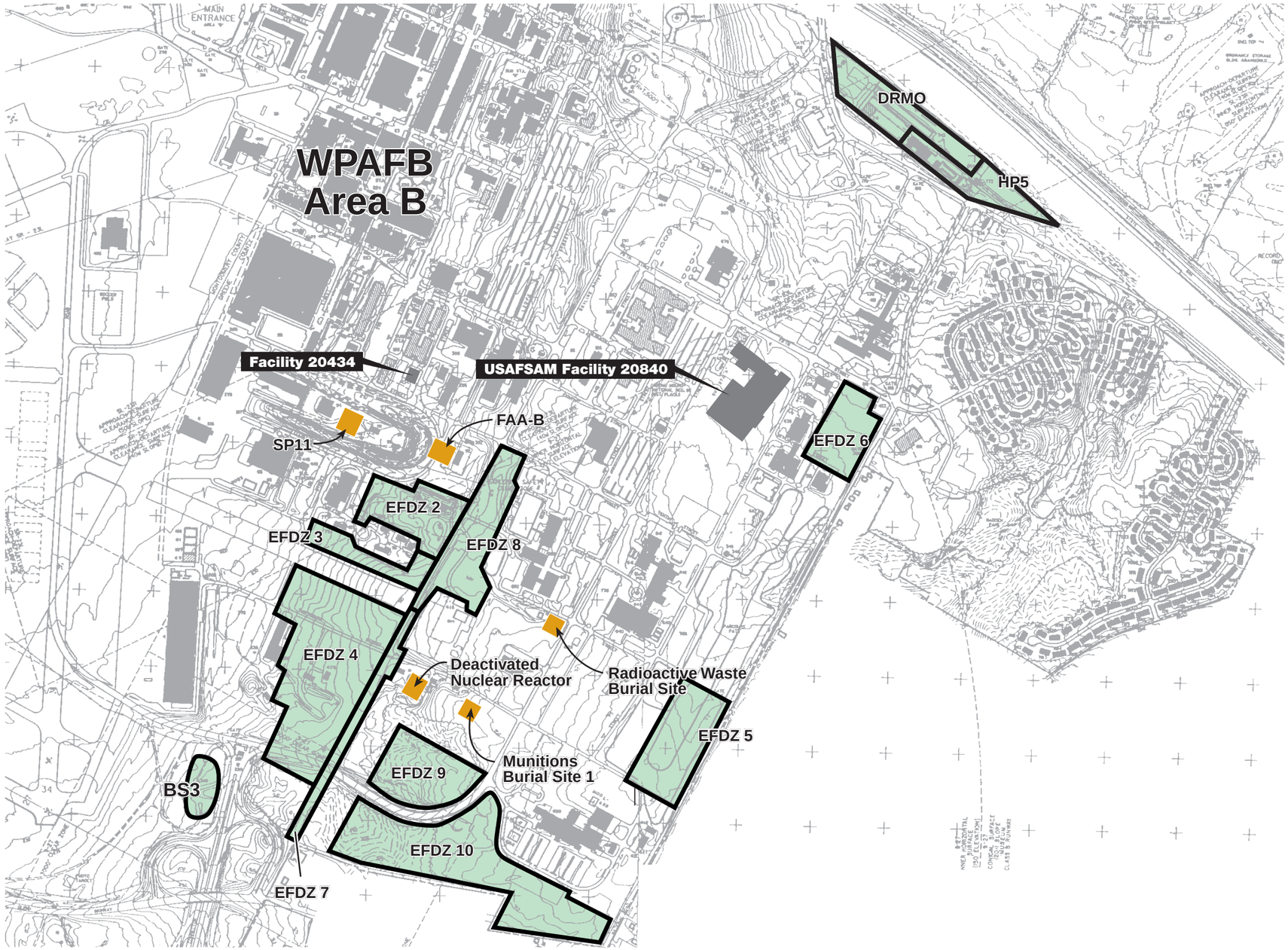
Cincinnati, OH	2/17/12	--	JIS	SAB	CH	s-144169.0601-2/12-w



Legend

- Operable Unit 9 (OU 9) Sites
- Other Environmental Restoration Program Sites
- EFDZ — Earthfill Disposal Zone
- SP — Spill Site
- FAA-B — Further Action Area B

0 600 1200 feet

N

Basemap: Woolpert Consultants 1987

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 3-12
ERP and Related Sites in Area B

Earthfill Disposal Zone 6

The only ERP site in the vicinity of Facility 20840 is Earthfill Disposal Zone 6 (EFDZ6) which is part of OU9. OU9 is a collection of 11 discrete sites, nine of which have been used for disposal of earthfill materials, one burial site (BS3), and Heating Plant No. 5 (HP5). The EFDZ sites were identified through the ERP as presented in the "*Installation Restoration Program Site Investigation Report for Eight Earthfill Disposal Zones, Wright-Patterson Air Force Base, Ohio*" (WPAFB 1992a), "*U.S. Air Force Site Investigation at Wright-Patterson Air Force Base, Ohio, Final Site Investigation Report for 16 IRP Sites*" (Science Applications International Corporation 1993), and "*Draft-Final Site Specific Work Plan for Remedial Investigation and Feasibility Study Wright-Patterson Air Force Base, Ohio, Operable Unit 9*" (IT 1994). EFDZ6 was characterized during the Site Investigations (WPAFB 1992a and SAIC 1993) as not having site-related contamination. Therefore, EFDZ6 was included in the *Record of Decision for 41 No Action Sites at WPAFB* (WPAFB 1998).

Spill Site 11 and Further Action Area B

As seen on **Figure 3-12**, the closest ERP sites to Facility 20434 are Spill Site 11 (SP11) and Further Action Area B (FAA-B). SP11 is a petroleum hydrocarbon release site in the Aircraft Survivability Test Facility that is undergoing passive remediation. The extent of the release was confined to a small area within the Range. FAA-B is located immediately downgradient of Facility 20492 which is a hazardous materials storage area. Organic solvents had been spilled at the facility at an unknown time(s) and had entered the glacial till soil. These low-permeability soils have kept the contamination relatively stationary and within the boundary shown on **Figure 3-12**. Groundwater at the site is monitored and reported under the LTM Program.

Radioactive Waste Burial Site

The Radioactive Waste Burial Site was located in the south central section of Area B at the intersection of P and 12th Streets, approximately 2,250 ft north of the WPAFB boundary along Colonel Glenn Highway. The site consisted of a 7ft by 4ft concrete slab surrounded by an 8ft barbed wire fence labeled "Radioactive Waste Burial Site". The site was first identified as a source of potential contamination during the ERP Phase I Records Search (ES 1982). Although the records search did not conclude that radioactive waste was buried at WPAFB, and no indications of elevated radiation were found at the Radioactive Waste Burial Site during the Phase I Investigation, the burial site was included as an ERP site because the area appeared to be a disposal site and was fenced and labeled.

The Radioactive Waste Burial Site was investigated in 1990 (WPAFB 1992b). Soil sample data from excavations at the site as well as the site history indicated that the Radioactive Waste Burial Site was not used as a burial site for radioactive materials. Reports of personnel present during the placement of the concrete slab indicated that the site was used as a staging area for drums of radioactive waste in the 1950s. However, there is no indication that environmental contamination resulted. Soil samples from the site showed only naturally occurring radioactivity at background levels. Because the environment was

not impacted by activities at the site, it was concluded that this site does not pose health risks and that no further action was necessary.

Deactivated Nuclear Reactor

The Deactivated Nuclear Reactor is an entombed reactor located in OU9, north of EFDZ9, shown on **Figure 3-12**. The reactor was a 10-megawatt reactor cooled and moderated with demineralized water. The reactor was completed in 1965 and operated for five years supporting various projects of defense agencies, civilian institutions, and USAF engineering students until shut down in June 1970. The Nuclear Regulatory Commission exempted the facility under Section 91B of the Atomic Energy Act of 1954. The AF internally regulates activities at the reactor. The 88 ABW, Aeronautical Systems Center, Air Force Materiel Command is the custodian of the facility and performs applicable inspection, maintenance, and monitoring activities to ensure compliance with the Air Force Nuclear Reactor Program (AFI 91-109), the USAF Special Nuclear Reactor Study 97-1, and the protection of personnel and environment from unnecessary exposure to radiation.

Radiological monitoring, including soil, vegetation, surface water, and groundwater monitoring, is conducted semi-annually outside the facility. Monitoring is also conducted inside the facility, including ambient air surveys, swipe surveys, and air monitoring. In addition, groundwater monitoring was conducted in the vicinity of the reactor as part of the OU9 RI. Results of the groundwater monitoring indicated detectable levels of gross alpha and beta; however, all detectable levels of radiological activity were below their respective MCLs.

Wright-Patterson Air Force Base has concluded that no action at the Deactivated Nuclear Reactor is necessary under CERCLA and the ERP to ensure protection of human health and the environment. Inspection, maintenance, and monitoring activities to ensure compliance with applicable regulations and ensures protection of personnel and the environment from unnecessary exposure to radiation. Actions taken to date include shutdown of the reactor in July 1970 and subsequent decommissioning.

Munitions Burial Site

Munitions Burial Site (MBS-1) is not technically part of the ERP because it was discovered in November 1995 when a construction contractor unexpectedly encountered buried objects while excavating a trench for installation of a sanitary sewer line for a new fire station in Area B (**Figure 3-12**). This area is located approximately 3,000 ft south of Facility 20840. The buried objects, located at a depth of 13 to 15 ft, were steel tubes approximately 22 inches long and 1.5 inches in diameter. The objects were identified as M-114 submunitions by members of the 71st Ordnance Detachment Explosive Ordnance Disposal Team. The condition of the M-114 submunitions varied from good to highly deteriorated, and nine of the submunitions contained liquid audibly sloshing within the submunitions.

Extensive research was carried out by Armstrong Laboratories and it was determined that the bomblets were from a 1950s experiment conducted at the Base. The bomblets contained the bacteria *Brucella suis* (the first standardized biological agent selected by the U.S. Army Chemical Corps), which had been heat-sterilized and rendered inert prior to disposal. Because no other biological agents were ever placed in M-114s, there was no possibility of encountering other biological agents. Furthermore, all of the bursters were inert and there were no live fuses on the M-114s. WPAFB concluded that the bomblets posed no biological or explosive hazard and that the bomblets could be removed by conventional excavation procedures. A work plan for the excavation was prepared in August 1996 and 2,306 bomblets were removed mid-September 1996.

4.0 ENVIRONMENTAL CONSEQUENCES

This section presents an evaluation of the environmental impacts that might result from implementing the Proposed Action or the No Action Alternative. The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; Federal, state, or local agency guidelines and requirement; and/or legislative criteria. Proposed environmental commitments are included for each environmental issue, as appropriate, to reduce potential impacts.

Impacts may be direct or indirect and are described in terms or type, context, duration, and intensity, which is consistent with the CEQ regulations. "Direct effects" are caused by an action and occur at the same time and place as the action. "Indirect effects" are caused by the action and occur later in time or are farther removed from the place of impact, but are reasonably foreseeable.

Impacts are defined in general terms and are qualified as adverse or beneficial, and as short-term or long-term. For the purposes of this EA, short-term impacts are generally considered those impacts that would have temporary effects. For example, air quality impacts from fugitive dust associated with construction would be considered short-term as they would only last for the duration of the construction activities. Long-term impacts are generally considered those impacts that would result in permanent effects. For example, the loss of vegetation, or the increase in traffic, associated with new development would be considered long-term.

Impacts are defined as follows:

Negligible, the impact is localized and not measureable or at the lowest level of detection;
Minor, the impact is localized and slight but detectable;
Moderate, the impact is readily apparent and appreciable; or
Major, the impact is severely adverse or highly noticeable and considered to be significant.

4.1 Airspace Management

4.1.1 Evaluation Criteria

Impacts on airspace use were assessed by comparing the projected military flight operations with existing conditions and with forecasted civil aviation activities in the defined ROI. This assessment included analyzing the capability of affected airspace elements to accommodate projected military activities, and determining whether such increases would have any adverse impacts on overall airspace use in the area.

Also included are considerations of the interaction of the proposed use of specific airspace with adjacent controlled, uncontrolled, or other military training airspace; possible impacts on other nonparticipating civil and military aircraft operations; and possible impacts on civil airports that underlie or are proximate to the airspace involved in the proposal. The ROI for airspace management has been limited to WPAFB

and the transitional airfields. The airspace classification is currently Class D and would not change with the implementation of the AE FTU.

4.1.2 Proposed Action

Effects on airspace management are predicated on the extent to which the Proposed Action would affect air traffic in the vicinity of WPAFB and the navigable airspace in an en-route environment. For additional information regarding airspace management, see Section 3.1.1.

Training sorties under the Proposed Action were evaluated with respect to the overall traffic at the WPAFB airfield. Data on annual operations for calendar year (CY) 2011 are shown in **Table 4-1**. Regardless of whether the AE FTU is located at Facility 20840 or 20434, total airfield operations would increase by approximately 5 percent under the Proposed Action when comparing total airfield operations in CY11 to proposed AE FTU operations (see **Table 4-2**). Aircraft would be transient and not permanently based at WPAFB. At the current operational state, no additional manpower or resources would be necessary to support this mission (WPAFB 2012d). In addition, AE FTU aircraft would not use low-level airspace or MTRs. Therefore, either Alternative A or Alternative B under the Proposed Action would have negligible short-term and minor long-term impacts on airspace management over current conditions. Impacts would be minor as airfield operations would slightly increase as a result of flight training.

Table 4-1
Annual and Average Airfield Operations Estimated by Aircraft Type
WPAFB

Aircraft	Total Annual Operations [a]	Average Daily Operations [b]
Based Aircraft		
C-17 [c]	422	1.156
BE-9/G	459	1.258
Aero Club [d]	11,771	32.249
Transient Aircraft		
C-5 [e]	257	0.704
E-4	147	0.403
C-130	808	2.214
C-17	73	0.200
KC-135	37	0.101
Other [f]	3,030	8.301
Total	17,004	46.586

IFR = Instrument Flight Rules; VFR = Visual Flight Rules

a) The total number of operations is based on actual data obtained from 88 OSS/OSAT and includes IFR departures, IFR arrivals, and VFR locals (touch-and-gos, low fly-bys). Annual operations for each aircraft were estimated by compiling operations data by aircraft type as recorded in one month (July 2011) and applying the percentage of operations calculated for each aircraft to the overall airfield operations data.

b) Average Daily Operations = Total Annual Operations/365 days.

c) Total operations for C-17 will increase in the future as the C-17 conversion is completed in 2012.

d) Total operations estimated for all Aero Club aircraft.

e) The C-5 operations were not included in future operations as this aircraft was phased out in 2012. The C-5 aircraft was classified as transient aircraft for this evaluation.

f) Total operations for all other transient aircraft.

Table 4-2
Annual and Average Airfield Operations with Proposed Action
WPAFB

Aircraft	Total Annual Operations [a]	Average Daily Operations [b]	Percent Average Daily Operations
Based Aircraft [c]	12,652	34.663	70.43
Transient Aircraft [d]	4,352	11.923	24.22
AE FTU Aircraft [e]	960	2.630	5.34
Total	17,964	49.216	100.00

Reference: WPAFB Air Traffic Control Activity Report, Estimated from July 2011 data.

a) The total number of operations is based on actual data obtained from 88 OSS/OSAT and includes IFR departures, IFR arrivals, and VFR locals (touch-and-gos, low fly-bys). Annual operations for each aircraft were estimated by compiling operations data by aircraft type as recorded in one month (July 2011) and applying the percentage of operations calculated for each aircraft to the overall airfield operations data.

b) Average Daily Operations = Total Annual Operations/365 days.

c) Based aircraft are listed in Table 4-1. Although the future status of the Aero Club is uncertain, Aero Club aircraft were retained in this evaluation.

d) Selected transient aircraft are defined in Table 4-1.

e) Airfield operations are based on a total of 480 sorties per year consisting of two operations each (arrival and departure).

4.1.3 No Action

No impacts to airspace management are expected under the No Action alternative because no changes to airspace management would occur.

4.2 Land Use

4.2.1 Evaluation Criteria

Potential impacts on land use are based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be adverse if it met the following criteria:

- Inconsistency or noncompliance with existing land use plans or policies;
- Precluded the viability of existing land use;
- Precluded continued use or occupation of an area;
- Incompatibility with adjacent land use to the extent that public health or safety is threatened; or
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

4.2.2 Proposed Action

4.2.2.1 Alternative A: Locating the AE FTU at Facility 20840

There would be no adverse effects on the land use surrounding WPAFB with the co-location of the AE FTU with USAFSAM in Facility 20840. All renovation and modification activities would be limited to areas located on Base. The renovation/modification projects would upgrade capabilities necessary to implement the AE FTU mission at WPAFB. Renovation projects would occur to existing buildings at WPAFB on two types of land (industrial and institutional) classified as improved (**Figure 3-3**).

No changes to land use would occur at WPAFB as a result of Alternative A. The land use categories incorporate developed and undeveloped lands. These land use designations were established to segregate aircraft facilities from other military base support areas.

Interior renovation/modification to the existing facility would not result in any adverse or incompatible land use changes on or off the Base nor would they alter the relationships of the general land use areas that have been designated in the base-planning guidance documents. Given minor interior renovation/modification of Facility 20840, effects associated with removal of construction materials and/or debris could include elevated noise levels and minor disruptions to roadway access due to construction vehicles.

With respect to protection of human life and property, Facility 20840 is not located in an APZ. In addition, land use associated with aircraft noise would not be affected because the noise associated with the AE FTU training sorties would contribute a relatively small percentage of the overall aircraft noise at WPAFB. The noise evaluation is presented in Section 4.4.

No significant impacts are expected to land use under Alternative A because no changes to land use would occur at or surrounding WPAFB.

4.2.2.2 Alternative B: Locating the AE FTU at Facility 20434

Alternative B consists of locating the AE FTU in Facility 20434. Impacts from Alternative B would be similar to those for Alternative A with the exception that renovation and construction activities would be more extensive, and potentially more disruptive. Therefore, no significant impacts are expected to land use under Alternative B because no changes to land use would occur at or surrounding WPAFB.

4.2.3 No Action

No impacts are expected to land use under the No Action alternative because no changes to land use would occur at or surrounding WPAFB.

4.3 Air Quality

4.3.1 Evaluation Criteria

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

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any Evaluation Criteria established by a SIP

As mentioned in Section 3.3, the area including WPAFB is classified as a moderate maintenance area for O_3, designated as moderate nonattainment for $PM_{2.5}$, and is designated as an unclassified/attainment area for all other criteria pollutants.

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

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

Because WPAFB is located in an area designated as maintenance for O_3 and non-attainment for $PM_{2.5}$, a conformity applicability analysis is required to determine whether the Proposed Action is subject to the Conformity Rule. With respect to the General Conformity Rule, effects on air quality would be considered significant and, therefore, subject to an evaluation to determine compliance with the General Conformity Rule, if:

- The proposed Federal action does not relate to transportation plans, programs, and projects developed, funded, or approved under Title 23 U.S.C. or the Federal Transit Act, and
- The Proposed Action-related direct and indirect emissions exceed *de minimis* threshold levels established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been re-designated as a maintenance area.

The *de minimis* threshold emission rates were established by USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to have "significant" air quality impacts. **Table 4-3** presents these thresholds, by regulated pollutant. These *de minimis* thresholds are similar, in most cases, to the definitions for major stationary sources of criteria and precursors to criteria pollutants under the CAA's NSR Program (CAA Title I). As shown in **Table 4-3**, *de minimis* thresholds vary depending on the severity of the nonattainment area classification.

In addition to the *de minimis* emission thresholds, Federal PSD regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Federal Class I area (e.g., wilderness area greater than 5,000 acres or national park greater than 6,000 acres) and emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. Although PSD rules apply only to stationary sources of emissions, for the purposes of this EA, such an impact to a Class I area would be considered adverse.

Table 4-3. Conformity *de minimis* Emission Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
Ozone (measured as NO_x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/ maintenance	All	100
Particulate Matter (PM_{10})	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not applicable	100
Particulate Matter ($PM_{2.5}$)	Nonattainment/ maintenance	Direct Emissions	100
		SO_2 precursors	100
		NO_x precursors	100
Sulfur Dioxide (SO_2)	Nonattainment/ maintenance	Not applicable	100
Nitrogen Oxides (NO_x)	Nonattainment/ maintenance	Not applicable	100

Source: 40 CFR 93.153 (b)
tpy: tons per year

4.3.2 Proposed Action

Air Quality Regulations Applicable to the Proposed Action

Stationary Sources and New Source Review

Local and regional pollutant impacts resulting from direct and indirect emissions from stationary emission sources under the Proposed Action are addressed through Federal and state permitting program requirements under NSR regulations (40 CFR 51 and 52). Local stationary source permits are issued and enforced by RAPCA. As noted previously, WPAFB has appropriate permits in place and has met all applicable permitting requirements and conditions for existing stationary devices. No new or modified stationary sources are anticipated as part of the Proposed Action.

National Emissions Standards for Hazardous Air Pollutants (NESHAP)

Because WPAFB has the potential to emit more than 25 tpy of hazardous air pollutants, certain hazardous air pollutant-emitting activities on Base are subject to regulation under Federal NESHAP, which are promulgated in 40 CFR Parts 61 and 63. These NESHAP require emissions control measures and detailed recordkeeping to show compliance with NESHAP restrictions on the types of materials, such as paints, adhesives, and solvents, which can be used in specific operations. Specific NESHAP to which activities at WPAFB are subject include:

- 40 CFR 63 Subpart GG, Aerospace NESHAP
- 40 CFR 63 Subpart ZZZZ, Reciprocating Internal Combustion Engines (RICE MACT)
- 40 CFR 63 Subpart DDDDD, Industrial, Commercial, and Institutional Boilers (Boiler MACT to be finalized during 2012)
- 40 CFR 61 Subpart M, Asbestos Remediation

In addition, WPAFB would also be subject to the Defense Land Systems and Miscellaneous Equipment (DLSME) NESHAP when that rule is promulgated. This rule would cover military surface coating operations other than those subject to the Aerospace and Shipbuilding NESHAP. The intent is to simplify compliance for DoD facilities that are currently forced to comply with multiple overlapping, and sometimes conflicting, NESHAP, including the Miscellaneous Metal Parts and Products Coating NESHAP, Plastic Parts and Products Coating NESHAP, Metal Furniture Coating NESHAP, Large Appliance Coating NESHAP, and Fabric and Other Textiles Coating NESHAP. USEPA currently has no date set for publication of a draft DLSME NESHAP.

Conformity

Because both a maintenance area and a nonattainment area are affected by this Proposed Action, the USAF must comply with the Federal General Conformity Rule. To do so, an analysis has been completed to ensure that, given the changes in direct and indirect emissions of the O_3 precursors (NO_x and VOCs), direct $PM_{2.5}$, and $PM_{2.5}$ precursors (SO_2 and NO_x), the Proposed Action would be in conformity with CAA requirements. The Conformity Determination requirements specified in this rule can be avoided if the project nonattainment pollutant rate increase resulting from the Proposed Action is below *de minimis* threshold levels for each nonattainment pollutant. For purposes of determining conformity in these nonattainment areas, projected regulated pollutant emissions associated with the Proposed Action were estimated using approved USEPA on-road vehicle emission models and proposed aircraft operations data and available emissions information. The emissions calculations and *de minimis* threshold comparisons are collectively presented in the Air Conformity Analysis provided in **Appendix B**.

Based on a review of current and proposed Area B activities and other airfield operations at WPAFB, it has been determined that the potential sources of $PM_{2.5}$, SO_2, NO_x and VOC pollutant emissions associated with the Proposed Action would be from (1) renovation activities associated with the Proposed Action; (2) airfield operations associated training sorties; and (3) motor vehicle emissions from commuting and personnel transport. Under the Proposed Action, worst case emissions were developed using maximum training class size, duration and number along with the maximum number of sorties for each potential aircraft type. These emissions are assumed to be recurring annually. Short-term emissions from renovation activities were added to the annually recurring emissions for a worst-case scenario. The scope of the analysis was limited to those operations or activities that result in emissions that would be directly or indirectly attributable to the implementation of the Proposed Action.

The Proposed Action consists of two parts: facility/administrative modifications to existing WPAFB buildings to accommodate the AE FTU mission; and training operations for AE personnel. One project alternative includes locating the AE FTU with the USAFSAM in Facility 20840 (Alternative A) which includes limited interior renovations. For the other project alternative, Facility 20434 may be utilized for the AE FTU (Alternative B) which would include extensive interior renovations. The potential air quality impacts have been assessed based on the characteristics of both Alternatives (i.e., aircraft operations, construction) and are presented below.

4.3.2.1 Alternative A – Locating the AE FTU to Facility 20840

Direct and Indirect Emissions

Renovation Activities

Alternative A consists of co-locating the AE FTU with USAFSAM in Facility 20840. The renovation activities include minor interior redesign for office cubicle space resulting in negligible emissions because no painting or building construction is anticipated.

Renovation activities would result in emissions of criteria pollutants as combustion products from construction worker commuting and roadway fugitive dust emissions. These emissions would be of a temporary nature. For purposes of analysis, combustion emissions were estimated using modeling output data from the USEPA MOVES2010a mobile emissions model for Greene County, Ohio and calendar year 2012. Fugitive dust emissions were estimated using USEPA's AP-42 Section 13.2 dated November 2006. The renovation emissions are presented in **Table 4-4** and the calculations in **Appendix B**.

Airfield Operations

Emissions from airfield operations at WPAFB affect Greene and Montgomery Counties, which are included in the Metropolitan Dayton Intrastate AQCR. Calculations of airfield air pollutant emissions from the Proposed Action aircraft operations were based on the annual number of sorties and landing and takeoffs (LTO) anticipated for the WPAFB airfield.

Up to 480 training operations would be performed by C-130 aircraft; however, optionally C-17 or KC-135 aircraft could be utilized to carry out training missions. An additional 80 LTOs are included in the emission calculations to account for the initial arrivals and final departures of transient aircraft used for the training missions. Low-level military airspace would not be used during the in-flight training exercises. Use of established airspace with a base altitude of 3,000 ft AGL is not expected to affect ground level air quality and does not require environmental analysis in accordance with the USAF EIAP, 32 CFR 989 (Appendix B, CATEX A2 3.36), as amended.

Alternative A does not require any special Aerospace Ground Equipment (AGE) and Aircraft Support Operations. The equipment assigned to each aircraft type and the operation duration was determined from generic information published by AFCEE. Engine emissions from each aircraft type were combined

with their respective AGE and the worst case emissions were determined for each criteria pollutant on a pollutant by pollutant basis. The worst emissions are considered annually recurring and are presented in **Table 4-4** and the calculations in **Appendix B**.

Table 4-4. Criteria Pollutant Emissions at WPAFB Associated with Alternative A

Air Pollutant Emissions Source	NO_x Emissions (tpy)	VOC Emissions (tpy)	SO_2 Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
Renovation Activities				
Worker Commuting	0.008	0.002	0.0001	0.0006
Roadway Fugitive Dust	0.000	0.000	0.0000	0.0470
Subtotal Renovation Emissions	0.008	0.002	0.0001	0.0476
Airfield Operations				
Aircraft Worst Case Per-Pollutant Scenario	11.03	0.94	2.40	0.21
AGE	18.47	1.60	0.24	0.54
Subtotal Airfield Emissions	29.50	2.54	2.64	0.76
Vehicle Operations				
AF Personnel Commuting	0.15	0.03	0.002	0.01
AF Student Transport	0.20	0.05	0.001	0.01
Roadway Fugitive Dust	0.00	0.00	0.000	1.07
Subtotal Vehicle Operations	0.35	0.08	0.003	1.09
Total Emissions	29.85	2.62	2.64	1.90

Note:
tpy: tons per year

Vehicle Operations

Calculations of air pollutant emissions from privately owned vehicles (POVs) used for aircraft program staff commuting were based on the vehicle miles traveled, vehicle category or classification (e.g., light-duty gasoline vehicle), and USEPA-approved pollutant emission factors. Emissions factors from USEPA's mobile source emission model, MOVES2010a, were used to estimate emissions from motor vehicles. The training and administrative staff associated with the Alternative A is expected to initially increase by 31 and result in a corresponding increase in motor vehicle commuting emissions in the Dayton Metropolitan area.

Calculation of air emissions from government-owned vehicles (GOVs) were based on the vehicle miles traveled, light-duty diesel commercial truck vehicle classification, and USEPA-approved pollutant emissions factors derived from MOVES2010a. Up to 400 transient students per year would require daily transport by passenger van between accommodations, classroom, and airfield, as required.

In addition to motor vehicle emissions, roadway fugitive duct emissions were estimated using USEPA's AP-42 Section 13.2 dated November 2006 for both POV and GOV. The vehicle emissions are presented in **Table 4-4** and the calculations in **Appendix B**.

Analysis

The information presented in **Table 4-4** shows that NO_x, VOC, SO_2, and $PM_{2.5}$ emissions are projected to increase under Alternative A at WPAFB. Comparing **Table 4-4** to the limits in **Table 4-3**, Alternative A would not result in a net emission increase above conformity *de minimis* limits listed in 40 CFR 93.153 (b). Because the emissions expected from Alternative A would not exceed *de minimis* levels, the General Conformity Rule does not apply and Alternative A can be deemed to be in conformity with the Ohio SIP. It is noted that these calculations were based on the proposed 31 staff positions for the initial activation of the AE FTU. Should four positions be approved and added in the future, the corresponding increase in vehicle emissions would be minimal. Total emissions would continue to be below *de minimis* limits. **Appendix B** details the emissions factors, calculations, and estimates of renovation, airfield, and motor vehicle emissions for Alternative A.

According to 40 CFR 81 Subpart D, no Class I visibility areas are located within 10 kilometers of WPAFB. The closest Federal Class I area is Mammoth Cave National Park in Kentucky, 320 kilometers to the south. Therefore, air emissions from Alternative A would not affect any Class I area.

Alternative A is projected to result in net emissions increases for all pollutants. The maximum Alternative A-related net emissions increases are below all General Conformity *de minimis* thresholds. Minor short-term impacts on air quality from particulate matter and engine exhaust emissions generated during renovation activities are anticipated under Alternative A; however, ongoing emissions would decrease over time as older engines are replaced with new, more fuel efficient models. Negligible long-term impacts on air quality are anticipated from slight increases in net emissions for all pollutants due to flight training.

4.3.2.2 Alternative B – Locating the AE FTU to Facility 20434

Direct and Indirect Emissions

Renovation Activities

Alternative B consists of locating the AE FTU in Facility 20434. The renovation activities are extensive including major interior redesign work where at a minimum, new carpet, ceiling tiles, relocation of interior walls, painting, and a new roof would be required.

Renovation activities would result in emissions of criteria pollutants as combustion products from construction worker commuting, diesel truck deliveries, refuse truck removals, and roadway fugitive dust emissions. Additionally, surface coating activities would result in emission of VOC. Any dust generated by interior renovation activities were assumed to be contained within the structure and not emitted. All of

these emissions sources would be of a temporary nature. For purposes of analysis, commuter emissions were estimated using modeling output data from the USEPA MOVES2010a mobile emissions model for Greene County Ohio and calendar year 2012. Roadway fugitive dust emissions were estimated using USEPA's AP-42 Section 13.2 dated November 2006. The surface coating emissions were estimated using paint specifications and material balance calculations. For the diesel truck combustion products, the emissions factors and estimates were generated based on guidance provided in Air Emission Factor Guide for Air Force Mobile Sources (AFCEE 2009). The renovation emissions are presented in **Table 4-5** and the calculations in **Appendix B**.

Table 4-5. Criteria Pollutant Emissions at WPAFB Associated with Alternative B

Air Pollutant Emissions Source	NO_x Emissions (tpy)	VOC Emissions (tpy)	SO_2 Emissions (tpy)	$PM_{2.5}$ Emissions (tpy)
Renovation Activities				
Worker Commuting	0.029	0.006	0.0004	0.002
Material & Refuse Truck	1.20	0.07	0.09	0.06
Surface Coating	0.00	0.104	0.00	0.00
Roadway Fugitive Dust	0.000	0.000	0.0000	0.194
Subtotal Renovation Emissions	1.23	0.180	0.0904	0.256
Airfield Operations				
Aircraft Worst Case Per-Pollutant Scenario	11.03	0.94	2.40	0.21
AGE	18.47	1.60	0.24	0.54
Subtotal Airfield Emissions	29.50	2.54	2.64	0.76
Vehicle Operations				
AF Personnel Commuting	0.14	0.03	0.002	0.01
AF Student Transport	0.22	0.05	0.001	0.02
Roadway Fugitive Dust	0.00	0.00	0.000	1.09
Subtotal Vehicle Operations	0.36	0.08	0.003	1.09
Total Emissions	31.09	2.80	2.73	2.12

Note:
tpy: tons per year

Airfield Operations

Alternative B airfield operations are identical to Alternative A. The worst case emissions are reproduced and presented in **Table 4-5** and the calculations in **Appendix B**.

Vehicle Operations

Alternative B vehicle emissions are identical to Alternative A with the exception that student transport between Facility 20840 and Facility 20434 was included on a daily basis. Calculation of air emissions from GOVs were based on the vehicle miles traveled, light-duty diesel commercial truck vehicle classification, and USEPA-approved pollutant emission factors derived from MOVES2010a. Up to 400

transient students per year would require daily transport by passenger van between accommodations, classroom, and airfield, as required.

In addition to motor vehicle emissions, roadway fugitive dust emissions were estimated using USEPA's AP-42 Section 13.2 dated November 2006 for both POV and GOV. The vehicle emissions are presented in **Table 4-5** and the calculations in **Appendix B**.

Analysis

The information presented in **Table 4-5** shows that NO_x, VOC, SO_2, and $PM_{2.5}$ emissions are projected to increase under the Alternative B at WPAFB. Comparing **Table 4-5** to the limits in **Table 4-3**, Alternative B would also not result in a net emission increase above conformity *de minimis* limits listed in 40 CFR 93.153 (b). Because the emissions expected from Alternative B would not exceed *de minimis* levels, the General Conformity Rule does not apply and Alternative B also can be deemed to be in conformity with the Ohio SIP. As discussed for Alternative A, additional emissions that would be associated with the addition of four personnel would have a negligible effect. **Appendix B** details the emissions factors, calculations, and estimates of renovation, airfield, and motor vehicle emissions for Alternative B.

Minor short-term impacts on air quality from particulate matter and engine exhaust emissions generated during renovation activities are anticipated under Alternative B. Negligible long-term impacts on air quality are anticipated from slight increases in net emissions for all pollutants due to flight training.

4.3.3 No Action

No impacts to air quality are expected under the No Action alternative because no changes to existing airfield operations or increased emissions would occur.

4.4 Noise

4.4.1 Evaluation Criteria

Noise impact analyses typically evaluate potential changes to existing noise environments that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise impacts from aircraft operations from the AE FTU were evaluated for the Proposed Action and No Action.

4.4.2 Proposed Action

4.4.2.1 Alternative A - Locating AE FTU at Facility 20840

Construction Program

Implementation of Alternative A at Facility 20840 would have minor, temporary effects on the noise environment near the project sites resulting from renovation and modification activities. Occupants of

Facility 20840 would be expected to experience minor noise during the workday. The effect of noise on nearby facilities would be expected to be negligible because the renovation and modifications would only be made to the interior of the building.

Because the noise environment on Base and in the vicinity of WPAFB is dominated by military aircraft overflights, noise produced by interior renovation/modification activities would not affect sensitive receptors on or off the Base. Noise associated with interior renovation/modification activities would be comparatively minor.

Aircraft Operations

Noise is a principal concern associated with aircraft operations. The main issues concerning noise effects on humans are physiological effects such as hearing loss and non-auditory effects, behavioral effects such as speech or sleep interference and performance effects, and subjective effects such as annoyance. These issues are discussed in greater detail in **Appendix C**. Noise impacts would be considered adverse if increased noise levels resulted in land use incompatibility.

Flight training for the AE FTU would be conducted by C-130, KC-135, or C-17 aircraft that would originate from other installations. A total of 480 sorties would be flown per year, which would result in 960 airfield operations. It is anticipated that two aircraft would fly into WPAFB for two days of flying on two separate occasions during each class. The aircraft would not remain at WPAFB during the course of the entire project and would be considered transient aircraft.

The training sorties to be conducted for the Proposed Action were evaluated with respect to the overall traffic at the airfield. As a basis for comparison, data on annual operations at the airfield were obtained for CY 2011 from the Air Traffic Control Tower (WPAFB 2012e). As shown in **Table 4-1**, the total airfield operations for 2011 were calculated to be 17,004 with an average of approximately 47 daily operations. The tickets generated by the Air Traffic Control Tower in July 2011 were reviewed and airfield operations were categorized by aircraft type. As shown in **Table 4-1**, approximately 74 percent of the airfield operations were associated with based aircraft. Based aircraft were predominantly aircraft from the Aero Club (69 percent of total operations). Transient aircraft comprised 26 percent of the total air field operations in 2011.

Under Alternative A, the AE FTU flight training would contribute an additional 960 annual operations at WPAFB (**Table 4-2**). Assuming the number of airfield operations and types of aircraft remain the same in the future, the AE FTU aircraft would represent approximately 5 percent of the annual airfield operations. This number of operations is expected to be within the typical transient aircraft workload at WPAFB (WPAFB 2012f) and noise levels would be expected to be within the footprint of WPAFB's Maximum Mission/Maximum Capacity Scenario Noise Contours. Therefore, long-term impacts to noise from the AE FTU would be minor.

The conversion to C-17 aircraft was completed in February 2012. Once this mission has matured and sufficient flight data are available, a noise study will be conducted to confirm the noise contour analysis conducted for the *Environmental Assessment for the 445th Airlift Wing Conversion from C-5 to C-17 Aircraft* (WPAFB 2011a). Similarly, flight data for the AE FTU mission would also be compiled. The contribution from the AE FTU mission to the overall aircraft noise at WPAFB would be further evaluated at that time.

In summary, minor short-term impacts are expected to ambient noise from construction activities associated with renovations under Alternative A because these activities involve interior renovations that would be carried out during normal working hours. Minor long-term impacts are anticipated to noise from slight increases in airfield operations as a result of flight training under Alternative A.

4.4.2.2 Alternative B - Locating AE FTU at Facility 20840

Construction Program

Similar to Alternative A, implementation of Alternative B would have minor, temporary effects on the noise environment at Facility 20434 resulting from the use of heavy equipment and power tools for renovation/modification. The building is currently unoccupied. Therefore, noise would only affect the work crews. Impacts to workers would be negligible because workers would be subject to a hearing protection program. While the nearby facilities could experience noise during the workday impacts would be minimal because renovation and construction would be interior. Noise would last only for the duration of renovation/modification activities, and could be reduced through the use of equipment exhaust mufflers for renovation/construction activities to normal working hours (between 7:00 a.m. and 5:00 p.m.).

Because the noise environment on Base and in the vicinity of WPAFB is dominated by military aircraft overflights, noise produced by primarily interior renovation and construction activities would not affect sensitive receptors on or off the Base. Noise associated with primarily interior renovation and modification activities would be comparatively minor.

Aircraft Operations

Impacts to noise under Alternative B would be identical to Alternative A. Flight training for the AE FTU would be expected to have a minor impact on noise.

Similar to Alternative A, minor short-term impacts are expected to ambient noise from construction activities associated with renovations under Alternative B and minor long-term impacts are anticipated to noise from slight increases in airfield operations as a result of flight training.

4.4.3 No Action

No impacts are expected to noise under the No Action alternative because this alternative assumes current airfield operation conditions.

4.5 Geology and Soils

4.5.1 Evaluation Criteria

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

Analysis of potential impacts on geological resources typically includes the following steps:

- Identification and description of resources that could potentially be affected;
- Examination of a proposed action and the potential impacts this action may have on the resource;
- Assessment of the level of potential impacts; and
- Provision of mitigation measures in the event that potentially adverse impacts are identified.

Effects on geology and soils would be adverse if they would alter the lithology, stratigraphy, and geological structure that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure or function within the environment.

4.5.2 Proposed Action

4.5.2.1 Alternative A - Locating the AE FTU at Facility 20840

Because proposed activities are limited to interior renovation/modification activities, negligible impacts to geology and soils are expected under Alternative A.

4.5.2.2 Alternative B - Locating the AE FTU at Facility 20434

Similar to Alternative A, negligible impacts to geology and soils are expected under Alternative B because proposed activities would be limited to interior renovation/modification activities.

4.5.3 No Action

No impacts are expected to geology and soils under the No Action alternative.

4.6 Water Resources

4.6.1 Evaluation Criteria

Evaluation criteria for impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. The Proposed Action would be adverse if it does one or more of the following:

- Reduces water availability or supply to existing users;
- Overdrafts groundwater basins;
- Exceeds safe annual yield of water supply sources;
- Affects water quality adversely;
- Endangers public health by creating or worsening health hazard conditions;
- Threatens or damages unique hydrologic characteristics; or
- Violates established laws or regulations adopted to protect water resources.

4.6.2 Proposed Action

4.6.2.1 Alternative A - Locating the AE FTU at Facility 20840

Groundwater and Surface Water

The groundwater and surface water systems that surround WPAFB are closely interconnected. Runoff contaminants that might result from construction and aircraft operations that would impact surface water quality could also impact groundwater quality. Therefore, they are analyzed together.

Because interior renovation/modification activities under Alternative A would not involve land disturbance, sediment and erosion controls would not be necessary. A NPDES construction general permit through OEPA would not be required. In addition, Alternative A does not involve an increase in impervious surfaces; therefore, surface water and/or runoff would not increase over current conditions.

Proposed AE FTU facility operations and aircraft operations would involve the same types of hazardous materials that are already used at WPAFB. Although this alternative would not pose any new risks, minor adverse effects on groundwater and surface water would still be possible in the event of a spill. Management plans are in place for hazardous or harmful materials should a spill occur. Erosion and sedimentation controls would be implemented as BMPs to reduce storm water runoff. Refer to Section 4.13 for more detailed information regarding quantities of hazardous materials associated with the Proposed Action.

Facility 20840 is outside wellhead protection areas and is not located within any travel time recharge areas (Tetra Tech 2007). The renovation/modification activities are not expected to impact groundwater quality.

Floodplains

According to EO 11988, *Floodplain Management*, any new construction in the regulatory floodplain must apply accepted flood protection to reduce the risk of flood-associated damages; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. Facility 20840 is outside the designated floodplain. Because building modifications would be interior, renovation activities would not involve loss or gain of soil in the retarding basin. Therefore, there would be negligible effects associated with the proposed renovation projects.

As part of the IICEP process for this EA, WPAFB requested input from MCD on Alternative A. MCD reviewed the Alternative A and concluded that Alternative A would have no impact on the retarding basin. Copies of correspondence with MCD are provided in **Appendix A**.

The ground surface elevation at Facility 20840 is approximately 950 ft MSL. This elevation is above the Mad River 100-year floodplain elevation of 814.3 ft MSL.

Negligible short-term impacts are anticipated to water resources during construction as proposed activities would be limited to interior renovation/modification under Alternative A. Although the Proposed Action would not pose any new risks, minor long-term adverse effects on groundwater could continue to occur as a result of aircraft operations.

4.6.2.2 Alternative B - Locating the AE FTU at Facility 20434

Groundwater and Surface Water

Similar to Alternative A, Alternative B would not involve land disturbance, sediment and erosion controls. A NPDES construction general permit would not be required and the Proposed Action would not involve an increase in impervious surfaces.

Proposed AE FTU facility operations would involve the same types of hazardous materials that are already used at WPAFB and management plans are in place for hazardous or harmful materials should a spill occur. Facility 20434 is outside wellhead protection areas and is not located within any travel time recharge areas (Tetra Tech 2007).

Floodplains

Facility 20434 is outside the designated floodplain. Because building modifications would be interior, MCD has concluded that renovation activities under Alternative B would not involve loss or gain of soil in the retarding basin (**Appendix A**). Therefore, there would be negligible effects associated with the proposed renovation projects.

The ground surface elevation at Facility 20434 is approximately 850 ft MSL. This elevation is above the Mad River 100-year floodplain elevation of 814.3 ft MSL. Therefore, Alternative B would have no adverse impact on floodplains.

Negligible short-term impacts are anticipated to water resources during construction as proposed activities would be limited to interior renovation/modification under Alternative B. Although the Proposed Action would not pose any new risks, minor long-term adverse effects on groundwater would continue to occur as a result of aircraft operations.

4.6.3 No Action

No impacts to water resources are expected under the No Action alternative.

4.7 Biological Resources

4.7.1 Evaluation Criteria

To evaluate the potential impacts on the biological resources under the Proposed Action and the No Action Alternative, the level of impact on biological resources is based on:

- Importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- Proportion of the resource that would be affected relative to its occurrence in the region;
- Sensitivity of the resource to the proposed activities; and
- Duration of ecological ramifications.

The impacts on biological resources are adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all Federal agencies avoid "taking" threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a Federal agency project.

4.7.2 Proposed Action

4.7.2.1 Alternative A - Locating the AE FTU at Facility 20840

WPAFB has been extensively altered over time and the project area is permanently disturbed with existing facilities and paved roads. Therefore, there would be negligible effects on the biological resources resulting from implementation of the Proposed Action under Alternative A.

Under the Proposed Action for this EA, flight training operations would consist of approaches and landings and would be limited to the flight line. There would be no impacts over current conditions with respect to biological resources.

Vegetation

Proposed renovation/modification activities to support the AE FTU mission at WPAFB are interior in nature and would occur solely within the improved areas of the Base. There are no naturally-occurring vegetation communities within these areas. Short-term, localized effects on vegetation could be expected in proximity to the construction sites.

Wildlife

Wildlife habitat within the improved areas of the Base is limited due to fragmentation by the existing facilities, roads, and impervious surfaces at WPAFB. Furthermore, most of the area associated with Alternative A consists of disturbed, landscaped, paved, or mowed lands. Renovation/modification activities would not impact habitat available to the mammals, birds, or herptiles that occur at WPAFB.

Potential effects on wildlife are also a function of noise produced by aircraft operations. Predictors of wildlife response include prior experience with overflights, aircraft approach distance, stage in the breeding cycle, activity or context, age, and sex composition. Previous experience with similar overflights is the most important of these indicators. The rate of habituation to aircraft overflights is not known. However, the maximum sound level projected for the aircraft operations within all of the training areas that are part of Alternative A would be less than current conditions.

Threatened and Endangered Species

As previously mentioned, there are several Federal- and state-listed threatened or endangered species as well as species of concern, candidate species, and potentially threatened species that have the potential to occur in proximity to the proposed interior renovation/modification project area. Short-term noise created during renovation/modification activities is not likely to affect threatened or endangered species due to the proximity of construction activities to these species.

No renovation/modification activities would occur within areas where threatened or endangered species have been documented or within their potential habitat. Therefore, there would be no effect on threatened or endangered species or species of concern, candidate species, and potentially threatened species as a result of the renovation/modification associated with the Alternative A on WPAFB.

The foregoing observations concerning aircraft overflights apply equally to wildlife listed as threatened or endangered. Effects on threatened and endangered species as a result of the use of training aircraft within the study area would not be expected due to the AE FTU aircraft expected to represent approximately 5 percent of the annual airfield operations and expecting to be within the typical transient aircraft workload at WPAFB. Alternative A is not likely to jeopardize the continued existence of Federal- or state-listed threatened and endangered species on or in proximity to WPAFB.

As part of the IICEP process for this EA, WPAFB requested concurrence from the USFWS regarding the Proposed Action. The USFWS indicated no objection to the proposed project (**Appendix A**).

Wetlands

Renovation/modification activities under Alternative A would not occur within the vicinity of any wetlands identified on the Base.

No significant short- or long-term impacts are expected to biological resources under Alternative A because proposed activities would take place on previously disturbed areas with no naturally-occurring vegetation, no suitable wildlife habitat, and no wetlands located within the project area.

4.7.2.2 Alternative B - Locating the AE FTU at Facility 20434

Similar to Alternative A, no significant short- or long-term impacts are expected to biological resources under Alternative B because proposed activities would take place on previously disturbed areas with no naturally-occurring vegetation, no suitable wildlife habitat, and no wetlands located within the project area.

4.7.3 No Action

No impacts to biological resources are expected under the No Action alternative.

4.8 Cultural Resources

4.8.1 Evaluation Criteria

Adverse impacts on cultural resources might include: 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; neglecting the resource to the extent that it deteriorates or is destroyed; or the sell, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

4.8.2 Proposed Action

4.8.2.1 Alternative A - Locating the AE FTU at Facility 20840

The most relevant impacts on cultural resources would be related to the direct impacts from ground-disturbing activities. No ground-disturbing activities are planned; therefore, no impacts to cultural resources are expected to occur under Alternative A. There is no potential for degradation of the setting from noise and visual intrusion related to the renovation/modification activities or aircraft operations proposed in this EA, nor are there potential for structural damage from noise and low-frequency sound vibrations associated with the renovation/modification activities or aircraft operations.

No significant short- or long-term impacts are expected to cultural resources under Alternative A because Facility 20840 would involve minor interior renovations and this building is not considered eligible for the NRHP.

4.8.2.2 Alternative B - Locating the AE FTU at Facility 20434

Facility 20434 is considered eligible for listing in the NRHP. Implementing Alternative B would include renovating Facility 20434. The USAF has not received funding to locate the AE FTU at WPAFB, therefore, the extent of interior renovations and detailed designs are not available at this time. Because

this type of activity has the potential to cause effects to Facility 20434 it would require full coordination with the SHPO in accordance with 36 CFR 800.3(b), if this alternative were to be selected. The SHPO evaluation of possible effects to this facility cannot take place at this time because information regarding proposed plans for renovation is not currently available. The USAF has coordinated this information with the SHPO and their response is in **Appendix A**.

Short- and long-term adverse impacts are anticipated to Facility 20434 under Alternative B because proposed interior renovations would cause effects to this NRHP-listed building.

4.8.3 No Action

No impacts to cultural resources are expected under the No Action alternative.

4.9 Socioeconomics

4.9.1 Evaluation Criteria

Elements of the Proposed Action include renovation/modification projects and changes in the number of military, USAF civilian, and contractor personnel. The level of construction expenditure impacts is assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates ten employment positions might be unnoticed in an urban area, but might have adverse impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, they would be considered adverse.

This section identifies potential economic and social impacts that might result from the Proposed Action. The methodology for the economic impact assessment is based on the Economic Impact Forecast System (EIFS) developed by the DoD in the 1970s to efficiently identify and address the regional economic effects of proposed military actions (EIFS 2001). EIFS provides a standardized system to quantify the impact of military actions, and to compare various options or alternatives in a standard, non-arbitrary approach.

The EIFS assesses potential impacts on four principal indicators of regional economic impact: business volume, employment, personal income, and population. As a “first tier” approximation of effects and their significance, these four indicators have proven very effective. The methodology for social impacts is based on the Guidelines and Principles for Social Impact Assessment, developed by an inter-organizational committee of experts in their field (NOAA 1994).

The Proposed Action at WPAFB would have an adverse impact with respect to the socioeconomic conditions in the surrounding MSA if it would:

- Change the local business volume, employment, personal income, or population that exceeds the MSA's historical annual change; and/or
- Negatively affect social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates.

4.9.2 Proposed Action

As part of the Proposed Action, up to 35 instructors are ultimately expected to be counted as part of the AE FTU cadre and administrative program. The proposed increase in personnel is minor in comparison to the approximately 27,000 personnel currently working at WPAFB and is expected to have a negligible effect on the local workforce.

4.9.2.1 Alternative A - Locating the AE FTU at Facility 20840

Alternative A would have no long-term effects on employment, population, personal income, poverty levels, or other demographic or employment indicators in the Dayton–Springfield MSA. The Proposed Action does not involve changes in land use or new development; therefore, no impacts on social conditions are anticipated.

In addition, EO 13045 requires that Federal agencies identify and assess environmental health and safety risks that might disproportionately affect children. Alternative A would not likely pose any adverse or disproportionate environmental health or safety risks to children living in the vicinity of the Base. The likelihood of the presence of children at the site where the Proposed Action would occur on Base is considered minimal, which further limits the potential for effects. Therefore, no adverse effects would be expected.

Modification costs associated with implementing Alternative A in Facility 20840 has not been determined; however, due to the recent construction of this building, minor modification of this building would involve retrofitting existing interior office space.

No significant short- or long-term impacts to socioeconomics are expected under Alternative A because the increase in personnel would be minor in comparison to the existing personnel currently working at WPAFB. In addition, a beneficial impact on the local economy would be expected from revenue generated by construction activities and the addition of a new mission at WPAFB.

4.9.2.2 Alternative B - Locating the AE FTU at Facility 20434

Modification/renovation costs associated with implementing the Proposed Action in Facility 20434 has been estimated at $1.5 million (USAF 2012a), which would have a minor, beneficial impact on the local economy. Construction workers would primarily be drawn from the local workforce, resulting in a short-term, beneficial direct impact on the local economy. Census data for the MSA found 24,578 employees working in the construction industry in 2000 (Bureau of Census 2000a). The number of construction

workers required for the proposed construction projects is very small compared to the available work force in the MSA, and would not impact local employment.

Similar to Alternative A, no significant impacts to socioeconomics are expected under Alternative B.

4.9.3 No Action

No impacts to socioeconomics are expected under the No Action Alternative.

4.10 Environmental Justice

4.10.1 Evaluation Criteria

This section evaluates environmental justice concerns to include disproportionate impacts on low-income or minority populations. The Proposed Action at WPAFB would have an adverse impact with respect to environmental justice in the surrounding MSA if it would disproportionately impact minority populations or low-income populations.

4.10.2 Proposed Action

As discussed in Section 3.10.1, the USAF has issued guidance on Environmental Justice analysis. To comply with EO 12898, ethnicity and poverty status in the study area have been examined and compared to state and national statistics to determine if minority or low-income groups could be disproportionately affected by the Proposed Action. The review indicates that residents living within Census Bureau Tracts 2001, 2002, and 2007 have a lower per capita income, a higher unemployment rate, and a higher percentage of residents living below the poverty level than county or state averages (Bureau of Census 2000a). The review also indicates that the percentage of minority residents is somewhat higher than county or state averages.

Potential adverse effects from the new renovation/modification activities would occur on the Base, with no adverse effects anticipated off-Base. The environment around WPAFB is influenced by USAF operations, land management practices, vehicle traffic, and emissions sources outside the Base. Increased traffic from temporary renovation/modification activities would affect local air quality, but these short-term effects would be dispersed and affect area residents and Base employees equally. The renovation/modification projects would be performed by outside contractors with employees living within Greene County and the ROI. Long-term economic benefits would be minimal because Alternative A would only require up to 35 additional personnel at WPAFB.

4.10.2.1 Alternative A - Locating the AE FTU at Facility 20840

No short- or long-term impacts are expected to low-income or minority populations under Alternative A.

4.10.2.2 Alternative B - Locating the AE FTU at Facility 20434

Similar to Alternative A, no short- or long-term impacts are expected to low-income or minority populations under Alternative B.

4.10.3 No Action

No impacts to low-income or minority populations are expected under the No Action Alternative.

4.11 Infrastructure

4.11.1 Evaluation Criteria

Impacts on infrastructure are evaluated for their potential to disrupt or improve existing levels of service and additional needs for energy and water consumption, sanitary sewer systems, and transportation patterns and circulation. Impacts might arise from physical changes to circulation, construction activities, introduction of construction-related traffic on local roads or changes in daily or peak-hour traffic volumes, and energy needs created by either direct or indirect workforce and population changes related to Base activities.

4.11.2 Proposed Action

Transportation Systems

There would be a temporary increase in use of the Base's roadways as a result of traffic associated with renovation/modification activities. On-Base operations would face short-term minor impacts as a result of increased traffic generation and elevated traffic volumes. Contractors would drive to the project locations and any small equipment would be kept on site during the duration of the project. All damaged Base transportation infrastructure from construction activities on the Base would be repaired.

The number of personnel supporting the AE FTU mission would increase overall Base personnel as a result of Alternative A; this alternative involves the gain of up to 35 personnel. This increase in personnel would increase the amount of personnel on Base by less than one percent, which is minor in comparison to the approximately 27,000 personnel currently working at WPAFB. Therefore, negligible effects on transportation systems would be expected under the Proposed Action.

Electrical Power

Alternative A or B would result in a negligible, if any, net change in the electrical power system.

Natural Gas

Alternatives A or B would result in a negligible, if any, net change in the natural gas system.

Liquid Fuels

Under Alternative A or B, the liquid fuels system would be unchanged to accommodate the training aircraft. Motorized equipment and vehicle operations are estimated to remain nearly unchanged under Alternative A or B.

Water Supply

Alternative A or B would result in a negligible increase of personnel and use of the water supply system resulting in a negligible increase in the demand for water.

Pollution Prevention

It is anticipated that Alternative A or B would not affect the Pollution Prevention Program at WPAFB. Quantities of hazardous material and chemical purchases, off-Base transport of hazardous waste, disposal of MSW, and energy consumption would continue. Operation of training aircraft at WPAFB would require procurement of products containing hazardous materials, generation of hazardous waste, and consumption of energy consistent with the operation of the training aircraft (refer to Section 4.13.2 for further information on quantities of hazardous materials at WPAFB).

Solid Waste

In considering the basis for evaluating the level of impacts on solid waste, several items are considered. These items include evaluating the degree to which the proposed construction/renovation projects would affect the existing solid waste management program and capacity of the area landfill.

Solid waste generated from the proposed renovation/modification activities could consist of building materials such as drywall, ceiling tiles, windows, doors, concrete, metals (conduit, piping, and wiring), and lumber. Contractors are required to recycle construction waste to the greatest extent possible as part of Base policy, and any recycled construction waste would be diverted from landfills.

Long-term changes in solid waste generation due to the operation of the renovated facilities and the decrease in personnel would be minor.

Sanitary Sewer and Wastewater Systems

Alternative A or B would result in a net change in the use of the sanitary sewer system due to the increase in personnel. However, this would have a minor affect on future use of the sanitary sewer system.

Heating and Cooling

Alternative A or B would not result in a net change in heating and cooling systems usage. However, any newly installed refrigerant-containing equipment must utilize only hydrofluorocarbon refrigerants.

Communications

Alternative A or B would not result in a net change in communications systems.

No significant impacts to infrastructure are expected under Alternative A or B.

4.11.3 No Action

No impacts to infrastructure are expected under the No Action Alternative.

4.12 Health and Safety

4.12.1 Evaluation Criteria

Impacts on health and safety are evaluated for their potential to jeopardize the health and safety of Base personnel as well as the surrounding area. Impacts might arise from physical changes in the work environment, construction activities, introduction of construction-related risks, and risks created by either direct or indirect workforce and population changes related to proposed Base activities.

The USAF regulations and procedures promote a safe work environment and guard against hazards to the public. WPAFB programs and day-to-day operations are accomplished according to applicable USAF Federal and state health and safety standards. Most of the activities that will be conducted for the AE FTU program will be in classroom or office settings. These types of activities have minimal risk to health and safety of personnel directly involved in these activities.

Potential impacts were also assessed based on direct effects from aircraft crashes (i.e., damage to aircraft and points of impact), as well as secondary effects, such as fire and environmental contamination. The extent of these secondary effects is situationally dependent and difficult to quantify. For example, there would be a higher risk of fire from aircraft crashes in highly vegetated areas during the winter. As stated in Section 3.12.1, historical mishap databases enable the military to calculate the mishap rates for each type of aircraft. These rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft.

4.12.2 Proposed Action

Fire Hazards and Public Safety

No effects regarding fire hazards or public safety would be expected to occur on Base from renovation/modification projects planned as part of either Alternative A or B.

Aircraft Safety

Negligible adverse effects would be expected as a result of Alternative A or B. Historical data on C-17, C-130, and KC-135 mishaps are presented in **Table 4-6**, **Table 4-7**, and **Table 4-8**, respectively, which

provide statistics from on each aircraft for previous years as well as for the overall lifetime of the aircraft from the beginning of operation of the aircraft.

Table 4-6. Historical Data on C-17 Mishaps (FY91 – FY11)

Year	Class A		Class B		Fatal		Hours Flown	Cumulative Hours[2]
	No.	Rate[1]	No.	Rate[1]	Pilot	All		
FY00	0	0.00	3	5.13	0	0	58,423	224,478
FY01	0	0.00	3	3.70	0	0	81,072	305,550
FY02	2	1.82	10	9.10	0	0	109,878	415,428
FY03	1	0.63	7	4.38	0	0	159,836	575,264
FY04	3	1.92	3	1.92	0	0	156,297	731,561
FY05	6	3.80	10	6.34	0	0	157,753	889,314
FY06	2	1.26	2	1.26	0	0	158,855	1,048,169
FY07	2	1.13	2	1.13	0	0	177,297	1,225,466
FY08	0	0.00	5	2.74	0	0	182,635	1,408,101
FY09	2	0.93	2	0.93	0	0	214,105	1,622,206
FY10	2	0.86	0	0.00	4	4	231,398	1,853,604
FY11	1	0.45	3	1.36	0	0	220,878	2,074,482
Lifetime [2]	24	1.16	53	2.55	4	4	2,074,482	

Source: AFSC 2011

Notes: [1] Rate of mishap per 100,000 hours flown. Statistics from the last 12 years are shown. Cumulative hours represent lifetime mishap record totals from the beginning of C-17 operations (FY91) to present.

Table 4-7. Historical Data on C-130 Mishaps (CY55 – FY11)

Year	Class A		Class B		Fatal		Hours Flown	Cumulative Hours[2]
	No.	Rate[1]	No.	Rate[1]	Pilot	All		
FY00	1	0.37	12	4.42	0	3	271,724	15,248,822
FY01	2	0.73	12	4.40	0	0	272,957	15,521,779
FY02	3	0.94	10	3.12	2	13	320,346	15,842,125
FY03	0	0.00	9	2.70	0	0	333,250	16,175,375
FY04	1	0.31	7	2.18	0	0	320,485	16,495,860
FY05	2	0.66	11	3.63	2	9	303,138	16,798,998
FY06	0	0.00	9	3.21	0	0	280,668	17,079,666
FY07	0	0.00	15	5.59	0	0	268,546	17,348,212
FY08	1	0.39	16	6.24	0	0	256,607	17,604,819
FY09	0	0.00	17	6.98	0	0	243,421	17,848,240
FY10	0	0.00	3	1.19	0	0	252,046	18,100,286
FY11	1	0.40	4	1.60	0	0	249,692	18,349,978
Lifetime [2]	153	0.83	271	1.48	138	638	18,349,978	

Source: AFSC 2012b

Notes: [1] Rate of mishap per 100,000 hours flown. Statistics from the last 12 years are shown. Cumulative hours represent lifetime mishap record totals from the beginning of C-130 operations (CY55) to present.

For the C-17 aircraft, the rate of Class A mishaps per 100,000 hours of flight time is approximately 1.16 and the rate of Class B mishaps is approximately 2.55 mishaps per 100,000 hours of flight time (AFSC 2011).

For the C-130 aircraft, the rate of Class A mishaps per 100,000 hours of flight time is approximately 0.83 and the rate of Class B mishaps is approximately 1.48 mishaps per 100,000 hours of flight time (AFSC 2012).

Table 4-8. Historical Data on KC-135 Mishaps – 5 and 10-Year Averages and Lifetime

Year	Class A		Class B		Fatal		Hours Flown	Cumulative Hours[2]
	No.	Rate[1]	No.	Rate[1]	Pilot	All		
5 YR AVG	0.6	0.25	11.2	4.65	0	0	241,087	N/A
10 YR AVG	1	0.43	16	6.92	0	0	222,602	N/A
Lifetime [2]	82	0.60	185	1.36	134	629	13,562,958	

Source: USAF 2007
Notes: [1] Rate of mishap per 100,000 hours flown. Cumulative hours represent lifetime mishap record totals from the beginning of KC-135 operations (CY57) to FY 07.

For the KC-135 aircraft, the rate of Class A mishaps per 100,000 hours of flight time is approximately 0.60 and the rate of Class B mishaps is approximately 1.36 mishaps per 100,000 hours of flight time (USAF 2007).

Based on Air Traffic Control Tower data from 2011 (WPAFB 2012d), Alternative A would result in an increase in the total number of aircraft operations by approximately 5 percent. Therefore, no adverse effects would be expected as a result of Alternative A.

Bird/Wildlife-Aircraft Strike Hazard

Wright-Patterson Air Force Base is located in proximity to the Mississippi Flyway for migratory birds. The number of bird strikes at WPAFB has declined with the reduction in the number flying missions (WPAFB 2012g). Over the previous ten years, an average of 30 bird strikes per year was reported. More recently, the average number of reported bird strikes has declined to approximately 15 strikes per year.

Under Alternative A, the probability of bird strikes would be expected to increase with the additional sorties associated with flight training. The impact on aircraft safety would be minor because the number of strikes per year is not likely to reach previous levels reported at WPAFB. In addition, the impact would be minor relative to the BASH experience at bases with larger flying missions, such as McConnell AFB, Kansas and Dyess AFB, Texas. These bases average 70 strikes per year.

Continued adherence to the WPAFB BASH Plan would decrease the potential for bird/wildlife-aircraft strikes. Aircraft operations at WPAFB would slightly increase with implementation of the Proposed Action, which would increase the likelihood of bird/wildlife-aircraft strikes. However, no adverse effects would be expected as a result of the Proposed Action with the continued adherence to the WPAFB BASH Plan.

Explosive Safety Zones

No effects on ESZs would occur as a result of the proposed construction/renovation projects because these activities would only involve the interiors of existing buildings. Therefore, no effects on ESZs would occur as a result of either Alternative A or B.

Construction Safety

Short-term minor adverse effects would be expected from proposed renovation/modification activities. Implementation of Alternative A would slightly increase the short-term risk associated with construction contractors performing work at WPAFB during the normal work day because of the increase in construction-related activities.

Contractors would be required to establish and maintain safety programs, and adhere to SOPs. Projects associated with Alternative A would not pose a safety risk to base personnel or to activities at the Base. Proposed renovation projects would enable AMC to meet the future AE FTU mission objectives at the Base, and conduct or meet mission requirements in a safe operating environment. Therefore, no effects would occur as a result of Alternative A due to safeguards existing to protect personnel.

The potential for minor short-term impacts to construction workers during renovation/modification activities would be anticipated under Alternative A or B; however, these impacts would be minimized by adherence to health and safety SOPs. No long-term impacts are expected to health and safety under Alternative A or B.

4.12.3 No Action

No impacts to health and safety are expected under the No Action alternative.

4.13 Hazardous Materials/Waste, Stored Fuels, and ERP Sites

4.13.1 Evaluation Criteria

Impacts to hazardous material management would be considered adverse if the Federal action resulted in noncompliance with applicable Federal and state regulations, or increased the amounts generated or procured beyond current WPAFB waste management procedures and capacities.

Impacts on pollution prevention would be considered adverse if the Federal action resulted in worker, resident, or visitor exposure to these materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on the ERP would be considered adverse if the Federal action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment. Impacts on fuels management would be adverse if the established management policies, procedures, and handling capacities could not accommodate the activities associated with the Proposed Action.

4.13.2 Proposed Action

4.13.2.1 Alternative A - Locating the AE FTU at Facility 20840

Hazardous Materials

Products containing hazardous materials would be procured and used during the proposed renovation/modification projects and subsequent operation of the training aircraft. It is anticipated that the quantity of products containing hazardous materials used during the renovation/modification of existing Base 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. Therefore, hazardous materials management at WPAFB would not be impacted by the proposed renovation/modification activities.

Under Alternative A, procurement of products containing hazardous materials would be comparable to those used for existing aircraft due to the similarity of the maintenance and support activities for the existing and transient aircraft that would be used during training. Each class would utilize two aircraft for two days of flying on two separate occasions. Two additional aircraft would have a negligible impact upon use of hazardous materials. Therefore, it is estimated that hazardous material procurement would remain comparable to the current condition. USAF is pursuing aircraft maintenance procedures that would use fewer hazardous materials.

Hazardous Wastes

It is anticipated that the quantity of hazardous wastes generated from proposed renovation/modification activities would be negligible. Contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations. Construction of the proposed facilities would not impact the Base's hazardous waste management program.

The addition of two AE FTU aircraft that would operate under Alternative A would be negligible. Therefore, it is anticipated that the volume, type, classifications, and sources of hazardous wastes associated with Alternative A would be similar in nature with the baseline condition waste streams. Hazardous waste would be handled, stored, transported, disposed of, or recycled in accordance with the WPAFB Hazardous Waste Management Plan.

Asbestos-Containing Material and Lead-Based Paint

Specifications for the proposed renovation/modification activities and USAF regulations prohibit the use of ACM and LBP for new construction. At this time, it is anticipated that modifications in Facility 20840 would only involve rearranging furniture. Even though Facility 20840 was recently constructed, ACM sampling would be required prior to renovation activities that involve the removal or relocation of any walls, doors, or windows.

Environmental Restoration Program

Implementing the Proposed Action at Facility 20840 would not impact the ERP sites, or any associated remediation efforts, in their vicinity. No proposed renovation/modification projects would be located within OU9 (**Figure 3-12**) and the OU9 site nearest to Facility 20840 (EFDZ6) was determined to need No Further Action (WPAFB 1998). As such, no adverse impact to ERP sites would occur as a result of implementing Alternative A at Facility 20840.

4.13.2.2 Alternative B - Locating the AE FTU at Facility 20434

Facility 20434 would be modified as part of Alternative B and may contain ACM and/or LBP. Interior renovation/modification activities would be handled in accordance with the WPAFB Asbestos Management Plan and LBP Management Plan. The potential for adverse impacts would be minor.

The Facility 20434 location is in proximity to active ERP sites; however, the known contamination at these ERP sites is limited to the immediate vicinity of the release areas as shown in **Figure 3-12**. Therefore, implementing the Proposed Action at Facility 20434 would not impact the ERP sites, or any associated remediation efforts, in their vicinity.

In summary, the potential for short-term adverse impacts from ACM and/or LBP would be expected to be minor under either Alternative A or B because either could be encountered during construction and renovation projects. Impacts would be minimized by surveying the buildings prior to construction and renovation and, if encountered, would follow WPAFB policy for removal and disposal of ACM and/or LBP. No significant long-term impacts are expected to hazardous materials under either Alternative A or B.

4.13.3 No Action

No impacts to hazardous materials/wastes, stored fuels, or ERP sites are expected under the No Action alternative.

4.14 Cumulative Impacts

This section includes an analysis of the potential impacts on WPAFB; unavoidable adverse impacts; the relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity; and irreversible and irretrievable commitments of resources.

The CEQ regulations (40 CFR 1508.7) require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decision making is served by consideration of cumulative impacts resulting from projects that

are proposed, under construction, recently completed, or anticipated to be implemented in the foreseeable future.

Projects proposed for the reasonably foreseeable future that are relevant to the project area include the following projects.

Construction on Runway TWY B North – Construction/runway pavement replacement is scheduled to start in April 2012 and be completed by October 2012.

Glide Slope Corridor Expansion – The expansion of easements associated with the glide slope corridor would also be evaluated in Area A.

Overlay Hanger Parking Area – Proposed plans include removing damaged concrete, providing asphalt overlay, and restriping the parking area in Area A.

Information Technology Center – Proposed new construction project in Area B located west of the Air Force Institute of Technology (AFIT) campus.

Visitor Center – Proposed new construction of visitor's center in the vicinity of Gate 15A in Area A.

These projects, should they be constructed as anticipated, would not be expected to result in any significant cumulative impacts associated with the Proposed Action.

4.15 Unavoidable Adverse Effects

Unavoidable adverse impacts to noise, safety, and energy would result from implementation of the Proposed Action, as described below.

Noise. The noise resulting from anticipated aircraft training operations is an unavoidable condition. Although increased aircraft noise would result from the Proposed Action, the AE FTU training sorties are expected to contribute a small percentage to the overall aircraft operations at WPAFB. Noise is not considered an adverse impact.

Safety. The potential for aircraft mishaps, the potential for accidents or spills at the fuel storage facility, and the generation of hazardous wastes are unavoidable conditions associated with the Proposed Action. However, the potential for these unavoidable situations would not increase over baseline conditions.

Energy. The use of nonrenewable resources is an unavoidable occurrence, although this use is negligible compared with total use of energy. The Proposed Action would require the use of fossil fuels, a

nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action or No Action alternative.

4.16 Relationship of Short-Term Uses and Long-Term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16).

Short-term uses of the biophysical components of man's environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occur over a period of less than 5 years. Long-term uses of human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss. Several kinds of activities could result in short-term resource uses that compromise long-term productivity. Filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

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

In the short-term, relocating the AE FTU program to WPAFB would enhance mission capabilities as well as increase efficiency by consolidating the program to a centralized location. The Proposed Action would result in long-term productivity because AMC would provide rapid, global mobility and sustainment for America's armed forces and provide an administrative and training facility. A universal qualification training facility is needed to accommodate the AE FTU program.

4.17 Irreversible and Irretrievable Commitments of Resources

The CEQ regulations in 40 CFR 1502.16 require that an agency identify any irreversible or irretrievable commitments of resources that would be involved in implementing Alternative A or B under the Proposed Action, should either be implemented.

The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of material resources, energy resources, and human resources. The use of these resources is considered to be permanent.

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame (e.g., energy and minerals).

Material Resources. Material resources used for the Proposed Action include building materials for renovation of facilities. Most materials that would be consumed are not in short supply and would not limit other unrelated construction activities.

Energy Resources. Energy resources used for the Proposed Action would be irretrievably lost. These include petroleum-based products, such as gasoline, jet fuel, diesel, natural gas, and electricity. During renovation, gasoline/diesel/electricity would be used for the operation of construction equipment. During operation, gasoline would be used for the operation of private and government-owned vehicles. Natural gas and electricity would be used by operational activities. Consumption of these energy resources would not place an overburdening demand on their regional availability.

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

5.0 LIST OF PREPARERS

This EA has been prepared under the direction of the 88 ABW/CEAOR. The individuals who contributed to the preparation of this document are listed below.

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6.0 LIST OF PERSONS CONTACTED

Several persons were contacted or consulted during the preparation of the EA. The persons contacted are listed below:

Name	Role	Affiliation
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WPAFB 2012c — Personal communication between Mr. Zach Olds (88 ABW/CEANQ) and Ms. Natalie Baum (Shaw Environmental & Infrastructure, Inc.) concerning deicing procedures. March 2012.

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WPAFB 2012e — Personal communication between MSgt. Travis Utz (88 OSS/OSAF) and Mr. Tim Rust (Shaw Environmental & Infrastructure, Inc.) concerning air traffic data. January 2012.

WPAFB 2012f — Personal communication between Ms. JoLynn Anderson (88 ABW/CEAOR) and Ms. Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.) concerning noise contour analysis. March 2012.

WPAFB 2012g — Personal communication between Mr. Mark Hohn (88 ABW/SEF) and Ms. Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.) concerning bird aircraft strike statistics and BASH Plan. March 2012.

WPAFB 2012h — Personal communication between Mr. David Snook (88 ABW/CEPD) and Ms. Cynthia Hassan (Shaw Environmental & Infrastructure, Inc.) concerning AE FTU space requirements. April 2012.

Appendix A

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) Correspondence

Miami Conservancy District Consultation Letters:

1. **WPAFB Request – 12Mar12**
2. **MCD Response – 15Mar12**

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

12 March 2012

88 ABW/CEANQ
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

Mr. Kurt Rinehart
Miami Conservancy District
38 E. Monument Avenue
Dayton, OH 45402

Dear Mr. Rinehart

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Assessment (EA) in accordance with the requirements of the National Environmental Policy Act of 1969 to address environmental impacts associated with the proposal to locate the Aeromedical Evacuation Formal Training Unit (AE FTU) facility at WPAFB. This EA will evaluate proposed facility and administrative modifications as well as operational changes to existing training regimes and flight mission operations specific to the AE FTU program. The purpose of this letter is to notify you of this proposal and request your evaluation of potential impacts of this project on the Miami Conservancy District. The geographic location of the proposed project area is Greene County, in Section 12, Range 7, Township 2 (39°47' North, 84°5' West) as shown on Figure 1.

Background

AE originated in the USAF in the late 1940's as a humane way of transporting and treating injured patients in-flight. The mission is to provide rapid, global mobility and sustainment for America's armed forces. The AE program is coordinated by the Air Mobility Command (AMC) at Scott Air Force Base (AFB). The AMC is proposing to combine flight training and medical training in one location. The USAF School of Aerospace Medicine (USAFSAM) is currently a tenant at Building 20840 in Area B at WPAFB and is the premier institute for research, education, and worldwide operational consultation in Aerospace Medicine. USAFSAM's established organizational mission at WPAFB would enable the consolidation of USAFSAM and AE training.

Proposed Action

The Proposed Action consists of two parts: facility/administrative modifications to existing WPAFB buildings to accommodate the AE FTU mission, and classroom and flight training operations for AE personnel. As currently proposed, to accommodate administrative function and classroom training, interior modifications only to either Building 20840 (Figure 2) or Building 20434 (Figure 3) at WPAFB would be required. No new facility construction or exterior demolition activities are planned. Neither of these buildings are located in the floodplain or retarding basin. To accommodate flight training

operations training flights would use C-130, KC-135, and/or C-17 aircraft on WPAFB's airfield located in Area A. These aircraft would be transient flights (not permanently stationed at WPAFB) and the proposed total number of flights would be 480 sorties per year. A sortie is a single military aircraft flight from initial takeoff through final landing.

Since the proposed activities would be limited to existing structures and areas of previous disturbance, request your concurrence that there would be no impacts to the floodplain or retarding basin.

Thank you for your consideration. If you have questions, please contact me at (937) 257-4857 or by email at Darryn.Warner@wpafb.af.mil.

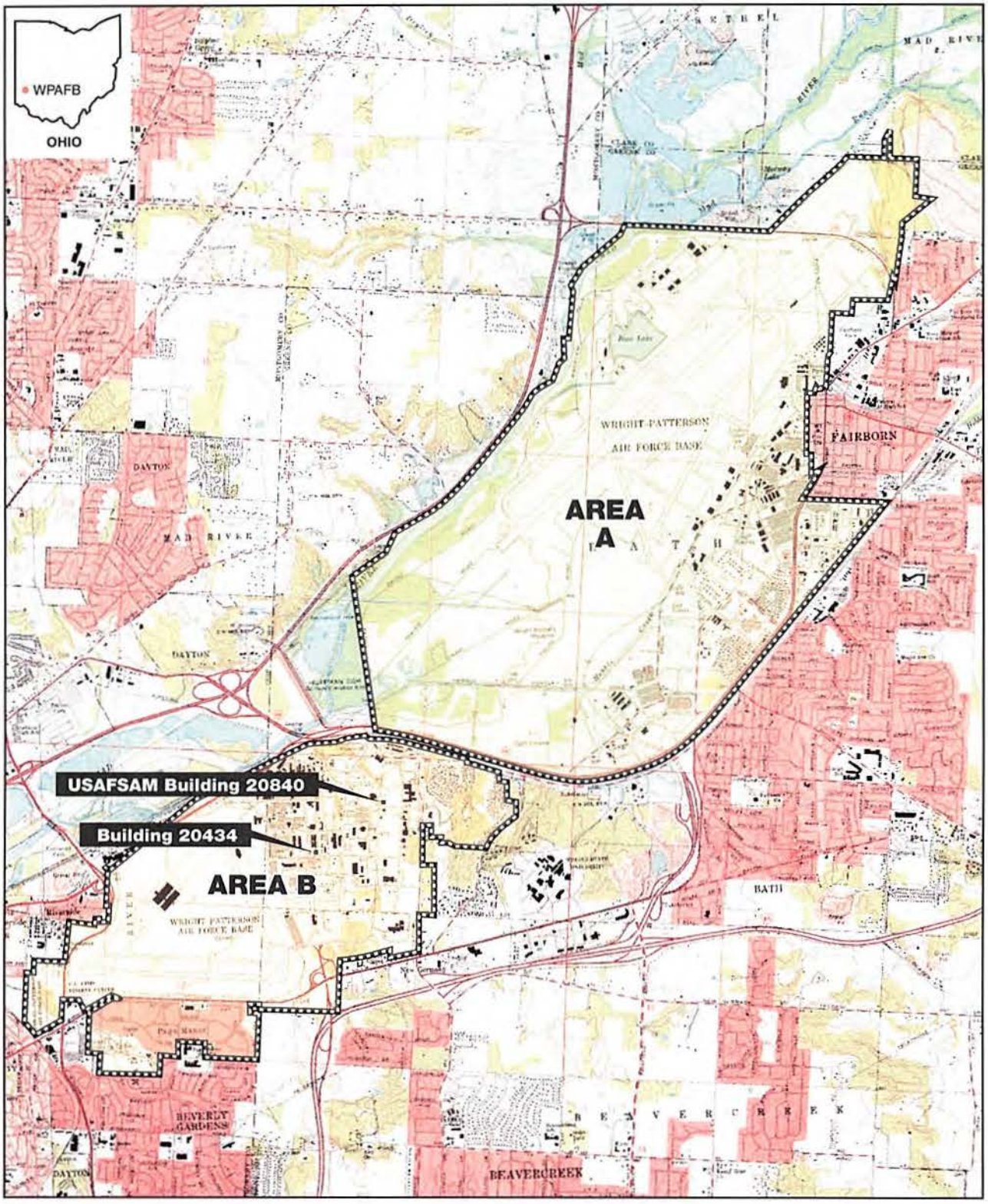
Sincerely

DARRYN M. WARNER
Natural Resources Program Manager
Environmental Quality Section

Attachments:
1. USGS Quadrangle Map
2. GIS Figures - Building 20840
3. GIS Figures - Building 20434

cc:
Karen Beason (88 ABW/CEAOR, WPAFB)
Cynthia A. Hassan (Shaw Environmental & Infrastructure. Inc.)

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	10/28/11	--	JIS	SB	CH	s-144169.0401-2/12-w



WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1
Location of WPAFB and Surrounding Area

Figures 2 and 3 of the 12Mar12 letter are available upon request, contact:

Asset Management Division
Environmental Quality Section
88 ABW/CEANQ
Natural Resources Program Manager
Wright-Patterson AFB
(937) 257-4857

MIAMI CONSERVANCY DISTRICT

BOARD OF DIRECTORS
William E. Lukens
Gayle B. Price, Jr.
Mark G. Rentschler

GENERAL MANAGER
Janet M. Bly

March 15, 2012

Mr. Darryn Warner
88 ABW/CEANQ
1450 Littrell Road, Building 22
Wright-Patterson AFB, OH 45433-5209

Re: Huffman Retarding Basin, WPAFB, Locate facilities

Dear Mr. Warner:

We have reviewed the proposed development of the 88 ABW/CEANQ to locate the Aeromedical Evacuation Formal Training Unit (AE FTU) facility at WPAFB to evaluate proposed facility and administrative modifications.

As most of the proposed development is located below the spillway elevation of the Huffman Dam, the proposed development will have no impact on the retarding basin.

Thank you for the opportunity to review your proposed development.

If you have any further questions or need additional information, please contact me at (937) 223-1278, ext. 3230.

Sincerely,

Roxanne H. Farrier
Property Administrator

cc: Kurt Rinehart

38 E. Monument Avenue • Dayton, Ohio 45402-1265 • 937-223-1271 • Fax 937-223-4730

Ohio Department of Natural Resources Consultation Letters:

1. **Shaw Request – 15Mar12**
2. **ODNR Response – 28Mar12**

Shaw Environmental & Infrastructure, Inc.
5050 Section Avenue
Cincinnati, OH 45212
513.782.4700
Fax: 513.782.4807

Shaw Environmental & Infrastructure, Inc.

March 15, 2012

Ms. Debbie Woischke
Ohio Department of Natural Resources
Division of Wildlife
Ohio Biodiversity Database Program
2045 Morse Road, Building G-3
Columbus, Ohio 43229-6693

Subject: Rare Species Data Request and Informal Consultation
Environmental Assessment for the Aeromedical Evacuation Formal Training Unit
Wright-Patterson Air Force Base, Ohio

Dear Ms. Woischke:

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Assessment (EA) in accordance with the requirements of the National Environmental Policy Act of 1969 to address environmental impacts associated with the proposal to locate the Aeromedical Evacuation Formal Training Unit (AE FTU) facility at WPAFB. This EA will evaluate proposed facility and administrative modifications as well as operational changes to existing training regimes and flight mission operations specific to the AE FTU program. The purpose of this letter is to notify you of the proposal and request information from the National Heritage Program for State and Federally-listed threatened or endangered plants and animals in the vicinity of the project area.

The geographic location of the proposed project area is Greene County, in Section 12, Range 7, Township 2 (39°47' North, 84°5' West) as shown on **Figure 1**.

Background

AE originated in the USAF in the late 1940's as a humane way of transporting and treating injured patients in-flight. The mission is to provide rapid, global mobility and sustainment for America's armed forces. The AE program is coordinated by the Air Mobility Command (AMC) at Scott Air Force Base (AFB). The AMC is proposing to combine flight training and medical training in one location. The USAF School of Aerospace Medicine (USAFSAM) is currently a tenant at Building 20840 in Area B at WPAFB and is the premier institute for research, education, and worldwide operational consultation in Aerospace Medicine. USAFSAM's established organizational mission at WPAFB would enable the consolidation of USAFSAM and AE training.

Proposed Action

The Proposed Action consists of two parts: facility/administrative modifications to existing WPAFB buildings to accommodate the AE FTU mission, and classroom and flight training operations for AE personnel. As currently proposed, to accommodate administrative function and classroom training, interior modifications only to either Building 20840 (**Figure 2**) or Building 20434 (**Figure 3**) at WPAFB would be required. No new facility construction or exterior demolition activities are planned. To accommodate flight training operations, training flights would use C-130, KC-135, and/or C-17 aircraft on WPAFB's airfield located in Area A. These aircraft would be transient flights (not permanently stationed at WPAFB) and the proposed total number of flights would be 480 sorties per year. A sortie is a single military aircraft flight from initial takeoff through final landing.

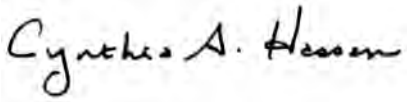
WPAFB has determined four Federally-listed endangered species: Indiana bat (*Myotis sodalis*), Clubshell mussel (*Pleurobema clava*), Snuffbox mussel (*Epioblasma triquerta*), and Rayed bean mussel (*Villosa fabalis*) are known to or may occur on WPAFB. The Eastern massasauga rattlesnake (*Sistrurus catenatus*), a Federal candidate species, may also occur on WPAFB. Based on our review, no other threatened, endangered, proposed, or candidate species are known to or may occur in the project area. No critical habitat has been designated or proposed for WPAFB.

Since the proposed activities would be limited to existing structures and areas of previous disturbance, we request your concurrence that there would be no impacts to State or Federally-listed threatened or endangered plants and animals.

The form for the data request is attached. We would appreciate information from your database that applies to our project area. Please let us know if you concur with the no effect determination. Please contact me at 513/782-4967 or by email at Cindy.Hassan@shawgrp.com if you have any questions. Thank you for your consideration.

Sincerely,

SHAW ENVIRONMENTAL & INFRASTRUCTURE, INC.



Cynthia A. Hassan
Project Manager

cc: Karen Beason (88 ABW/CEAOR, WPAFB)

Enclosures: USGS Quadrangle Map
GIS Figures
Ohio Biodiversity Database Program Data Request Form

DATA REQUEST FORM

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
OHIO BIODIVERSITY DATABASE PROGRAM
2045 MORSE RD., BLDG. G-3
COLUMBUS, OHIO 43229-6693
PHONE: 614-265-6452; FAX: 614-267-3096

INSTRUCTIONS:
Please complete both sides of this form, sign and return it to the address or fax number given above along with: **(1)** a brief letter describing your project, and **(2)** a map detailing the boundaries of your project site. A copy of the pertinent portion of a USGS 7.5 minute topographic map is preferred but other maps are acceptable. Our turnaround time is two weeks, although we can often respond more quickly. If you fax in your request you do not need to mail the original unless otherwise requested.

FEES:
As of June 2010, we have temporarily suspended charging a fee until a review of the data request process has been completed.

WHAT WE PROVIDE: The Biodiversity Database is the most comprehensive source of information on the location of Ohio's rare species and significant natural features. Records for the following will be provided: plants and animals (state and federal listed species), high quality plant communities, geologic features, breeding animal concentrations and unprotected significant natural areas. We also provide locations for managed areas including federal, state, county, local and non-profit sites, as well as state and national scenic rivers. A minimum one mile radius around the project site will automatically be searched. Because the data is sensitive information, it is our policy to provide only the data needed to complete your project.

****

Date: March 15, 2012

Company name: Shaw Environmental & Infrastructure, Inc.

Name of person response letter should be addressed to: Mr. Ms. X

Cindy Hassan, Project Manager

Address: 5050 Section Avenue

City/State/Zip: Cincinnati, Ohio 45212-2025

Phone: 513/782-4967 Fax: 513/782-4663

E-mail address: Cindy.Hassan@shawgrp.com

Project Name: Environmental Assessment for the Aeromedical Evacuation Formal Training Unit, Wright-Patterson AFB, Ohio

Project Number: _____

Project Site Address: Buildings 20434 and 20840 in Area B at Wright-Patterson Air Force Base

Project County: Greene

Project City/Township: Fairborn / Bath

Project site is located on the following USGS 7.5 minute topographic quad(s): _____

Fairborn Quad, Section 12, Range 7, Township 2 / 39°47' North, 84°5' West

Description of work to be performed at the project site: Renovation/modification activities associated with locating the Aeromedical Evacuation Formal Training Unit facilities and training operations to WPAFB.

How do you want your data reported? (Both formats provide exactly the same data. The only difference is in the format of our response. The manual search is most appropriate for small scale projects or for those who do not have GIS capabilities. Please choose only one option.)

Printed list and map (manual search) __X__ **OR** GIS shapefile (computer search) _____

Additional information you require: For the Indiana bat, include information with a five-mile radius of the project areas.

How will the information be used? The name, status and location of each species will be published in an environmental assessment that is being performed to satisfy requirements under the National Environmental Policy Act (NEPA).

I certify that data supplied by the Ohio Biodiversity Database Program will not be published without crediting the ODNR Division of Wildlife as the source of the material. In addition, I certify that electronic datasets will not be distributed to others without the consent of the Division of Wildlife, Ohio Biodiversity Program.

Signature: Cynthia A. Hansen

Date: March 15, 2012

DNR 5203
REV 8/2010

Ohio Department of Natural Resources
JOHN R. KASICH, GOVERNOR
JAMES ZEHRINGER, DIRECTOR

Ohio Division of Wildlife
Scott Zody, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

March 28, 2012

Ms. Cynthia Hassan
Shaw Environmental & Infrastructure, Inc.
5050 Section Avenue
Cincinnati, OH 45212-2025

Dear Ms. Hassan

After reviewing the Biodiversity Database, I find the Division of Wildlife has no records of rare or endangered species in the Environmental Assessment for the Aeromedical Evacuation Formal Training Unit Wright Patterson AFB project area, including a one mile radius, in area B of Wright-Patterson Air Force Base, in Bath Township, Greene County, Ohio. We are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, parks or forests or other protected natural areas within a one mile radius of the project area.

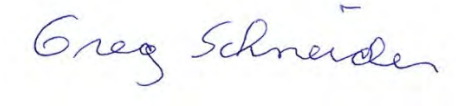
I have also performed a search for Indiana Bat (Myotis sodalis, state endangered, federal endangered) capture sites within a five mile radius and hibernacula within a ten mile radius of the project site. There is a capture record within five miles of your project area. However, please note that we no longer give out specific location data on this sensitive species. Since your project is within the range of the Indiana Bat (Myotis sodalis), we offer these comments. The following species of trees have relatively high value as potential Indiana bat roost trees: Shagbark Hickory (Carya ovata), Shellbark Hickory (Carya laciniosa), Bitternut Hickory (Carya cordiformis), Black Ash (Fraxinus nigra), Green Ash (Fraxinus pennsylvanica), White Ash (Fraxinus americana), Shingle Oak (Quercus imbricaria), Northern Red Oak (Quercus rubra), Slippery Elm (Ulmus rubra), American Elm (Ulmus americana), Eastern Cottonwood (Populus deltoides), Silver Maple (Acer saccharinum), Sassafras (Sassafras albidum), Post Oak (Quercus stellata) and White Oak (Quercus alba). Indiana Bat habitat consists of suitable trees that include dead and dying trees of the species listed above with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees of the species listed above with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. If suitable trees occur within the project area, these trees must be conserved. If suitable habitat occurs on the project area and trees must be cut, cutting must occur between September 30 and April 1. If suitable trees must be cut during the summer months of April 2 to September 29, a net survey must be conducted in May or June prior to cutting. If no tree removal is proposed, the project is not likely to impact this species.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although we inventory all types of plant communities, we only maintain records on the highest quality areas.

This letter only represents a review of rare species and natural features data within the Ohio Biodiversity Database. It does not fulfill coordination under the National Environmental Policy Act (NEPA) or the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S. C. 661 et seq).and does not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Please contact me at 614-265-6452 if I can be of further assistance.

Sincerely,



Greg Schneider, Administrator
Ohio Biodiversity Database Program

U.S. Fish & Wildlife Service Consultation Letters:

1. WPAFB Request – 15Mar12
2. USFWS Response – 03Apr12

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

15 March 2012

88 ABW/CEANQ
1450 Littrell Road, Building 22
Wright-Patterson AFB OH 45433-5209

Dr. Mary Knapp
U.S. Fish and Wildlife Service
4625 Morse Rd., Suite 104
Columbus, OH 43230

Dear Dr. Knapp

Wright Patterson Air Force Base (WPAFB) is preparing an Environmental Assessment (EA) in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 to address environmental impacts associated with the proposal to locate the Aeromedical Evacuation Formal Training Unit (AE FTU) facility at Wright Patterson Air Force Base (WPAFB). This EA will evaluate proposed facility and administrative modifications as well as operational changes to existing training regimes and flight mission operations specific to the AE FTU program. WPAFB is seeking informal consultation with the U.S. Fish and Wildlife Service in compliance with Section 7 of the Endangered Species Act regarding the proposal.

The geographic location of the proposed project area is Greene County, in Section 12, Range 7, Township 2 (39°47' North, 84°5' West) as shown on Figure 1.

Proposed Action

The Proposed Action consists of two parts: facility/administrative modifications to existing WPAFB buildings to accommodate the AE FTU mission, and classroom and flight training operations for AE personnel. As currently proposed, to accommodate administrative function and classroom training, interior modifications only to either Building 20840 (Figure 2) or Building 20434 (Figure 3) at WPAFB would be required. No new facility construction or exterior demolition activities are planned. To accommodate flight training operations, training flights would use C-130, KC-135, and/or C-17 aircraft on WPAFB's airfield located in Area A. These aircraft would be transient flights (not permanently stationed at WPAFB) and the proposed total number of flights would be 480 sorties per year. A sortie is a single military aircraft flight from initial takeoff through final landing.

WPAFB has determined four federally listed endangered species: Indiana bat (*Myotis sodalis*), Clubshell mussel (*Pleurobema clava*), Snuffbox mussel (*Epioblasma triquerta*) and Rayed bean mussel (*Villosa fabalis*) are known to or may occur on WPAFB. The Eastern massasauga rattlesnake (*Sistrurus catenatus*), a federal candidate species, may also occur on WPAFB. Based on our review of the February 2012 revised list for Greene and Montgomery counties (www.fws.gov/midwest/endangered/ section7/ sppranges /ohio-cty.html), no other threatened, endangered, proposed, or candidate species are known to or may occur in the project area. No critical habitat has been designated or proposed for WPAFB.

Printed On Recycled Paper

Because the project area is not within suitable habitat nor will any potential habitat be disturbed, no listed species would be directly or indirectly impacted. Furthermore, there are no impacts to trees and/or wetlands or other native habitat that supports the above listed species. WPAFB has therefore determined the proposed project will have no effect on listed species and further consultation with your office is not necessary. Your written concurrence with this determination of no effect is, however, requested.

Thank you for your assistance. If there are any questions or additional detail is needed, please contact me by telephone at 937-257-4857 or by e-mail at darryn.warner@wpafb.ar.mil.

Sincerely

DARRYN M. WARNER
Natural Resources Program Manager
Environmental Quality Section
Environmental Branch

Attachments:
1. USGS Quadrangle Map
2. GIS Figures- Building 20840
3. GIS Figures- Building 20434

cc:
Karen Beason (88 ABW/CEAOR, WPAFB)
Cynthia A. Hassan (Shaw Environmental & Infrastructure, Inc.)

Figures of the 15Mar12 letter are available upon request, contact:

Asset Management Division
Environmental Quality Section
88 ABW/CEANQ
Natural Resources Program Manager
Wright-Patterson AFB
(937) 257-4857

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

April 3, 2012

Darryn M. Warner - Natural Resources Program Manager
Environmental Quality Section/Environmental Branch
88 ABW/CEANQ
1450 Littrell Road, Bldg. 22
Wright-Patterson AFB OH 45433-5209

Reference: Aeromedical Evacuation Formal Training Unit Facility

Dear Mr. Warner, TAILS: 03E15000-2012-TA-0600

We have received your recent correspondence requesting information about the subject proposal. There are no Federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the project area. Based on the information you have provided, at this time we have no objection to the proposed project.

ENDANGERED SPECIES COMMENTS: Due to the project type, size, and location, we do not anticipate any impact on federally listed endangered, threatened, or candidate species, or their habitats. Should the project design change, or during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be initiated to assess any potential impacts.

If you have additional questions or require further assistance with your project proposal, please contact me at the following number (614) 416-8993 x12. I would be happy to discuss the project in further detail with you and provide additional assistance if necessary. In addition, you can find more information on natural resources in Ohio, and a County list of federally threatened and endangered species in Ohio, by visiting our homepage at: http://www.fws.gov/midwest/ohio.

Sincerely,

for Mary Knapp, Ph.D.
Field Supervisor

Ohio Historic Preservation Office Consultation Letters:

1. **WPAFB Request – 23Mar12**
2. **OHPO Response – 11Apr12**

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 88TH AIR BASE WING (AFMC)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

23 March 2012

Paul F. Woodruff, CRM
88 ABW/CEANQ
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Mr. Mark Epstein
Department Head, Resource Protection & Review
Ohio Historic Preservation Office
1982 Velma Ave
Columbus OH 43211-2497

Dear Mr. Epstein

Wright-Patterson Air Force Base (WPAFB) is preparing an Environmental Assessment (EA) in accordance with the requirements of the National Environmental Policy Act of 1969 to address environmental impacts associated with the proposal to locate the Aeromedical Evacuation Flight Training Unit (AE FTU) facility at WPAFB. This EA will evaluate proposed facility and administrative modifications as well as operational changes to existing training regimes and flight mission operations specific to the AE FTU program. It is our opinion that no historic properties will be affected by the proposed action (Alternative A). However, Alternative B has the potential to cause adverse effects on Facility 20434 which is eligible for listing on the National Register of Historic Places. In accordance with 36 CFR 800.11(e), we are submitting the following documentation.

Description of the undertaking. The Proposed Action consists of two parts: facility/administrative modifications to existing WPAFB buildings to accommodate the AE FTU mission, and classroom and flight training operations for AE personnel. As currently proposed, to accommodate administrative function and classroom training, interior modifications only to either Building 20840 or Building 20434 at WPAFB would be required. No new facility construction or exterior demolition activities are planned. To accommodate flight training operations, training flights would use C-130, KC-135, and/or C-17 aircraft on WPAFB's airfield located in Area A. These aircraft would be transient flights (not permanently stationed at WPAFB) and the proposed total number of flights would be 480 sorties per year. A sortie is a single military aircraft flight from initial takeoff through final landing. The Area of Potential Effects (APE) has been determined to be the area within and adjacent to Buildings 20840 and 20434, and the area of the active airfield located in Area A.

Alternative A

Alternative A consists of co-locating the AE FTU with USAFSAM at Building 20840 in Area B at WPAFB (Attachment 1, Figure 2). Building 20840 was recently constructed as a new Base Realignment and Closing (BRAC) facility completed in 2011, and is currently occupied by USAFSAM. This facility would be modified to accommodate the facility/administrative requirements and training operations for AE personnel as described above for the Proposed Action. As currently proposed, modifications would only be made to the interior of Building 20840. Flight training operations would involve the 480 transient flights per year.

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Alternative B

Alternative B consists of locating the AE FTU at Building 20434 in Area B at WPAFB (Attachment 1, Figure 3). Facility 20434 is currently unoccupied; however, this facility would need to be renovated and/or modified to accommodate one classroom, the testing lab, procedures examination room, and the medical storage area. As part of this alternative, some training activities would be carried out in two classrooms and the two training devices currently located in Building 20840. As currently proposed, renovation/modifications would only be made to the interior of Building 20434. Flight training operations would involve the 480 transient flights per year.

No Action Alternative

Under the No Action Alternative, there would be no change in the current AE flight training program and Air Mobility Command personnel would not be transferred from Pope Air Force Base to WPAFB. In addition, no centralized AE FTU facility would exist, training would continue to be conducted within each of the 32 AE squadrons, and the continued inefficient use of training devices and resources would result.

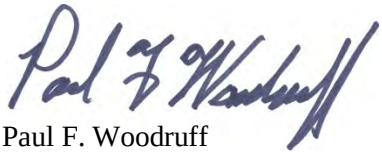
Description of steps taken to identify historic properties. WPAFB has assessed all buildings on the installation that are 50 years old or older, and has assessed buildings for exceptional significance relating to the Cold War. Facility 20840 is a new BRAC facility completed in 2011and as such is not eligible for the National Register. As part of the *Integrated Cultural Resources Management Plan* at WPAFB, surveys have been conducted encompassing the entire Base to locate historic and prehistoric archaeological sites. There are currently no known eligible or potentially eligible archaeological sites within the areas of potential effects for this undertaking. Numerous archaeological surveys have been conducted at WPAFB beginning in the 1990's with the US Army Corps of Engineers Research Lab and continuing with various other contractors resulting in identification of eligible and non-eligible sites (Attachment 2, 2011 WPAFB-ICRMP maps). Facility 20434 was completed in 1955. A history of the Flight Dynamics Laboratory indicates that this building was originally a gunnery laboratory and then became vacant. It was taken over in the late 1950s by the Flight Control Laboratory. The building housed flight simulators and was the site of research that contributed to the development of controls for the Apollo space vehicles. At a later date, the simulators and research laboratories were removed from the building, and offices were installed in most of the building. Corridors have original concrete walls and ceilings with pre-1970 steel doors. Some of the office spaces of the building have been recently remodeled and contain plasterboard walls, acoustical drop ceilings, and carpeted floors. Overall, the exterior of the building retains its original concrete surface textures and the original pattern of openings on all sides except the rear west elevation. Facility 20434 is eligible for listing on the National Register of Historic Places for Cold War significance. This determination was made on January 25, 1999. The Ohio Historic Inventory form is enclosed as Attachment 3.

Description of the undertaking's effects on historic properties. It is our opinion that the 480 training flights per year required for either alternative would not have an impact on historic properties. This number of flights represents a very small percentage increase compared to the overall number occurring each year, which averages approximately 20,000 per year. It is also our opinion that Alternative A would result in no historic properties affected, since Facility 20840 is not historic and there are no other historic resources in the area of this building. It is noted that until the USAF has officially been funded to locate the AE FTU mission at WPAFB, no scope will be written for interior renovations, and therefore, no design will occur until funding is in place for the AE FTU mission. As such, detailed designs are not available at this time. Therefore it is not possible to evaluate Alternative B for its effects on Facility

20434 at this time. However, it is our opinion that Alternative B, as described, is a type of activity that does have the potential to cause effects to Facility 20434, and would require full coordination with the State Historic Preservation Office in accordance with 36 CFR 800.3(b), if this alternative were to be chosen. In accordance with 36 CR 800.1(c) timing: the Section 106 process must be complete for Alternative B, prior to the approval of the expenditure of any federal funds on the undertaking (i.e. award of contract), if Alternative B would become the preferred alternative.

Please review the information we have provided and let us know whether you concur with the determinations of effects outlined above. Should you have questions, I can be reached at (937) 257-1374, or via email at paul.woodruff@wpafb.af.mil.

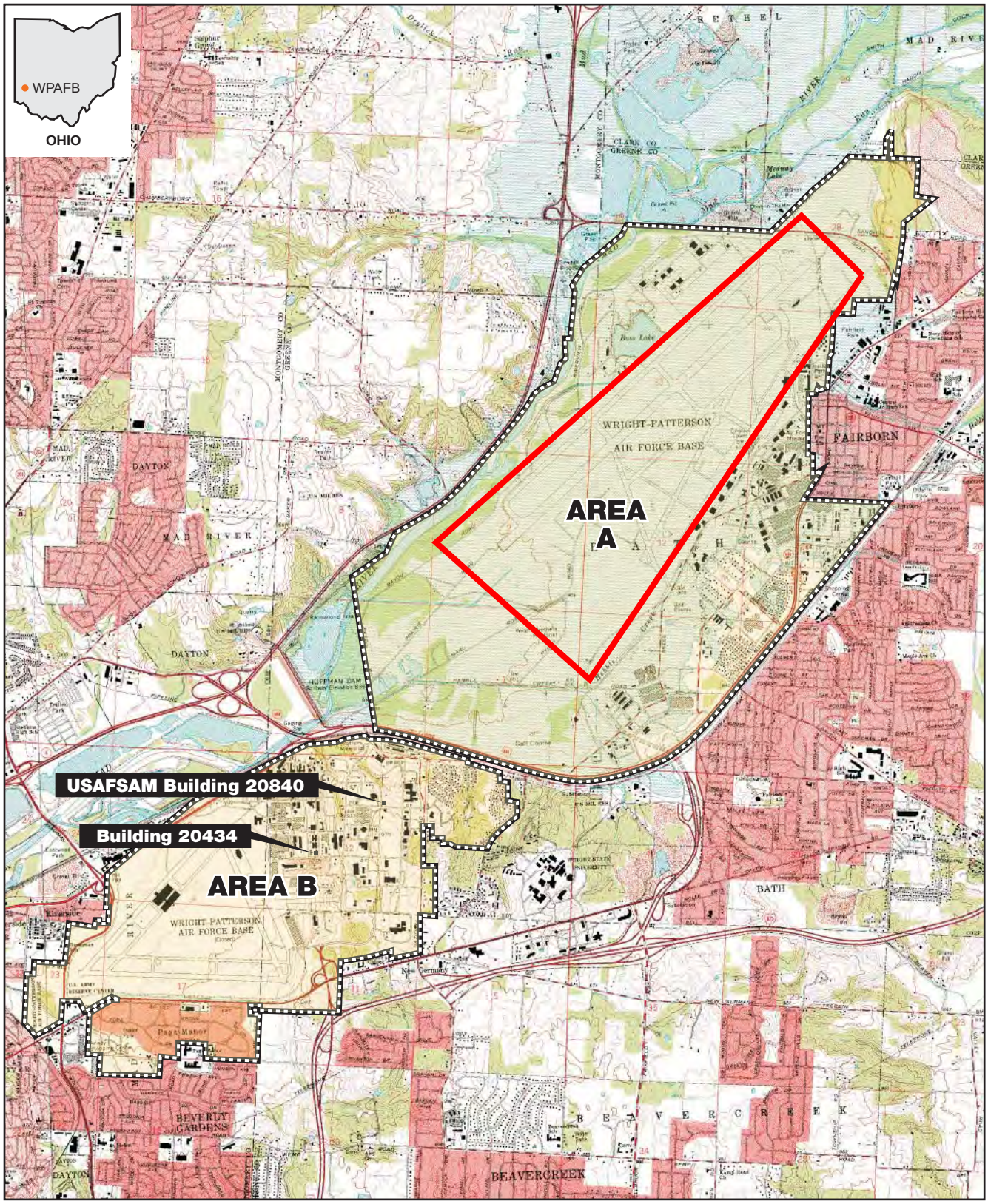
Sincerely



Paul F. Woodruff
Cultural Resources Manager
Environmental Quality Section
Environmental Branch

Attachments:
1. Mapping
2. WPAFB 2011 ICRMP Archaeology Mapping
3. Ohio Historic Inventory Form

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
Cincinnati, OH	10/28/11	--	JJS	SB	CH	s-144169.0401-2/12-w



Area of Potential Effects

N

0 .5 1 mile

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Figure 1
Location of WPAFB and Surrounding Area

Figures 2 and 3, ICRMP Archaeology Mapping, and Ohio Historic Inventory Forms of the 23Mar12 letter are available upon request*, contact:

Asset Management Division
Environmental Quality Section
88 ABW/CEANQ
Cultural Resources Manager
Wright-Patterson AFB
(937) 257-1374

***Following confidentiality requirements under Air Force Instruction 32-7065 (02Nov09; Section 4.4) and pertinent authorities protecting cultural resources.**

OHIO HISTORY

April 11, 2012

Paul Woodruff, Cultural Resources Manager
Environmental Quality Section
Environmental Branch
88 ABW/CEANQ
1450 Littrell Road
Wright-Patterson AFB OH 45433-5209

Re: Consideration of Alternatives: Interior Rehabilitation of Building 20840 or Building 20434, Wright Patterson Air Force Base, Dayton, Greene County, Ohio

Dear Mr. Woodruff,

This is in response to correspondence from your office dated March 26, 2012 (received February 9, 2012), regarding the above referenced undertaking. Comments of the Ohio Historic Preservation Office (OHPO) are offered under provisions of the National Historic Preservation Act of 1966, as amended (16 USC 470 with implementing regulations at 36 CFR 800).

Wright-Patterson Air Force Base (WPAFB) is considering rehabilitating the interior of either Building 20840 (Alternative A) or Building 20434 (Alternative B) to accommodate the relocation of the Aeromedical Evacuation Flight Training Unit (AE FTU) to WPAFB. You have requested the comments of the Ohio Historic Preservation Office (OHPO) regarding the effects of the proposed project alternatives on historic properties.

Building 20840 was constructed in 2011. Your project submission states that Alternative A would include only interior modifications to this building to accommodate the facility and administrative requirements of the AE FTU. Since Building 20840 is not eligible for the National Register of Historic Places (NRHP) and the proposed work would not be visible from neighboring historic properties, Alternative A would not affect historic properties.

Building 20434, however, constructed in 1955, has been determined to be eligible for listing in the NRHP for its Cold War significance. Alternative B calls for the interior rehabilitation of this historic property to accommodate AE FTU functions. No information is provided regarding the nature of the proposed work and, as a result, we are unable to determine if it would conform to the Secretary of the Interior's *Standards for Rehabilitation*. As you state in your letter, it is impossible to make a determination regarding Alternative B's effects on historic properties without a scope of work.

Both Alternative A and Alternative B also involve the introduction of 480 additional transient flights per year at WPAFB as part of the AE FTU's flight training operations. Based on the small percentage of this increase in comparison to the current number of flights occurring at WPAFB, which you state to be approximately 20,000 per year, we concur that these additional transient flights would not affect historic properties.

OHIO HISTORICAL SOCIETY
Ohio Historic Preservation Office
1982 Velma Avenue, Columbus, Ohio 43211-2497 ph: 614.298.2000 fx: 614.298.2037
www.ohiohistory.org

We will complete our review of this undertaking when more information is provided regarding the proposed scope of work. If you have any questions, please contact me by phone at (614) 298-2000 or by email at jbertram@ohiohistory.org. Thank you.

Sincerely,

JBertram

Jamie Bertram, Project Reviews Manager
Resource Protection and Review

2012-GRE-19964
OHPO Serno#1043583

Appendix B

Clean Air Act
General Conformity Analysis

EXECUTIVE SUMMARY

Agencies: U.S. Air Force (USAF), Air Mobility Command (AMC), Scott Air Force Base (AFB), Illinois and 88th Air Base Wing (88 ABW), Wright-Patterson AFB, Ohio

Designation: Clean Air Act General Conformity Analysis

Affected Location: Wright-Patterson AFB, Ohio

Proposed Action: Establish the Aeromedical Evacuation (EA) Formal Training Unit (FTU) mission to Wright-Patterson AFB

Abstract: AMC is proposing to establish the AE FTU mission to Wright-Patterson AFB, Ohio. Currently, no Mobility Air Force (MAF) AE FTU exists with the exception of the AFRC AE FTU at Pope Air Field (AF), North Carolina. A universal qualification training facility is needed to accommodate the AE FTU program, which currently consists of 32 AE units: 4 Active Duty (AD), 18 AFRC, and 10 National Guard Bureau (NGB). The Proposed Action would provide the necessary base infrastructure modifications, flight operations, and personnel changes to enable Wright-Patterson AFB to consolidate and utilize the existing USAF School of Aerospace Medicine (USAFSAM) training devices and resources in order to have a universal qualification training mission conducted at one location and have a standardized curriculum and standardized qualifications.

The Proposed Action at Wright-Patterson AFB would be located in the Dayton-Springfield Metropolitan Area, which is currently designated as a "maintenance" area for attainment with the National Ambient Air Quality Standard (NAAQS) for ozone (O_3; both 1-hour and 8-hour standards) (OEPA 2010a-c). In addition, the area is classified for very fine particulate matter ($PM_{2.5}$) as attainment with the 24-hour standard and nonattainment for the annual standard (OEPA 2010a-c).

The USEPA recently proposed new NAAQS for several criteria pollutants including O_3 (March 2008), lead (Pb; November 2008), nitrogen dioxide (NO_2; February 2010), and sulfur dioxide (SO_2; June 2010) (USEPA 2008a, b); (USEPA 2010a, c). The USEPA recently designated the new NO2 NAAQS to unclassifiable/attainment effective February 29, 2012 (USEPA 2012). The USEPA and Ohio EPA have not yet completed effective designations for the remaining pollutants as of the date of this conformity applicability analysis (OEPA 2010a-c). Redesignation of the Dayton-Springfield Metropolitan Area as nonattainment for any of these standards during the execution of the Proposed Actions has no statutory impact on this Conformity Analysis because Section 6 of 176.c of the CAAA states that Conformity does not take effect until one year after the effective date of a nonattainment designation (40 CFR 93.153(k)).

Based upon the conformity applicability criteria requirements, and the current attainment status of the areas affected by Wright-Patterson AFB operations, this conformity analysis focuses upon potential air emissions of O_3 precursors, [i.e., volatile organic compounds (VOCs) and nitrogen oxides (NO_x)], $PM_{2.5}$ direct emissions, and $PM_{2.5}$ precursors (i.e. SO_2 and NO_x). This analysis does

not address the pollutants for which affected areas are in "attainment" – sulfur oxides (SO_x), nitrogen dioxide (NO_2), carbon monoxide (CO), fine particulate matter (PM_{10}), and lead (Pb).

Emissions of VOC, NO_x, $PM_{2.5}$, and SO_2 in the vicinity of Wright-Patterson AFB (Metropolitan Dayton Intrastate Air Quality Control Region [AQCR]) are all not expected to interfere with the Ohio SIP maintenance plans as a result of the Proposed Action.

The conformity analysis completed for this project concluded that the Proposed Action at Wright-Patterson AFB will not be required to conduct a conformity determination under the requirements of the Federal Conformity Rule. Emissions estimates attached to this analysis predict that emission levels of all criteria pollutants for any calendar year of the proposed project would fall below the 100 tons per year *de minimis* thresholds of VOC, NO_x, $PM_{2.5}$, and SO_2 for triggering a formal Conformity determination, as defined in 40 CFR 93.153(b). The General Conformity Regional Significance threshold no longer applies because it was deleted in the revised Federal General Conformity rules promulgated on April 4, 2010 (USEPA 2010b).

Conformity Analysis:

After careful and thorough consideration of the facts contained herein, and following consideration of the views of those agencies having jurisdiction by law or special expertise with respect to air quality impacts and the SIP, the project proponent finds that the proposed Federal actions are consistent with the objectives as set forth in Section 176(c) of the Clean Air Act (CAA), as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State and Local Implementation Plans, and said actions conform to the applicable SIP in accordance with the law.

The conformity analysis is based upon the total direct and indirect emissions associated with the proposed establishment of the AE FTU mission to Wright-Patterson AFB, Ohio. Future activity levels and aircraft operations associated with Wright-Patterson AFB addressed by this action may differ from those analyzed in this conformity analysis. If the Proposed Action is changed so that there would be a change in the total direct and indirect emissions reported in this analysis, a new conformity analysis must be performed.

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B.1. Introduction

The Clean Air Act Amendments (CAAA) of 1990 require Federal agencies to ensure that their actions conform to the applicable State Implementation Plan (SIP). The SIP is a U.S. Environmental Protection Agency (USEPA)-approved plan developed by state or local agencies. It provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS). The SIP includes emission limitations, rules, schedules, and specific control measures to attain and maintain the NAAQS. Conformity to a SIP, as defined in the Clean Air Act (CAA), means conforming to the SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of such standards.

As a Federal agency and proponent of a "Federal Action," the U.S. Air Force (USAF) must complete a conformity analysis to determine whether the establishment of the AE FTU and associated regulated pollutant emissions at Wright-Patterson AFB would conform to the Ohio SIP. The Proposed Action consists of two parts: facility/administrative modifications to existing WPAFB buildings to accommodate the AE FTU mission; and training operations for AE personnel. One project alternative includes locating the AE FTU with the USAFSAM in Facility 20840 (Alternative A) which includes limited interior renovations. For the other project alternative, Facility 20434 may be utilized for the AE FTU (Alternative B) which would include significant interior renovations. Airfield operations would increase by up to 480 sorties by transient C-130, KC-135, or C-17 aircraft as required for personnel training and support missions. Personnel authorizations would increase by 31 for the full-time instructors and administrative staff with the potential for four additional positions in the future. As many as 400 transient personnel would be trained each year. All elements of the Proposed Action could affect areas covered by the SIP, so a conformity analysis is required.

B.1.1 Background

The CAA and CAAA were passed by Congress and corresponding rules were promulgated by USEPA because it has been determined that certain pollutants have the potential to cause an adverse effect on public health and the environment when certain concentrations are exceeded in ambient air. In order to control and regulate these "criteria pollutants" and better maintain healthful air, NAAQS were established for seven criteria pollutants. These pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur oxides (SO_x), and lead (Pb). Ozone is not typically emitted directly from emission sources, but rather is formed in the atmosphere by photochemical reactions involving sunlight and other emitted pollutants, or "ozone precursors."

These ozone precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs), which are emitted directly from a wide range of stationary and mobile sources. Therefore, O_3 concentrations in the atmosphere are controlled through limiting the emissions of NO_x and VOCs. $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable $PM_{2.5}$ can include SO_2, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there The States in developing SIP revisions must determine which precursors are considered significant for $PM_{2.5}$ formation. In the draft Ohio SIP revisions proposed on April 24, 2009, Ohio EPA included in the definition of "$PM_{2.5}$ precursor" that $PM_{2.5}$ precursors include sulfur dioxide and nitrogen oxides in OAC Rule 3745-31-01(UUUU) draft 04/24/2009.

Air quality conformity provisions first appeared in the CAA of 1977. These provisions stated that no Federal agency could engage in; support in any way; provide financial assistance for; license, permit, or approve any activity that did not conform to a SIP after approval and promulgation. Section 176(c) (42 United States Code 7506c) of the CAA, as amended in 1990, further explained conformity to an implementation plan as meaning conformity to the plan's purpose of eliminating or reducing the severity of violations of the NAAQS, and achieving timely attainment of these standards. In November 1993, USEPA promulgated regulations and requirements that clarify the applicability, procedures, and analyses necessary to ensure that Federal facilities comply with the CAA.

In establishing the Final General Conformity Rule, USEPA requires Federal agencies to evaluate a proposed Federal action and ensure that it does not:

1. Cause a new violation of a NAAQS
2. Contribute to an increase in the frequency or severity of violations of NAAQS
3. Delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS

The General Conformity Rule requires that Federal agencies consider total direct and indirect emissions of criteria pollutants. Conformity must be shown for those pollutants (or precursors) emitted in areas designated as nonattainment for those pollutants as well as pollutants for which an area has been redesignated from nonattainment to attainment (i.e., a maintenance area).

The Conformity Rule requires that Federal agencies do a conformity applicability analysis to determine whether a formal conformity determination is required. The primary criteria used in an applicability analysis are the *de minimis* thresholds. The total direct and indirect emissions associated

with a proposed action are compared to the *de minimis* threshold levels promulgated in 40 Code of Federal Regulations (CFR), 93.153(b). **Table B-1** below presents the applicable *de minimis* thresholds under the General Conformity Rule.

Table B-1. General Conformity Rule *de minimis* Emission Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
Ozone (measured as NO_x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/ maintenance	All	100
Particulate Matter (PM_{10})	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not applicable	100
Sulfur Dioxide (SO_2)	Nonattainment/ maintenance	Not applicable	100
Nitrogen Oxides (NO_2)	Nonattainment/ maintenance	Not applicable	100
Lead (PB)	Nonattainment/ maintenance	All	25

Source: 40 CFR 93.153
tpy: tons per year

When applicable, another required analysis is a comparison of the Federal action's emissions to any existing SIP emission budgets that have been established specifically for the Federal facility or the affected region. If the action would cause an increase in emissions such that the established SIP emissions budgets would be exceeded, a formal conformity determination and other applicable rule requirements would apply. In the case of Wright-Patterson AFB, there is no facility-specific emissions budget in the Ohio SIP.

B.1.2 Purpose

The purpose of this general conformity analysis is to document the USAF's compliance with CAA requirements in accordance with 40 CFR 93 subpart B and Ohio Administrative Code, Rule 3745-102. This conformity analysis will analyze the air quality impact of emissions of nonattainment pollutants (i.e., NO_x, VOC, $PM_{2.5}$, and SO_2) resulting from the proposed Federal action in order to determine whether the Proposed Action will be subject to these Federal and state conformity rules.

B.1.3 Document Organization

The remainder of Section B.1 presents the purpose and background for the document, describes the proposed project at Wright-Patterson AFB and summarizes the existing air quality conditions in the region. Section B.2 of this analysis outlines the regulatory requirements of the General Conformity Rule and their relationships to this Conformity Analysis.

Section B.3 details the applicability of the conformity rule to the proposed AE FTU establishment project at Wright-Patterson AFB. Section B.4 provides the conformity analysis results for the Proposed Action. Finally, the emissions estimations attached to this analysis detail the calculation methodologies and results used for this conformity analysis.

B.1.4 Existing Air Quality

Air Basins/Air Quality Control Regions

Wright-Patterson AFB is located in Greene and Montgomery counties, Ohio, which are in the Metropolitan Dayton Intrastate Air Quality Control Region (AQCR). The Metropolitan Dayton AQCR consists of the counties of Clark, Greene, Miami, Montgomery, Darke, and Preble.

Air quality resources in the Metropolitan Dayton AQCR are managed by the Ohio Environmental Protection Agency (OEPA), Division of Air Pollution Control (DAPC). Local permitting of stationary air emissions sources is delegated to the Regional Air Pollution Control Agency (RAPCA) in Dayton. Ambient air quality for the Metropolitan Dayton Intrastate AQCR was formerly classified as a maintenance area for the 1-hour O_3 and 8-hour O_3 (1997) standards and is classified as a nonattainment area for the annual $PM_{2.5}$ NAAQS (USEPA 2005); (USEPA 2007). For the annual $PM_{2.5}$ NAAQS, OEPA has proposed redesignation to "attainment" (maintenance area) (March 2011), however, that action has no impact on this conformity analysis (OEPA 2011a). Except as noted in the following paragraph, the Metropolitan Dayton Intrastate AQCR is designated as an

unclassifiable/attainment area for all other criteria pollutants, which include SO_x, PM_{10}, CO, NO_2, and Pb.

Ambient Air Quality Attainment Designations for Affected Air Quality Control Region

The USEPA recently proposed new NAAQS standards for several criteria pollutants including O_3 (March 2008), Pb (November 2008), NO_2 (February 2010), and SO_2 (June 2010) (USEPA 2008a, b); (USEPA 2010a, c). The USEPA formally designated the area to unclassifiable/attainment for the new NO_2 NAAQS effective February 29, 2012 (USEPA 2012). The USEPA and Ohio EPA have not completed effective area designations for the remaining pollutants as of the date of this conformity applicability analysis (OEPA 2010a, b); (OEPA 2010). For the new 1-hr SO_2 NAAQS, the OEPA published a draft report in April, 2011 recommending that Greene County be designated as "unclassified" (OEPA 2011b). Redesignation of the Dayton-Springfield Metropolitan Area as nonattainment for any of these standards during the execution of the Proposed Action has no statutory impact on this Conformity Analysis. Furthermore, the recently revised General Conformity Rule included new *de minimis* thresholds for $PM_{2.5}$ and did not change the other pollutant thresholds (USEPA 2010b). This is because the General Conformity *de minimis* thresholds correspond to the CAAA Title V Major Stationary Source emissions thresholds for each nonattainment classification. The new Major Stationary Source emission threshold for "basic" nonattainment with the 8-hour O_3 standard is 100 tons per year. Therefore, assuming that the General Conformity Rule follows this precedent when updated, the General Conformity *de minimis* thresholds for NO_x, VOC, $PM_{2.5}$, and SO_2 in the Dayton-Springfield Metropolitan Area would be expected to remain at 100 tpy for the next several years.

Nonattainment Pollutants

Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants (mainly VOCs and NO_x) and sunlight. A brown odorless gas, O_3 can cause irritation of the respiratory tract in humans and animals, and can damage vegetation. The maximum effect of the precursor emissions on O_3 formation may be many miles from the source because O_3 is a by-product of a photochemical reaction.

$PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Precursors of condensable $PM_{2.5}$ can include SO_2, NO_x, VOC, and ammonia. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there. Health studies have shown a significant association between exposure to fine particles

and premature death from heart and lung disease. Fine particles can aggravate heart and lung diseases and have been linked to effects such as: cardiovascular symptoms; cardiac arrhythmias; heart attacks; respiratory symptoms; asthma attacks; and bronchitis. These effects can result in increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days.

State Implementation Plan

In accordance with Federal and state CAA requirements, the OEPA and all agencies responsible for CAA implementation in nonattainment areas must develop and implement a plan to reduce and maintain regulated air pollution levels that are less than the NAAQS. On April 24, 2009, Ohio EPA completed draft amendments to several rules in OAC Rule 3745-31 and OAC Rule 3745-17-08 rules related to Federal changes affecting the implementation of $PM_{2.5}$. On December 9, 2009, Ohio EPA drafted new rules and amended several rules in OAC Rule 3745-21, OAC Rule 3745-72, and OAC Rule 3745-110 intended to assist in achieving and maintaining the NAAQS for O_3 through the control of O_3 precursors. A portion of these draft rules have become SIP approved by the USEPA as of the completion of this applicability determination, though others are still under review. The current list of effective rules is maintained by Ohio EPA on its air pollution control website at http://epa.ohio.gov/Default.aspx?tabid=2906. Ohio EPA additionally maintains a current listing of area attainment status on its website at http://www.epa.ohio.gov/dapc/general/naaqs.aspx.

B.2. GENERAL CONFORMITY DETERMINATION REQUIREMENTS

B.2.1 Regulatory Background

USEPA has promulgated rules that establish the conformity determination criteria and procedures for Federal actions, pursuant to Section 176(c) of the CAA. The General Conformity Rule (40 CFR Part 93, Subpart B) defines the "general" conformity criteria and procedures for Federal agencies that propose to implement non-transportation projects. The Ohio Administrative Code Rule 3745-102 contains the General Conformity Rules promulgated by the state of Ohio. These Ohio rules essentially mirror the Federal requirements of the Federal General Conformity Rule; however, the most recent revisions to the Federal General Conformity Rule that became final on April 5, 2010 (75 FR 17274) have not been incorporated into the Ohio SIP as of the date of this applicability analysis.

The General Conformity Rule applies to Federal actions in areas that are failing to meet one or more of the Federal air quality standards (designated as nonattainment areas), and/or areas that are subject to attainment maintenance plans (designated as maintenance areas). As noted in Section B.1, the Proposed Action would be located in the Metropolitan Dayton AQCR in Ohio. This AQCR has been designated a maintenance area for O_3 and non-attainment for $PM_{2.5}$. The AQCR is in attainment with NAAQS for each of the other criteria pollutants. This conformity applicability analysis will evaluate the conformity of the Proposed Action emissions of O_3 precursors (NO_x and VOC), direct $PM_{2.5}$, and indirect $PM_{2.5}$ precursors (SO_2 and NO_x) in the affected region. The following subsections describe the General Conformity Rule procedures and criteria, and how they specifically pertain to this conformity analysis.

B.2.2 Exemptions and Applicability

Source Exemptions

The general conformity provisions identify specific Federal actions or portions of actions that are exempt from the conformity procedural requirement, because the USEPA has deemed these actions to conform. These actions include those that must undergo air quality analysis to comply with other statutory requirements; actions that would result in no emission increase or an increase in emissions that is clearly *de minimis*; or actions presumed to conform by the agency through separate rule-making actions. These exemptions include the transfer of ownership of real property under 40 CFR 93.153(c)(2)(xiv and xx), as well as leasing agreements pending environmental restoration under 40 CFR 93.153(c)(2)(xix).

The only source exemption potentially applicable to the USAF's Proposed Action for establishing the AE FTU at Wright-Patterson AFB is the exemption for major or minor new or modified *stationary* sources, which are subject to permits under OEPA's New Source Review (NSR) program or Prevention of Significant Deterioration (PSD) program (40 CFR 93.153(d)(1)). No new or modified stationary sources included in this Proposed Action are anticipated to require a permit.

De minimis Emission Levels

In addition to the specific source exemptions identified in the conformity rule, Federal actions might be exempt from the conformity requirements if the action meets the applicability criteria for *de minimis* emission levels. The applicability determination procedures presented in the rule include the following elements:

- Define the applicable emission sources for the Federal action
- Quantify the total direct and indirect emissions of nonattainment pollutants from these sources
- Compare these emission rates against the appropriate *de minimis* emission levels

If the total direct and indirect emissions of nonattainment pollutants reach or exceed these applicability threshold values, a Conformity Determination must be prepared by the Federal agency before undertaking the action.

The conformity rule defines direct and indirect emissions based upon the timing and location of the emissions. "Direct" emissions are those that are caused or initiated by the Federal actions, and occur at the same time and place as the action and are reasonably foreseeable. "Indirect" emissions are those that originate in the same nonattainment or maintenance area, but occur at a different time or place from the Federal action. In addition, the conformity rule limits the scope of indirect emissions to those that are *reasonably foreseeable* by the agency at the time of analysis, and those emissions that the Federal agency can practicably control and maintain control of through its continuing program responsibility.

The definitions of direct and indirect emissions do not distinguish among specific source categories; point, area, and mobile sources are given equal consideration in the conformity requirements. All substantive procedural requirements of the General Conformity Rule apply to the total of the net increases and decreases in direct and indirect emissions resulting from the action.

If the total of direct and indirect emissions from the action meet or exceed the *de minimis*, the agency must perform a conformity determination to demonstrate the positive conformity of the Federal action. The *de minimis* emission levels vary by the criteria pollutant and the severity of the region's nonattainment conditions.

Section B.3 presents the specific emission thresholds and the applicability analysis results for the USAF's Proposed Action to establish the AE FTU at Wright-Patterson AFB.

B.2.3 CAA General Conformity Criteria

If the Proposed Action is not exempt from the conformity demonstration requirements, the General Conformity Rule defines conformity and provides five basic criteria to determine whether a Federal action conforms to an applicable SIP. These criteria assess conformity based upon emission analyses and/or dispersion modeling for the nonattainment pollutants. If the Federal action meets the conformity criteria and requirements, the action is demonstrated to conform to the applicable SIP. If the action cannot meet the criteria and requirements, the agency must develop an enforceable implementation plan to mitigate effectively (e.g., completely offset) the increased emissions from the Proposed Action to meet the conformity requirements. The Federal action cannot proceed unless positive conformity can be demonstrated.

The General Conformity Rule provides the option to select any one of several criteria to analyze the conformity of the Proposed Action. Presented in 40 CFR 93.158, the criteria are primarily based upon the type of pollutant and the status of the applicable SIP. If the applicability analysis concludes that further conformity analyses are required to demonstrate positive conformity (i.e., *de minimis* thresholds are exceeded) the following conformity criteria (paraphrased below) can be used to demonstrate conformity for a proposed action in a nonattainment area:

- The total direct and indirect emissions for the Proposed Action are specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration. [40 CFR 93.158(a)(1)].
- The total direct and indirect emissions of O_3 precursors are fully offset within the same nonattainment or maintenance area through a revision to the applicable SIP or a similarly enforceable measure so that there is a no net increase in emissions [40 CFR 93.158(a)(2)].
- The State has made a revision to the area's attainment or maintenance demonstration after 1990 and the State either:

- Determines and documents that the action, together with all other emissions in the nonattainment (or maintenance) area, *would not* exceed the emissions budget specified in the applicable SIP.
- Determines that the action, together with all other emissions in the nonattainment (or maintenance) area, *would* exceed the emissions budget specified in the applicable SIP but the State's Governor or designee for SIP actions makes a written commitment to the USEPA to demonstrate CAA conformity through specific measures and scheduled actions [40 CFR 93.158(a)(5)(i)(A & B)].

- The Federal action fully offsets its entire emissions within the same nonattainment area through a revision to the SIP or a similar measure so that there is no net increase in nonattainment pollutant emissions [40 CFR 93.158(a)(5)(iii)].
- The State has not made a revision to the approved SIP since 1990, and the total emissions from the action do not increase emissions above the baseline emissions which are either:
  - Calendar Year 1990 (CY 90) emissions or another calendar year that was the basis for the nonattainment area designation) [40 CFR 93.158(a)(5)(iv)(A)].
  - Historic activity levels and emissions calculated for future years using appropriate emission factors and methods for future years.
- Dispersion modeling analysis demonstrates that direct and indirect emissions from the Federal action will not cause or contribute to violations of Federal ambient air quality standards [40 CFR 93.158(b)].

The USEPA revised the general conformity regulation on April 5, 2010 (USEPA 2010). One of the changes to the regulation relates to the determination of regional significant action. The USEPA deleted the provision of the then existing regulation (40 CFR 93.153) that requires Federal agencies to conduct conformity determinations for regional significant actions where the direct and indirect emissions of any pollutant represent 10 percent or more of a nonattainment or maintenance area's emission inventory for that pollutant. It applied even though the total direct and indirect emissions from the actions are below the *de minimis* emission levels or the actions are otherwise "presumed to conform." The OEPA is revising its general conformity rule to be consistent with the revised Federal regulation (USEPA 2010c).

B.2.4 Other State Implementation Plan Consistency Requirements

The conformity analysis must also demonstrate that total direct and indirect emissions from the Proposed Action will be consistent with the applicable SIP requirements and milestones, including:

- Reasonable further progress schedules
- Assumptions specified in the attainment or maintenance demonstration
- SIP prohibitions, numerical emissions limits, and work practice requirements

B.3. APPLICABILITY ANALYSIS

This section of the conformity analysis describes the applicability analysis of the proposed establishment of the AE FTU at Wright-Patterson AFB to the General Conformity Rule requirements.

B.3.1 Sources Included in the Conformity Analysis

In accordance with the General Conformity Rule, total direct and indirect emissions resulting from proposed Federal action includes several types of stationary and mobile sources. These emissions would occur during renovation and anticipated operational training conditions with the Proposed Action. As defined by the rule and applied to the Proposed Action at Wright-Patterson AFB, direct emissions would result from emissions sources not subject to air permitting as well as proposed increases in flight operations. Examples of direct emissions sources include renovation activities, aerospace ground equipment (AGE) devices, and flight operations. Indirect pollutant emissions for the proposed project include activities that the USAF can control as part of the Federal action and include government-owned vehicles (GOVs) and privately-owned vehicles (POVs), and various military support activities at the base.

B.3.2 Total Direct and Indirect Emission Calculations

The detailed estimates of the changes in nonattainment and maintenance area pollutant emissions that would result from implementation of the Proposed Action at Wright-Patterson AFB are presented in the attachment of this Appendix. These calculations are based on the maximum number of training classes, aircraft sorties, class size, and staffing requirements anticipated annually for full implementation of the EA FTU. The resulting analyses indicate that the majority of the potential pollutant impacts would result from three elements of the Proposed Action: (1) renovation activities, (2) airfield operations at Wright-Patterson AFB, and (3) commuter traffic from motor vehicles. The changes in direct and indirect VOC, NO_x, $PM_{2.5}$, and SO_2 emissions from these elements of the Proposed Action are presented below.

Renovation Activities

AMC has identified two possible facilities to locate the AE FTU at Wright-Patterson AFB. Alternative A involves interior redesign of Facility 20840 for office cubicle space. The renovation activities alone have negligible potential to emit air pollutants because no painting or building construction is anticipated. Pollutant emissions would result from worker commuter traffic and truck deliveries that would occur during the renovation phase execution of Alternative A.

Alternative B involves major interior redesign of Facility 20434 that includes at a minimum new carpet, ceiling tiles, relocation of interior walls, painting, and a new roof. VOC evaporative emissions would occur due to building interior painting. All criteria pollutants would also be emitted during renovation as combustion by-products from diesel-fueled trucks that would be used for hauling materials. The construction worker commuter traffic emissions are also accounted.

Table B-2 presents the estimated annual emissions of the nonattainment and maintenance area pollutants generated during renovation activities at Wright-Patterson AFB. These emissions only occur during the first year of operation and are not recurring for future years.

Table B-2. Renovation Activity Emissions Associated with the Proposed Action Alternatives A and B at Wright-Patterson AFB

Alternative	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Alternative A	0.002	0.008	0.048	0.0001
Alternative B	0.176	1.23	0.256	0.09

tpy: tons per year

Airfield Flight Operations

The training curricula for the AE FTU include 48 flight hours per class at two hours per flight for an annual total of 480 sorties. The primary aircraft used will be the C-130; however, both the KC-135 and C-17 may be utilized on a provisional basis. The aircraft are considered transient to Wright-Patterson AFB; therefore, emissions only result from the landing and takeoff cycle (LTOs) and the ground operation of the auxiliary power unit (APU), if applicable. The transient aircraft add 80 additional annual LTOs to the number of training sorties due to the initial arrival and final departures of the aircraft participating in the training missions. All criteria pollutants are emitted from both operations as by-products of fuel combustion.

Aircraft support operations include operation of the aerospace ground equipment (AGE). The equipment assigned to each aircraft and the operation duration was determined from generic information published by the Air Force Center for Engineering and the Environment (AFCEE). The Proposed Action does not include any special airfield ground support requirements. All criteria pollutants are emitted from both operations as by-products of fuel combustion.

Table B-3 presents estimated annual potential airfield operations emissions of nonattainment and maintenance area pollutants as a result of the Proposed Action. Because any combination of the three

proposed aircraft can be utilized, these emissions represent the maximum worst case pollutant-by-pollutant emissions potential for each year the AE FTU operates.

Table B-3. Military Airfield Operation Emissions Associated with the Proposed Action Alternatives A and B at Wright-Patterson AFB

Alternative	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Alternative A	2.54	29.50	0.76	2.64
Alternative B	2.54	29.50	0.76	2.64

tpy: tons per year

For the purposes of this analysis, an air pollutant 'mixing height' of 3,000 feet above ground level (AGL) has been assumed. That is, aircraft emissions released above this altitude are not considered to have any impact on ground-level air quality. All in-flight training is assumed to occur outside the mixing zone; therefore, airfield activity emissions are tabulated from the ground up to 3,000 feet AGL which is factored into the LTO cycle times.

Motor Vehicle Emissions

Motor vehicle emissions include commuter emissions associated with the changes in permanent program staff (i.e., instructors and administrative staff), and transient student transportation. Commuter vehicle emissions associated with temporary renovation workers and activities are included in the renovation emissions in **Table B-2** above.

The Proposed Action is expected to require 31 additional permanent program staff and handle up to 400 transient students annually. The primary difference between the Proposed Action's Alternative A and Alternative B is that daily transport of the students between Facilities 20434 and 20840 is included in the calculations. **Table B-4** below lists the projected nonattainment and maintenance area pollutant emissions for commuter and student transport motor vehicle and roadway surface emissions under the Proposed Action Alternatives.

Table B-4. Motor Vehicle Emissions Associated with the Proposed Action Alternatives A and B at Wright-Patterson AFB

Alternative	VOC (tpy)	NO_x (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)
Alternative A	0.08	0.35	1.10	0.003
Alternative B	0.08	0.36	1.12	0.003

tpy: tons per year

B.3.3 Applicability Analysis Results

Wright-Patterson AFB Operations

Table B-5 sums the Proposed Action emissions changes from **Tables B-2 through B-4** above, and compares those impacts to the applicable General Conformity *de minimis* thresholds. The results of the applicability analysis indicate that total cumulative peak year direct and indirect emissions at Wright-Patterson AFB (i.e., the sum of renovation, airfield operations, and transportation) within the Metropolitan Dayton Intrastate AQCR would *not* exceed the 100 tpy *de minimis* for any of the criteria pollutants of concern. Therefore, state and Federal General Conformity rules are not applicable, and no conformity determination is required for this Proposed Action.

Table B-5. Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOC), Fine Particulate Matter ($PM_{2.5}$), and Sulfur Dioxide (SO_2) Emissions – Comparison to Conformity *de minimis* Thresholds for Metropolitan Dayton Intrastate Air Quality Control Region

Criteria Pollutant	Ozone Attainment Status [1]	*de minimis* Threshold (tpy)	Alternative A Emissions Net Change [2] (tpy)	Alternative B Emissions Net Change [2] (tpy)
NO_x (as O_3 precursor)	Maintenance	100	29.85	31.09
VOC	Maintenance	100	2.62	2.80
$PM_{2.5}$	Nonattainment	100	1.90	2.12
SO_2 (as $PM_{2.5}$ precursor)	Nonattainment	100	2.64	2.73
NO_x (as $PM_{2.5}$ precursor)	Nonattainment	100	29.85	31.09

[1] There are no NO_x (NO_2) or SO_2 nonattainment areas at this time. The *de minimis* threshold for NO_x and SO_2 emissions is defined by the ozone and $PM_{2.5}$ attainment statuses respectively.

[2] Net emissions change corresponds to the first full year of training plus renovation activities. Future years of training for all pollutants of concern will be less.

tpy: tons per year

B.4. CONFORMITY ANALYSIS AND RESULTS

This section presents the conclusion of the conformity analysis for the proposed establishment of the AE FTU at Wright-Patterson AFB. The purpose of this analysis is to determine whether the USAF's Proposed Action at Wright-Patterson AFB would conform to the applicable SIP, based upon the criteria established in the General Conformity Rule and promulgated in 40 CFR 93.158.

The regulatory basis and specific criteria for this analysis were presented in Section B.2 above. This Section B.4 presents the results of the conformity analysis for the following criterion:

> *A Conformity Determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal Action would equal or exceed any of the (de minimis) rates.[40 CFR, 93.153(b)]*

This criterion is shown to be satisfied by the information presented in Section B.3, Tables B-2 through B-5. That is, the reasonably foreseeable project emissions of NO_2, VOC, $PM_{2.5}$, and SO_2 would not exceed the General Conformity Rule *de minimis* levels. This conclusion is supported by the calculations attached to this analysis.

Based upon the conformity analyses results summarized in the previous sections, the proposed Federal action at Wright-Patterson AFB has been shown to meet the conformity criteria for consistency with the Ohio SIP requirements. The proposed Federal actions are therefore consistent with the objectives as set forth in Section 176(c) of the CAA, as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State and Local Implementation Plans, and said actions conform to the applicable SIP in accordance with the law.

REFERENCES

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APPENDIX B ATTACHMENT

PROPOSED EMISSIONS SPREADSHEETS

Aeromedical Evacuation Formal Training Unit	Total Emissions by Activity (tons/yr)						
	NOx	VOC	CO	PM	PM-10	PM-2.5	SO2
Flight Operations and Ground Support	29.50	2.54	38.08	0.80	0.80	0.76	2.64
Alternative A - Use Building 20840	NOx	VOC	CO	PM	PM-10	PM-2.5	SO2
AF Personnel Commuting and Transport	0.35	0.08	1.59	0.028	0.028	0.025	0.003
Renovation Commuting	0.008	0.002	0.05	0.0007	0.0007	0.0006	0.0001
Roadway Surface Emissions Renovation	0.00	0.000	0.00	0.9579	0.1916	0.0470	0.0000
Roadway Surface Emissions AF Personnel	0.00	0.00	0.00	21.76	4.35	1.07	0.00
Subtotal	0.35	0.08	1.65	22.75	4.57	1.14	0.00
Alternative A Total	29.85	2.62	39.73	23.54	5.37	1.90	2.64
Alternative B - Use Building 20434	NOx	VOC	CO	PM	PM-10	PM-2.5	SO2
AF Personnel Commuting and Transport	0.36	0.08	1.63	0.029	0.029	0.026	0.003
Renovation Commuting	0.029	0.006	0.197	0.003	0.003	0.002	0.0004
Roadway Surface Emissions Renovation	0.00	0.00	0.00	3.952	0.790	0.194	0.0000
Roadway Surface Emissions AF Personnel	0.00	0.00	0.00	22.13	4.43	1.09	0.00
Demo and Renovation Activities	1.20	0.17	0.39	0.06	0.06	0.06	0.09
Subtotal	1.59	0.26	2.22	26.18	5.31	1.37	0.09
Alternative B Total	31.09	2.80	40.30	26.98	6.11	2.12	2.73

Aircraft Engine Criteria Pollutant Emission Factors										
Aircraft Type and Engine	Activity	Fuel Flow Rate (lbs/hr)	Fuel Flow Rate (Mlb/min)	LTO TIME (minutes)	NOx (lb/Mlb)	VOC (lb/Mlb)	CO (lb/Mlb)	SO2 (lb/Mlb)	PM10 (lb/Mlb)	PM2.5 (lb/Mlb)
C-130J AE2100D3 (No Factors) Use T-56-A-9	Taxi Out	769.85	0.01283	9.2	7.45	2.15	5.61	1.40	0.15	0.14
	Takeoff	2,088.29	0.03480	0.4	1.17	0.41	2.47	1.40	0.31	0.28
	Climbout	1,745.68	0.02909	1.2	9.37	0.41	2.47	1.40	0.33	0.30
	Approach	967.08	0.01612	5.1	7.37	0.73	4.29	1.40	0.24	0.22
	Taxi In	769.85	0.01283	6.7	7.45	2.15	5.61	1.40	0.15	0.14
C-17 F117-PW-100	Taxi Out	1,213.99	0.02023	9.2	3.95	2.05	23.81	1.40	0.15	0.14
	Takeoff	14,110.81	0.23518	0.4	34.23	0.11	0.38	1.40	0.12	0.11
	Climbout	11,056.81	0.18428	1.2	29.95	0.11	0.38	1.40	0.19	0.17
	Approach	4,362.80	0.07271	5.1	13.00	0.29	1.25	1.40	0.16	0.14
	Taxi In	1,213.99	0.02023	6.7	3.95	2.05	23.81	1.40	0.15	0.14
KC-135 F108-CF-100	Taxi Out	1,248.90	0.02082	32.8	3.93	0.88	27.13	1.40	0.12	0.11
	Takeoff	6,520.51	0.10868	0.7	15.25	0.03	1.12	1.40	0.13	0.12
	Climbout	5,721.69	0.09536	2.5	13.50	0.03	1.34	1.40	0.13	0.12
	Approach	2,596.96	0.04328	5.2	6.94	0.04	6.38	1.40	0.11	0.10
	Taxi In	1,248.90	0.02082	14.9	3.93	0.88	27.13	1.40	0.12	0.11

Aircraft Auxiliary Power Unit Criteria Pollutant Emission Factors										
APU Model	Fuel Flow Rate (lbs/hr)	Fuel Flow Rate (Mlb/min)	LTO TIME (minutes)	LTO TIME (hours)	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO2 (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)
GTCP 85-71A	273.00	0.00455	90	1.5	0.82	0.03	2.52	0.21	0.13	0.12
331-259(G)	273.00	0.00455	90	1.5	2.55	0.11	1.11	0.27	0.13	0.12

Aircraft Emission Factors from Table 1-4 and the APU from Table 1-5 of December 2009 AFCEE Mobile Source Guide

Engine AE2100D3 does not have emission factors listed in the AFCEE Guide; Engine T-56-A-9 was substituted because it is used on C-130A and C-130D aircraft; and has emission factors listed in the AFCEE Mobile Source Guide.

SO2 emission factor (lb/hr) calculated from 0.07% S content (Table 2-11), 6.67 lb/gal JP-8 Density (Table 2-8), 124,000 Btu/gal JP-8 (Table 2-6), 7,000 Btu/hp-hr engine rating (Equation 2-5 of 12/2009 AFCEE Mobile Source Guide), and 2.0 molar ratio of SO2 to S.

Aircraft Engine Criteria Pollutant Emissions										
Aircraft Type and Engine	Activity	Sorties (LTOs)	Engine Number		NOx (ton/yr)	VOC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)	PM2.5 (ton/yr)
C-130J	Taxi Out	560	4		0.985	0.284	0.742	0.185	0.020	0.019
AE2100D3	Takeoff	560	4		0.018	0.006	0.039	0.022	0.005	0.004
(No Factors)	Climbout	560	4		0.366	0.016	0.097	0.055	0.013	0.012
Use	Approach	560	4		0.679	0.067	0.395	0.129	0.022	0.020
T-56-A-9	Taxi In	560	4		0.717	0.207	0.540	0.135	0.014	0.013
GTCP 85-71A	APU	560	1		0.344	0.013	1.058	0.088	0.055	0.050
	Totals	560			3.11	0.59	2.87	0.61	0.13	0.12
C-17	Taxi Out	560	4		0.824	0.427	4.964	0.292	0.031	0.029
F117-PW-100	Takeoff	560	4		3.606	0.012	0.040	0.148	0.013	0.012
	Climbout	560	4		7.418	0.027	0.094	0.347	0.047	0.042
	Approach	560	4		5.399	0.120	0.519	0.581	0.066	0.058
	Taxi In	560	4		0.600	0.311	3.615	0.213	0.023	0.021
331-259(G)	APU	560	1		1.071	0.046	0.466	0.113	0.055	0.050
	Totals	560			18.92	0.94	9.70	1.69	0.23	0.21
KC-135	Taxi Out	560	4		3.005	0.673	20.745	1.071	0.092	0.084
F108-CF-100	Takeoff	560	4		1.299	0.003	0.095	0.119	0.011	0.010
	Climbout	560	4		3.605	0.008	0.358	0.374	0.035	0.032
	Approach	560	4		1.749	0.010	1.608	0.353	0.028	0.025
	Taxi In	560	4		1.365	0.306	9.424	0.486	0.042	0.038
N/A	APU	560	0		0.000	0.000	0.000	0.000	0.000	0.000
	Totals	560			11.02	1.00	32.23	2.40	0.21	0.19

Note: The Total Number of sorties (LTO) consists of 480 sorties (LTOs) for class training operations plus 80 (LTOs) for initial arrival and final departures of the transient aircraft for the training (two planes, two separate occasions per class) [Personal communication with Major Artemus Armas (AMC A3/A3TM) 21 February 2012]

AGE (GSE) Equipment Assignments					
Aircraft Type	GSE Type	GSE Model	Operating Time per LTO (hr)	LTO Ops per Year	Time (hr/yr)
C-130J	Generator	A/M32A-86D	6	560	3360.00
	Start Cart	A/M32A-95	0.25	560	140.00
	Heater A/C	MA-3D	1	560	560.00
	Light Cart	NF-2	4	560	2240.00
	Air Compressor	MC-2A	4	560	2240.00
	Hydraulic Test Stand	MJ-2A-1	3	560	1680.00
C-17	Generator	A/M32A-86D	2	560	1120.00
	Start Cart	A/M32A-95	2	560	1120.00
	Heater A/C	MA-3D	1.5	560	840.00
	Light Cart	NF-2	1.5	560	840.00
	Air Compressor	MC-2A	0.66	560	369.60
	Pressure Tester	AF/M27M-1	0.5	560	280.00
	Cargo Loader	MJ-1B	1.5	560	840.00
KC-135	Generator	A/M32A-86D	6	560	3360.00
	Start Cart	A/M32A-95	0.25	560	140.00
	Heater A/C	MA-3D	1	560	560.00
	Light Cart	NF-2	4	560	2240.00
	Air Compressor	MC-2A	4	560	2240.00
	Hydraulic Test Stand	MJ-2A-1	3	560	1680.00

AGE (GSE) Criteria Pollutant Emission Factors									
AGE (GSE) Equipment	Model	Fuel Flow (gal/hr)	Average Power (hp)	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO2 (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)
Generator	A/M32A-86D	6.47000	148.0	7.97	0.20	1.52	0.08	0.091	0.0880
Start Cart	A/M32A-95	N/A	180.0	1.47	0.07	5.86	0.09	0.110	0.1070
Heater A/C	MA-3D	4.57000	110.0	0.64	0.28	0.06	0.06	0.145	0.1410
Light Cart	NF-2	N/A	18	0.11	0.01	0.08	0.01	0.010	0.0097
Air Compressor	MC-2A	3.3	52	1.29	0.06	0.64	0.03	0.145	0.1410
Hydraulic Test Stand	MJ-2A-1	N/A	97.0	3.85	0.19	2.46	0.05	0.083	0.0760
Pressure Tester	AF/M27M-1	1.78000	30.0	0.18	0.28	12.26	0.02	0.145	0.1410
Cargo Loader	MJ-1B	N/A	97.0	4.78	3.04	3.04	0.05	0.800	0.7760

AGE (GSE) Emission Factors from Table 2-2 of 12/2009 AFCEE Mobile Source Guide

SO2 emission factor (lb/hr) calculated from 0.07% S content (Table 2-11), 6.67 lb/gal JP-8 Density (Table 2-8), 124,000 Btu/gal JP-8 (Table 2-6), 7,000 Btu/hp-hr engine rating (Equation 2-5 of 12/2009 AFCEE Mobile Source Guide), and 2.0 molar ratio of SO2 to S.

AGE (GSE) Criteria Pollutant Emissions										
Aircraft	AGE (GSE) Equipment	Model	LTO Ops (Ops/yr)	Total Operating Time (hr/yr)	NOx (ton/yr)	VOC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)	PM2.5 (ton/yr)
C-130J	Generator	A/M32A-86D	560	3,360	13.39	0.34	2.55	0.13	0.15	0.15
	Start Cart	A/M32A-95	560	140	0.10	0.00	0.41	0.01	0.01	0.01
	Heater A/C	MA-3D	560	560	0.18	0.08	0.02	0.02	0.04	0.04
	Light Cart	NF-2	560	2,240	0.12	0.01	0.09	0.01	0.01	0.01
	Air Compressor	MC-2A	560	2,240	1.44	0.07	0.72	0.03	0.16	0.16
	Hydraulic Test Stand	MJ-2A-1	560	1,680	3.23	0.16	2.07	0.04	0.07	0.06
	Totals				18.47	0.66	5.85	0.24	0.44	0.43
C-17	Generator	A/M32A-86D	560	1,120	4.46	0.11	0.85	0.04	0.05	0.05
	Start Cart	A/M32A-95	560	1,120	0.82	0.04	3.28	0.05	0.06	0.06
	Heater A/C	MA-3D	560	840	0.27	0.12	0.03	0.02	0.06	0.06
	Light Cart	NF-2	560	840	0.05	0.00	0.03	0.00	0.00	0.00
	Air Compressor	MC-2A	560	370	0.24	0.01	0.12	0.01	0.03	0.03
	Pressure Tester	AF/M27M-1	560	280	0.03	0.04	1.72	0.00	0.02	0.02
	Cargo Loader	MJ-1B	560	840	2.01	1.28	1.28	0.02	0.34	0.33
	Totals				7.87	1.60	7.30	0.15	0.56	0.54
KC-135	Generator	A/M32A-86D	560	3,360	13.39	0.34	2.55	0.13	0.15	0.15
	Start Cart	A/M32A-95	560	140	0.10	0.00	0.41	0.01	0.01	0.01
	Heater A/C	MA-3D	560	560	0.18	0.08	0.02	0.02	0.04	0.04
	Light Cart	NF-2	560	2,240	0.12	0.01	0.09	0.01	0.01	0.01
	Air Compressor	MC-2A	560	2,240	1.44	0.07	0.72	0.03	0.16	0.16
	Hydraulic Test Stand	MJ-2A-1	560	1,680	3.23	0.16	2.07	0.04	0.07	0.06
	Totals				18.47	0.66	5.85	0.24	0.44	0.43

Flight Operations Worst-case Comparison Criteria Pollutant Emission Summary								
Aircraft Type	Emission Source	Sorties (LTOs)	NOx (ton/yr)	VOC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)	PM2.5 (ton/yr)
C-130J	Engine	560	3.11	0.59	2.87	0.61	0.13	0.12
	AGE		18.47	0.66	5.85	0.24	0.44	0.43
	Total		21.58	1.25	8.72	0.85	0.57	0.55
C-17	Engine	560	18.92	0.94	9.70	1.69	0.23	0.21
	AGE		7.87	1.60	7.30	0.15	0.56	0.54
	Total		26.79	2.54	17.00	1.85	0.80	0.76
KC-135	Engine	560	11.02	1.00	32.23	2.40	0.21	0.19
	AGE		18.47	0.66	5.85	0.24	0.44	0.43
	Total		29.50	1.66	38.08	2.64	0.65	0.62
Worst-case per Pollutant Scenario			29.50	2.54	38.08	2.64	0.80	0.76

Step 1 Estimate the Vehicle Miles Traveled (VMT) by Vehicle Class

For this analysis, it is assumed that the commuter fleet corresponding to the construction workers will reflect the passenger vehicle fleet on the roads in the vicinity of Wright-Patterson AFB. The passenger vehicle VMT data for Green County County Ohio, were derived from the US EPA Mobile Source MOVES 2010a Model for Calendar Year 2012, Greene County Ohio

The following average construction worker counts have been assumed for this analysis:

Area Description	Number of Personnel	Class Days
Alternative A		
Class Instructors and Participants		
Increase in Permanent Instructors	31	250
Students per Class	20	27
Total	**51**	
Alternative B		
Class Instructors and Participants		
Increase in Permanent Instructors	30	250
Students per Class	20	27
Transfer between 20840 and 20434	20	27
Total	**70**	

Greene County Passenger Vehicle VMT Mix

VClassId	VMT	Vehicle Class	Fuel Type	Mix
11	3,326,549	Motorcycle	Gasoline	0.56%
21	389,680,409	Passenger Car	Gasoline	65.53%
31	196,649,137	Passenger Truck	Gasoline	33.07%
11	0	Motorcycle	Diesel	0.00%
21	1,217,453	Passenger Car	Diesel	0.20%
31	3,820,530	Passenger Truck	Diesel	0.64%
Total (mi/yr)	**594,694,078**			**100.00%**

Source for VMT Mix: MOVES2010a for Greene County Ohio, 2012 Calendar Year

Assumptions Used To Estimate Mileage

1	Riders per vehicle
30	Miles avg. commute round trip
50%	Vehicles do daytime errands/lunch
10	Miles avg. errand/lunch round trip
10	Students per Passenger Van
20	Classes per Year
9	Mileage to/from (20840) accommodations
12	Airfield Training Days per Class
18	Mileage to/from (20840) airfield
2	Mileage to/from 20840 and 20434

Step 2 Select the Appropriate Air Pollutant Emission Factors (grams per mile) for the POV Fleet

Emission Factors

Emission factors are taken from the U.S. EPA MOVES2010a emissions model, as compiled for 2012 Calendar Year

All vehicle emissions are calculated assuming a weighted average by distance traveled of all possible model years.

Note that PM10 and PM 2.5 emission factors include both exhaust and "fugitive" emissions (paved road, brake & tire dust, etc.).

Emission for the passenger van are represented by the MOVES2010a vehicle class 32 diesel light commercial truck & presented separately in the tables below.

Emission Factors in g/mi from MOVES2010a for all Model Year Vehicles in Greene County Ohio CY2012.

	Moves2010a Greene County g/mi - 2012					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	0.60	1.02	15.35	0.006	0.043	0.037
(21) Gasoline	0.34	0.06	2.60	0.006	0.036	0.030
(31) Gasoline	0.76	0.15	4.87	0.008	0.055	0.048
(11) Diesel	N/A	N/A	N/A	N/A	N/A	N/A
(21) Diesel	0.83	0.04	0.45	0.003	0.051	0.045
(31) Diesel	3.27	0.47	2.28	0.006	0.246	0.233
(32) Diesel	3.94	0.60	2.84	0.006	0.300	0.285

Step 3 Multiply the Emission Factors Times the Annual Vehicle Miles Traveled for Each Vehicle Class

Class Instructors and Participants	**Increase in Permanent Instructors**					
	Personnel Commute Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	9.96E-04	1.70E-03	2.57E-02	9.22E-06	7.14E-05	6.20E-05
(21) Gasoline	6.66E-02	1.22E-02	5.09E-01	1.16E-03	7.11E-03	5.93E-03
(31) Gasoline	7.49E-02	1.51E-02	4.81E-01	7.94E-04	5.40E-03	4.76E-03
(11) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(21) Diesel	5.05E-04	2.36E-05	2.76E-04	2.02E-06	3.13E-05	2.77E-05
(31) Diesel	6.27E-03	8.94E-04	4.37E-03	1.11E-05	4.73E-04	4.48E-04
(32) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	**1.49E-01**	**2.99E-02**	**1.02E+00**	**1.98E-03**	**1.31E-02**	**1.12E-02**

Class Instructors and Participants	**Students per Class**					
	Personnel Transport Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	1.21E-02	2.06E-02	3.11E-01	1.12E-04	8.64E-04	7.51E-04
(21) Gasoline	6.87E-03	1.26E-03	5.25E-02	1.20E-04	7.34E-04	6.13E-04
(31) Gasoline	1.53E-02	3.09E-03	9.85E-02	1.63E-04	1.11E-03	9.74E-04
(11) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(21) Diesel	1.67E-02	7.79E-04	9.13E-03	6.68E-05	1.04E-03	9.14E-04
(31) Diesel	6.61E-02	9.42E-03	4.61E-02	1.17E-04	4.98E-03	4.72E-03
(32) Diesel	7.97E-02	1.22E-02	5.75E-02	1.18E-04	6.06E-03	5.77E-03
Total	**1.97E-01**	**4.73E-02**	**5.75E-01**	**6.96E-04**	**1.48E-02**	**1.37E-02**

Alternative A	**Total Emissions**					
	Personnel Commute and Transport Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
Total	**0.346**	**0.077**	**1.595**	**0.003**	**0.028**	**0.0250**

Class Instructors and Participants	Increase in Permanent Instructors					
	Personnel Commute Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	9.64E-04	1.65E-03	2.48E-02	8.92E-06	6.91E-05	6.00E-05
(21) Gasoline	6.44E-02	1.18E-02	4.92E-01	1.13E-03	6.88E-03	5.74E-03
(31) Gasoline	7.25E-02	1.46E-02	4.66E-01	7.69E-04	5.22E-03	4.60E-03
(11) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(21) Diesel	4.89E-04	2.28E-05	2.67E-04	1.96E-06	3.03E-05	2.68E-05
(31) Diesel	6.07E-03	8.65E-04	4.23E-03	1.07E-05	4.58E-04	4.34E-04
(32) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	**1.44E-01**	**2.90E-02**	**9.87E-01**	**1.92E-03**	**1.27E-02**	**1.09E-02**

Class Instructors and Participants	Students per Class					
	Personnel Transport Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	1.21E-02	2.06E-02	3.11E-01	1.12E-04	8.64E-04	7.51E-04
(21) Gasoline	6.87E-03	1.26E-03	5.25E-02	1.20E-04	7.34E-04	6.13E-04
(31) Gasoline	1.53E-02	3.09E-03	9.85E-02	1.63E-04	1.11E-03	9.74E-04
(11) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(21) Diesel	1.67E-02	7.79E-04	9.13E-03	6.68E-05	1.04E-03	9.14E-04
(31) Diesel	6.61E-02	9.42E-03	4.61E-02	1.17E-04	4.98E-03	4.72E-03
(32) Diesel	7.97E-02	1.22E-02	5.75E-02	1.18E-04	6.06E-03	5.77E-03
Total	**1.97E-01**	**4.73E-02**	**5.75E-01**	**6.96E-04**	**1.48E-02**	**1.37E-02**

Class Instructors and Participants	Transfer between 20840 and 20434					
	Personnel Transport Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	1.42E-03	2.42E-03	3.66E-02	1.31E-05	1.02E-04	8.83E-05
(21) Gasoline	8.09E-04	1.48E-04	6.18E-03	1.41E-05	8.64E-05	7.21E-05
(31) Gasoline	1.80E-03	3.64E-04	1.16E-02	1.91E-05	1.30E-04	1.15E-04
(11) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(21) Diesel	1.97E-03	9.17E-05	1.07E-03	7.86E-06	1.22E-04	1.08E-04
(31) Diesel	7.77E-03	1.11E-03	5.42E-03	1.37E-05	5.86E-04	5.56E-04
(32) Diesel	9.37E-03	1.43E-03	6.77E-03	1.39E-05	7.13E-04	6.79E-04
Total	**2.31E-02**	**5.56E-03**	**6.76E-02**	**8.19E-05**	**1.74E-03**	**1.62E-03**

Alternative B	Total Emissions					
	Personnel Commute and Transport Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
Total	**0.364**	**0.082**	**1.629**	**0.0027**	**0.0292**	**0.0262**

Step 1 Estimate the Vehicle Miles Traveled (VMT) by Vehicle Class

For this analysis, it is assumed that the commuter fleet corresponding to the construction workers will reflect the passenger vehicle fleet on the roads in the vicinity of Wright-Patterson AFB. The passenger care VMT data for Green County County Ohio, were derived from the US EPA Mobile Source MOVES 2010a Model for Calendar Year 2012, Greene County Ohio

The following average construction worker counts have been assumed for this analysis:

Area Description	Number of Workers	Working Days
Alternative A		
Building 20840		
Interior Redesign	20	20
Total	**20**	
Alternative B		
Building 20434		
Interior Renovation	30	50
Total	**30**	

Greene County Passenger Vehicle VMT Mix

VClassId	VMT	Vehicle Class	Fuel Type	Mix
11	3,326,549	Motorcycle	Gasoline	0.56%
21	389,680,409	Passenger Car	Gasoline	65.53%
31	196,649,137	Passenger Truck	Gasoline	33.07%
11	0	Motorcycle	Diesel	0.00%
21	1,217,453	Passenger Car	Diesel	0.20%
31	3,820,530	Passenger Truck	Diesel	0.64%
Total (mi/yr)	**594,694,078**			**100.00%**

Source for VMT Mix: MOVES2010a for Greene County Ohio, 2012 Calendar Year

Assumptions Used To Estimate Mileage

1	Riders per vehicle
30	Miles avg. commute round trip
50%	Vehicles do daytime errands/lunch
10	Miles avg. errand/lunch round trip

Step 2 Select the Appropriate Air Pollutant Emission Factors (grams per mile) for the POV Fleet

Emission Factors

Emission factors are taken from the U.S. EPA MOVES2010a emissions model, as compiled for 2012 Calendar Year

All vehicle emissions are calculated assuming a weighted average by distance traveled of all possible model years.

Note that PM10 and PM 2.5 emission factors include both exhaust and "fugitive" emissions (paved road, brake & tire dust, etc.).

Emission Factors in g/mi from MOVES2010a for all Model Year Vehicles in Greene County Ohio CY2012.

	Moves2010a Greene County g/mi - 2012					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	0.60	1.02	15.35	0.006	0.043	0.037
(21) Gasoline	0.34	0.06	2.60	0.006	0.036	0.030
(31) Gasoline	0.76	0.15	4.87	0.008	0.055	0.048
(11) Diesel	N/A	N/A	N/A	N/A	N/A	N/A
(21) Diesel	0.83	0.04	0.45	0.003	0.051	0.045
(31) Diesel	3.27	0.47	2.28	0.006	0.246	0.233

Step 3 Multiply the Emission Factors Times the Annual Vehicle Miles Traveled for Each Vehicle Class

Building 20840	**Interior Redesign**					
	Construction Commute Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	5.14E-05	8.78E-05	1.33E-03	4.76E-07	3.69E-06	3.20E-06
(21) Gasoline	3.44E-03	6.29E-04	2.63E-02	6.00E-05	3.67E-04	3.06E-04
(31) Gasoline	3.87E-03	7.80E-04	2.48E-02	4.10E-05	2.79E-04	2.45E-04
(11) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(21) Diesel	2.61E-05	1.22E-06	1.42E-05	1.04E-07	1.62E-06	1.43E-06
(31) Diesel	3.24E-04	4.61E-05	2.26E-04	5.72E-07	2.44E-05	2.31E-05
Total	**7.70E-03**	**1.54E-03**	**5.27E-02**	**1.02E-04**	**6.75E-04**	**5.79E-04**

Alternative A						
	Construction Commute Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
Total	**0.008**	**0.002**	**0.053**	**0.0001**	**0.0007**	**0.0006**

Building 20434	**Interior Renovation**					
	Construction Commute Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
(11) Gasoline	1.93E-04	3.29E-04	4.97E-03	1.78E-06	1.38E-05	1.20E-05
(21) Gasoline	1.29E-02	2.36E-03	9.84E-02	2.25E-04	1.38E-03	1.15E-03
(31) Gasoline	1.45E-02	2.93E-03	9.32E-02	1.54E-04	1.04E-03	9.20E-04
(11) Diesel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(21) Diesel	9.78E-05	4.56E-06	5.34E-05	3.91E-07	6.06E-06	5.35E-06
(31) Diesel	1.21E-03	1.73E-04	8.46E-04	2.14E-06	9.15E-05	8.67E-05
Total	**2.89E-02**	**5.79E-03**	**1.97E-01**	**3.83E-04**	**2.53E-03**	**2.17E-03**

Alternative B	**Total Emissions**					
	Construction Commute Emissions by Vehicle Class (tons/yr)					
	NOx	VOC	CO	SO2	PM10	PM2.5
Total	**0.029**	**0.006**	**0.197**	**0.0004**	**0.0025**	**0.0022**

ROADWAY SURFACE PARTICULATE EMISSIONS

Description of Roadway Scenarios				k (TSP)	k (PM-10)	k (PM2.5)	sL	W	TSP Emission Factor lbs/VMT	PM-10 Emission Factor lbs/VMT	PM-2.5 Emission Factor lbs/VMT	VMT/yr
Alternative A												
New Personnel Commuting				0.011	0.0022	0.00054	8.2	2	0.14	0.03	0.01	271,250
Transient Student Transportation				0.011	0.0022	0.00054	8.2	5	0.35	0.07	0.02	18,360
Construction Commuting				0.011	0.0022	0.00054	8.2	2	0.14	0.03	0.01	14,000
Totals												
Alternative B												
New Personnel Commuting				0.011	0.0022	0.00054	8.2	2	0.14	0.03	0.01	271,250
Transient Student Transportation				0.011	0.0022	0.00054	8.2	5	0.35	0.07	0.02	20,520
Construction Commuting				0.011	0.0022	0.00054	8.2	2	0.14	0.03	0.01	52,500
Construction Material and Equipment Deliveries				0.011	0.0022	0.00054	8.2	25	1.80	0.36	0.09	400
Totals												

Description of Roadway Scenarios	Uncontrolled TSP Emissions		Control Efficiency	Controlled TSP Emissions	Uncontrolled PM-10 Emissions		Control Efficiency	Controlled PM-10 Emissions	Uncontrolled PM-2.5 Emissions		Control Efficiency	Controlled PM-2.5 Emissions
	(lb/yr)	(ton/yr)	(%)	(ton/yr)	(lb/yr)	(ton/yr)	(%)	(ton/yr)	(lb/yr)	(ton/yr)	(%)	(ton/yr)
Alternative A												
New Personnel Commuting	37,120	18.56	0%	18.56	7,424	3.71	0%	3.71	1,822	0.91	0%	0.91
Transient Student Transportation	6,397	3.20	0%	3.20	1,279	0.64	0%	0.64	314	0.16	0%	0.16
Construction Commuting	1,916	0.96	0%	0.96	383	0.19	0%	0.19	94	0.05	0%	0.05
Totals	45,433	22.72		22.72	9,087	4.54		4.54	2,230	1.12		1.12
Alternative B												
New Personnel Commuting	37,120	18.56	0%	18.56	7,424	3.71	0%	3.71	1,822	0.91	0%	0.91
Transient Student Transportation	7,150	3.58	0%	3.58	1,430	0.72	0%	0.72	351	0.18	0%	0.18
Construction Commuting	7,184	3.59	0%	3.59	1,437	0.72	0%	0.72	353	0.18	0%	0.18
Construction Material and Equipment Deliveries	720	0.36	0%	0.36	144	0.07	0%	0.07	35	0.02	0%	0.02
Totals	52,174	26.09		26.09	10,435	5.22		5.22	2,561	1.28		1.28

NOTES:

Emission estimation equations from AP-42 Section 13.2.1 (11/06), Equation (2) for industrial paved roads. Variable definitions:

k = base emission factor for particle size Particulate Matter/PM30 and PM10

W = average weight (tons) of vehicles traveling the road

sL = road surface silt loading for particle size range of interest (assumed similar to a quarry).

P = number of days with at least 0.01 inches of rain (140 from Figure 13.2.1-2)

N = 365 days per year for annual emissions

Control efficiencies of 0% calculated for all locations.

Construction Material Deliveries and/or refuse removal trucks are assumed to occur twice per week for 20 weeks @ 10 miles round trip.

Calculation of VOC Emissions Due to Site Surface Coating Activities (Uncontrolled).

Input Parameters and Assumptions

All paint is restricted to maximum VOC

150	g/L of VOC
0.33	lb/L of VOC
1.25	lb/gal of VOC

Alternative A

Operation	Foot Print scf	Stories floors	Total Area (ft^2)	Coats	Paint Coverage (ft^2/gal)	Max. VOC (lb)
Paint Interior Walls	0	3	0	0	350	0.00
Primer Interior Walls	0	3	0	0	150	0.00
					Total (lb)	**0.00**
					Total (tons)	**0.000**

Alternative B

Operation	Foot Print scf	Stories floors	Total Area (ft^2)	Coats	Paint Coverage (ft^2/gal)	Max. VOC (lb)
Paint Interior Walls	4900	3	7560	3	350	81.12
Primer Interior Walls	4900	3	7560	2	150	126.19
					Total (lb)	**207.31**
					Total (tons)	**0.104**

Resources:

Dimensions: Based on estimated footprints for each construction project. Estimates were made from Sections 2.3.1 & 2.4.1 of the DOPAA.

Paint Coverage Rate is from Sherwin Williams Product Data Sheet for Surface Coating for interior/exterior latex paint, surface coating of all surface enamel.

Renovation Activities

Equipment	Load Factor (%)	Operating Hours hours	Duration days	HP hp	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr
Diesel Truck	0.59	8	Varies	1500	0.29	1.66	5.11	0.26	0.25	0.37

Notes:

Emission factors from Table 3-1 of Air Emissions Factor Guide for Air Force Mobile Sources, December 2009.

Assumed Values for Operating Hours and specific HP of equipment based on engineering judgment.

Alternative B Demolition and Renovation Activities

Equipment		Duration Days	VOC	CO	NOx	PM-10	PM-2.5	SO2
Diesel (Refuse) Truck		10	45.26	259.10	797.59	40.58	39.02	57.75
Diesel (Material Delivery) Truck		20	90.53	518.20	1595.19	81.16	78.04	115.50
Total Emissions (lb)			**135.79**	**777.30**	**2392.78**	**121.75**	**117.06**	**173.25**
Total Emissions (ton)			**0.07**	**0.39**	**1.20**	**0.06**	**0.06**	**0.09**

Appendix C

Noise Terminology and Analysis Methodology

This Appendix presents a detailed discussion of noise and its effects on people and the environment. An assessment of aircraft noise requires a general understanding of how sound is measured and how it affects people in the natural environment. The purpose of this appendix is to address public concerns regarding aircraft noise impacts.

Section C.1 is a general discussion on the properties of noise. Section C.2 summarizes the noise metrics discussed throughout this Environmental Assessment (EA). Section C.3 provides Federal land use compatibility guidelines that are used in applying aircraft noise impacts to land use planning in the airport environment.

C.1 GENERAL

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Of course, aircraft are not the only source of noise in an urban or suburban surrounding, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identifiable to those affected by their noise, and typically are singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon, and consists of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant or unpleasant depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The measurement and human perception of sound involves two basic physical characteristics, intensity and frequency. The intensity is a measure of the strength or amplitude of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder is the perception of that sound. The second important physical characteristic is sound frequency which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

The loudest sounds which can be detected comfortably by the human ear have intensities which are 1,000,000,000,000 times larger than those of sounds which can just be detected. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

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

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

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 what we are really doing when we add decibel values is 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.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain Day-Night Average Sound Level (DNL). Because of the logarithmic units, the time-average sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

The minimum change in the time-average sound level of individual events which an average human ear can detect 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.

Sound frequency is pitch measured in terms of hertz (Hz). The normal human ear can detect sounds which range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. To account for the varied frequency sensitivity of people, we use the A-weighted scale that approximates the average, healthy human ear. The A-weighting de-emphasizes the low and high frequency portion of the noise signal and emphasizes the mid-frequency portion. Sound levels measured using A-weighting are most properly called A-weighted sound levels while sound levels measured without any frequency weighting are most properly called sound levels. However, since most environmental impact analysis documents deal only with A-weighted sound levels, the adjective "A-weighted" is often omitted, and A-weighted sound levels are referred to simply as sound levels. In some instances, the author will indicate that the levels have been A-weighted by using the abbreviation dBA or dB(A), rather than the abbreviation dB, for decibel. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms "sound level" and "A-weighted sound level" or by the units dB, dBA, and dB(A). The A-weighting function de-emphasizes higher and especially lower frequencies to which humans are less sensitive. Because the A-weighting is closely related to human hearing characteristics, it is appropriate to use A-weighted sound levels when assessing potential noise effects on humans and many terrestrial wildlife species. In this document, all sound levels are A-weighted and are reported in dB.

Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common: 1 second and 1/8 of a second. A measured

sound level averaged over 1 second is called a slow response sound level; one averaged over 1/8 of a second is called a fast response sound level. Most environmental noise studies use slow response measurements, and the adjective "slow response" is usually omitted. It is easy to understand why the proper descriptor "slow response A-weighted sound level" is usually shortened to "sound level" in environmental impact analysis documents.

C.2 NOISE METRICS

A "metric" is defined as something "of, involving, or used in measurement." As used in environmental noise analyses, a metric refers to the unit or quantity that measures or represents the effect of noise on people. Noise measurements typically have involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics. Recently, however, various Federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analyses documents, and both the Department of Defense (DOD) and the Federal Aviation Administration (FAA) have specified those which should be used for Federal aviation noise assessments. These metrics are as follows.

C.2.1 Maximum Sound Level

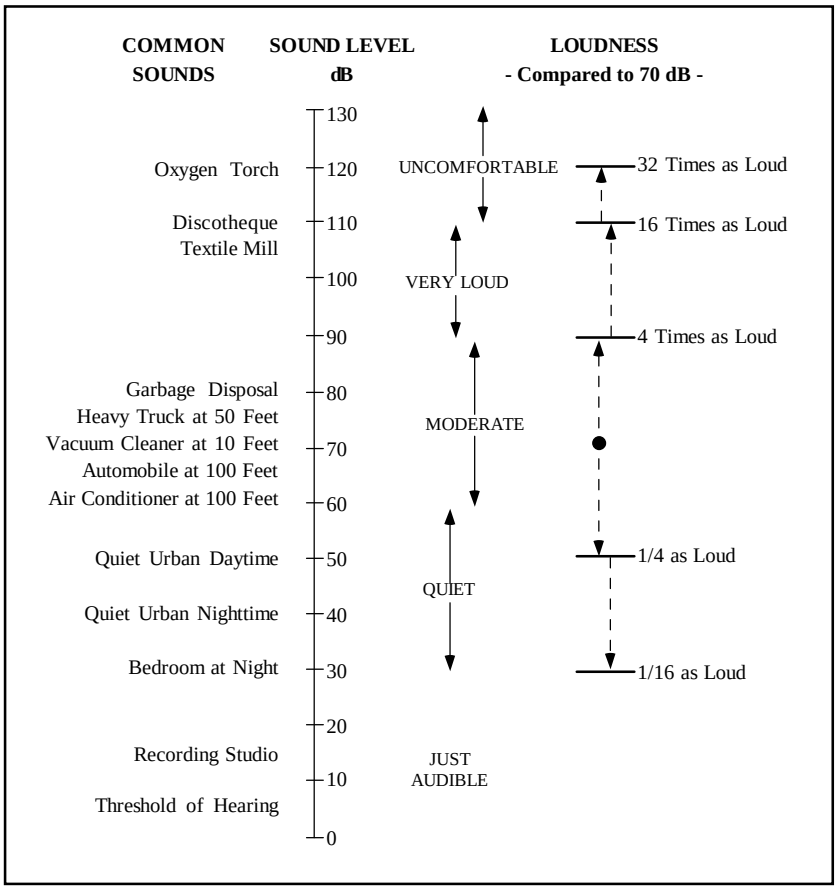
The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, L_{max}, or L_{Amax}. The typical A-weighted levels of common sounds are shown in Figure C-1. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

C.2.2 Sound Exposure Level

Individual time-varying noise events have two main characteristics: (1) a sound level which changes throughout the event, and (2) 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 LAE) combines both of these characteristics into a single metric.

Sound exposure level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the SEL of an overflight is usually greater than the maximum sound level of the overflight.

Sound exposure level is a composite metric which represents both the intensity of a sound and its duration. 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 A-weighted sound levels expressed in dBs, there is sometimes confusion between the two, so the specific metric used should be clearly stated.



Source: Harris 1979

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

Day-Night Average Sound Level

Time-average sound levels are the measurements of sound levels which are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

For the evaluation of community noise effects, and particularly aircraft noise effects, the day-night average sound level (abbreviated DNL or L_{dn}) is used. Day-night average sound level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-dB adjustment added to those noise events which take place between 10:00 p.m. and 7:00 a.m. (local time) the following morning. This 10 dB "penalty" represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

Ignoring the 10 dB nighttime adjustment for the moment, DNL may be thought of as the continuous A-weighted sound level which would be present if all of the variations in sound level which occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

DNL provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels which occur during the day. For example, a DNL of 65 dB could result from a very few noisy events, or a large number of quieter events.

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. Scientific studies and social surveys which have been conducted to appraise community annoyance to all types of environmental noise have found the DNL to be the best measure of that annoyance. Its use is endorsed by the scientific community (American National Standards Institute [ANSI] 1980, 1988; U.S. Environmental Protection Agency [USEPA] 1974; Federal Interagency Committee on Urban Noise [FICUN] 1980; Federal Interagency Committee on Noise [FICON] 1992).

There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of DNL. This is illustrated in Figure C-2, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in DNL.

Figure C-2 is taken from Schultz (1978) and shows the original curve fit. A more recent study has reaffirmed this relationship (Fidell et al. 1991). Figure C-3 shows an updated form of the curve fit in comparison with the original (Finegold et al. 1992). 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 which influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.

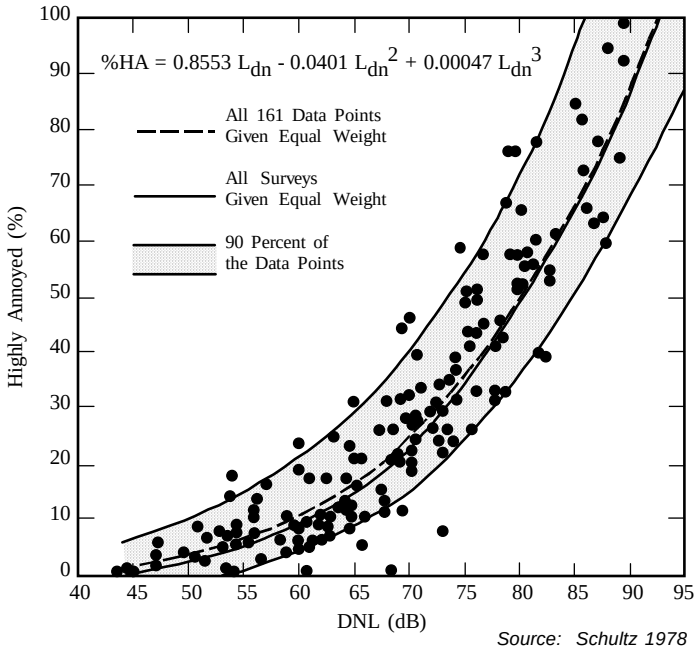
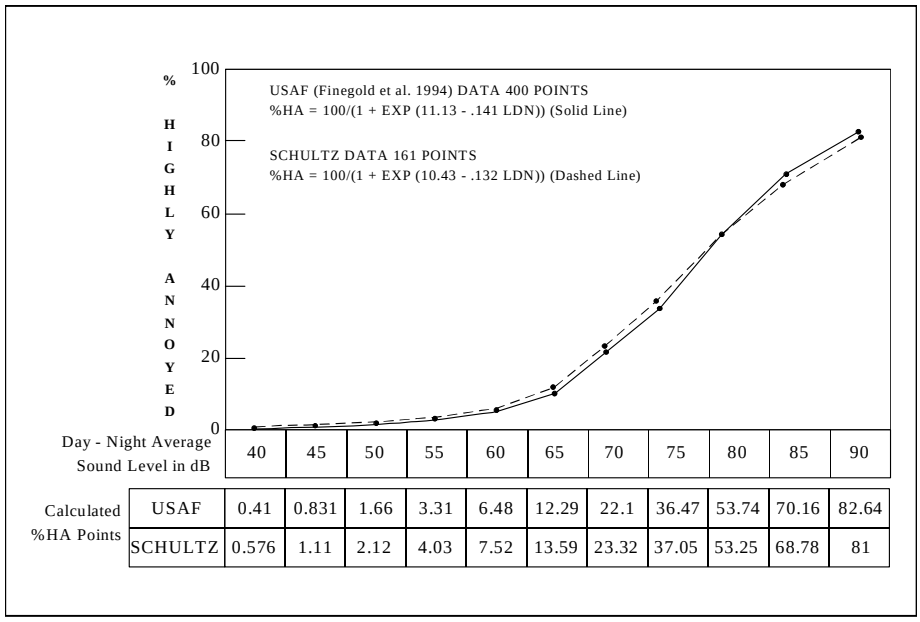


Figure C-2. Community Surveys of Noise Annoyance



Day - Night Average Sound Level in dB		40	45	50	55	60	65	70	75	80	85	90
Calculated %HA Points	USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
	SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Sources: Schultz 1978 and Finegold et al. 1994

Figure C-3. Response of Communities to Noise and Comparison of Original Schultz 1978 and Current USAF Curve Fits

This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. A National Aeronautics and Space Administration (NASA) study reported the reactions of individuals in a community to daily helicopter overflights, ranging from 1 to 32 per day (Fields and Powell 1985). The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of DNL has been criticized recently as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of DNL. One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to “meaningless” time-average sound levels.

Time-average noise metric, such as DNL, takes into account both the noise levels of all individual events which occur during a 24-hour period and the number of times those events occur. As described briefly above, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs in daytime during a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.5 dB. Assume, as a second example that 10 such 30-second overflights occur in daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of events. This is the basic concept of a time-average sound metric, and specifically the DNL.

C.3 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 degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL. In June 1980, an ad hoc FICUN published guidelines for considering noise in land use planning (FICUN 1980). These guidelines related DNL to compatible land uses in urban areas. The committee was composed of representatives from the DOD, Department of Transportation, Department of Housing and Urban Development; USEPA; and the Veterans Administration. Since the issuance of these guidelines, Federal agencies have generally adopted these guidelines to make recommendations to the local communities on land use compatibilities.

The FAA included the committee's guidelines in the Federal Aviation Regulations (USDOT 1984). These guidelines are reprinted in Table C-1, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (see Notes in Table C-1), they provide the best means for evaluating noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL (L_{dn} 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 1990, the FICON was formed to review the manner in which aviation noise effects are assessed and presented. This group released its report in 1992 and reaffirmed the use of DNL as the best metric for this purpose (FICON 1992).

Analyses of aircraft noise impacts and compatible land uses around DOD facilities are normally made using NOISEMAP (Moulton 1992). This computer-based program calculates DNL at many points on the ground around an airfield and draws contours of equal levels for overlay onto land-use maps of the same scale. The program mathematically calculates the DNL of all aircraft operations for a 24-hour period, taking into consideration the number and types of aircraft, their flight paths and engine thrust settings, and the time of day (daytime or nighttime) that each operation occurs.

Day-night average sound levels may also be measured directly around an airfield, rather than calculated with NOISEMAP; however, the direct measurement of annualized DNL is difficult and costly since it requires year-round monitoring or careful seasonal sampling. NOISEMAP provides an accurate projection of aircraft noise around airfields.

NOISEMAP also has the flexibility of calculating sound levels at any specified ground location so that noise levels at representative points under flight paths can be ascertained. NOISEMAP is most accurate for comparing "before and after" noise impacts which would result from proposed airfield changes or alternative noise control actions, so long as the various impacts are calculated in a consistent manner.

Table C-1. Land Use Compatibility Guidelines with Yearly

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVELS IN DECIBELS					
	BELOW 65	65-70	70-75	75-80	80-85	OVER 85
Residential						
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*
Public Use						
Schools	*Y*	*N(1)*	*N(1)*	*N*	*N*	*N*
Hospitals & nursing homes	*Y*	*25*	*30*	*N*	*N*	*N*
Churches, auditoria, & 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*
Commercial Use						
Offices, business, & professional	*Y*	*Y*	*25*	*30*	*N*	*N*
Wholesale & 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*
Manufacturing and Production						
Manufacturing, general	*Y*	*Y*	*Y(2)*	*Y(3)*	*Y(4)*	*N*
Photographic & optical	*Y*	*Y*	*25*	*30*	*N*	*N*
Agriculture (except livestock) & forestry	*Y*	*Y(6)*	*Y(7)*	*Y(8)*	*Y(8)*	*Y(8)*
Livestock farming & breeding	*Y*	*Y(6)*	*Y(7)*	*N*	*N*	*N*
Mining & fishing, resource production & extraction	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*
Recreational						
Outdoor sports arenas & spectator sports	*Y*	*Y(5)*	*Y(5)*	*N*	*N*	*N*
Outdoor music shells, amphitheaters	*Y*	*N*	*N*	*N*	*N*	*N*
Nature exhibits & zoos	*Y*	*Y*	*N*	*N*	*N*	*N*
Amusements, parks, resorts, & camps	*Y*	*Y*	*Y*	*N*	*N*	*N*
Golf courses, riding stables, & water recreation	*Y*	*Y*	*25*	*30*	*N*	*N*

Key:
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 or 30 = 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:
(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 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 often are 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 of 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 of 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 of 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 level is low.
(5) Land-use compatible, provided special sound reinforcement systems are installed.
(6) Residential buildings require an NLR of 25 dB.
(7) Residential buildings require an NLR of 30 dB.
(8) Residential buildings not permitted.

Source: FAA 1985 and USDOT 1984

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